Profiling Higher Education Institutions

Case Studies from Eastern and Southern Africa

A Report to RUFORUM and CTA by: | Batte Richard and Wanzala Sylvia.

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Acknowledgements

The consultants would like to thank the many individuals who contributed to this study. Many are listed in the contact list and we are grateful for the time they gave to team members. The Technical Centre for Agricultural and Rural Cooperation (CTA) for funding the study and entrusting us young professionals, CTA, FARA, ANAFE and RUFORUM for promoting excellence among youth especially women and Universities for helping us with the required information.

The Dean, Dr. Daniel Rwakazambuga at the National University of Rwanda (NUR), Ms. Vwamariya Veneranda, Mr. Innocent Nzeyimana, Ms. Beatrice Uwumukiza at NUR were not only a source of information but also participated in organizing meetings with students and staff. The Dean, Faculty of Agriculture, Makerere University, Prof. Samuel Kyamanywa for bothering with the endless survey tool. Prof. Seth F.O. Owido, the Deputy Registrar (Academic Affairs), , Prof. Alexander Kahi, Chairman Department of Animal Science, Prof. Robert Obura Kariuki, the Director Graduate School, Prof. Onyango Christopher and Mr. Calvins Odhiambo Oliech at Egerton University, Kenya for showing us the way through despite the numerous cob webs encountered in the system.

Dr. Judith Lungu the Dean, College Agricultural Science, University of Zambia, Dr. Charles Mutisi, The Dean, Faculty of Agriculture, University of Zimbabwe and The Graduate student at Bunda College of Agriculture, University of Malawi for facilitating data collection in southern Africa and for making sure that the filled surveyed tools reached RUFORUM Secretariat in good order.

We are also indebted to the Staff of RUFORUM the Regional Coordinator, Prof. Adipala Ekwamu for the trust he had in us and for the ideas advanced during the preliminary discussions and Dr. Washington Ochola who worked with us closely to make sure that the survey tools were suitable for data collection.

Errors you come across and any omissions are not deliberate and are solely ours.

List of Acronyms

AET	Agricultural Education and Training
AICM	Agricultural Information and Communication Technology
ANAFE	
BARI	Bachelor of Agricultural and Rural Innovation
BAT	British American Tobacco
B.Sc	Bachelor of Science
CTA	Technical Centre for Agricultural and Rural Cooperation
EU	Egerton University
FARA	Forum for Agricultural Research in Africa
FAO	Food and Agricultural Organisation
FERD	Faculty of Environment and Resources Development
GIS	Geographical Information System
GoK	Government of Kenya
ICART	Implementation and Coordination of Agricultural Research and Training
EU	European Union
ICT	Information and Communication Technologies
IFS	International Foundation for Science
MAK	Makerere University
MSC	Master of Science
NAADs	National Agricultural Advisory Services
NUR	National University of Rwanda
NCHE	National Council for Higher Education
NGO	Non Governmental Organisation
NEPAD	New Partnership for Africa Development
PHD	Doctor of Philosophy
R&D	Research and Development
RS	Remote Sensing
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SGE	Soil and Environmental Management
SELPs	Supervised Experiential Learning Projects
SSA	Sub Saharan Africa
VICRES	Lake Victoria Research Initiative
NACCRI	

Executive Summary

Brief Background

The sole objective for this study was to profile selected African Universities Faculties of Agriculture and related Faculties in order to assess the current status of the academic programmes so as to update the existing databases on higher education in Agriculture with a view of improving the outreach and impact of the work university networks and The Technical Centre for Agricultural and Rural Cooperation (CTA) including its partners, NEPAD and FARA. This exercise started with a desktop search of existing national resources related to the subject. A survey of the existing higher agricultural education/training institutions in the selected countries, University Prospectuses, annual reports, brochures, catalogs and manual were useful for this purpose. The RUFORUM Secretariat resource center can't go mentioning. Upon approval of the survey tools and an action plan, field trips were carried out for countries in Eastern Africa and for southern Africa, soft copies of the survey tools were sent via email to the respective country contacts and this case the Deans of faculties who then appointed staff and students in their universities to collect the data.

The one to one talks with respondents, indicates that (HIV/AIDS) is impacting negatively on their social wellbeing and economy. This is affecting faculties of agriculture and related faculties in many ways for example, i) in these faculties there are staff and students who are sick or have been claimed by this epidemic; ii) institutions which these faculties collaborate or partner with are also losing staff which is negatively affecting the ability to maintain linkages; iii) farming systems, particularly small holder agriculture, are changing as a result of demographic changes in the labour supply worsened by the hostile climatic changes; iv) funding support to universities from national governments is declining as a larger share of the budget is being spent on health care. Still, amongst agricultural graduates at all levels, women are seriously underrepresented. While gender issues are widely accepted and many agricultural specialists are fully attuned to gender sensitivity, an understanding of how to mainstream gender issues and, importantly, to engage fully women at all levels of agricultural development is less evident. Girls are typically not encouraged to take sciences in secondary school, though agriculture is looks a favoured subject amongst students in the visited universities of either sex (figs. 4 and 7). Enlightened and focused programmes, such as those being introduced by RUFORUM in its member universities, can substantially increase female enrolments in agricultural education.

All these issues require intervention of experienced agriculturalists and create a window of opportunity for universities in the region and research networks, such as the Technical Centre for Agricultural and Rural Cooperation (CTA) and The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), to backstop these institutions through building capacity for capacity development, champion leadership and vision for future of African universities. Today, universities that churn out agricultural professionals and the industry were they are absorbed have little knowledge about such existing networks; though their efforts in the region are glaring. Further discussions with stakeholders in the field also indicated critical issues related to quality and focus of undergraduate training available within the surveyed countries. Sentiments Reservations were expressed widely and consistently by graduates themselves, employers, and farmers to the consultants. A widespread perception amongst students is that delivery of course materials is too theoretical, employers contending that agricultural graduates are weak in terms of problem analysis and solution skills. They may be receiving the theory in their coursework; they do not seem able to put the theory into practice.

Approaches Used

The study was required to review and update existing databases and information on tertiary education institutions in Africa including students' enrolment and courses offered, evaluate and collate lessons learned from improvements/innovations in the curriculum and conduct a min survey among students at their institutions to inform policy as to how the demand for agricultural programmes is expressed in different areas where CTA and RUFORUM are operating in the region. Resources did not permit, at this stage, for a country visit to each of the CTA and RUFORUM countries. Instead, a sample of three countries was chosen in East Africa (Kenya, Uganda and Rwanda), in consultation with RUFORUM to represent the range of situations likely to be found in that region and three countries in Southern Africa Malawi, Zambia and Zimbabwe. Field visits to the selected east African countries were undertaken. The quantitative tools were not that effective so the consultants ended up holding one to one discourses with heads/chairmen of departments. This is because the survey tool was looked as being bulky and so would consume a lot of their time. For southern Africa, the electronic survey tool was filled and sent back online. Others were hand written and sent back using courier service.

Major Findings

In Annex A, the summarised information on the interviews conducted is reported. The following sections on the various countries visited contain the major highlights.

Overview

Once the data were collected and analysed, some major points of consensus across all countries, and amongst the two groups of interviewees (graduates and faculty) emerged.

Quality of Training and Underinvestment in Facilities: The need for a major change in mindset (amongst both graduates and faculty) and substantial improvement in skills (practical experience, communication and report writing, up to date knowledge) dominated the discussions with academic staff and graduates alike. There was widespread recognition that curricula were outdated and students had poor access to up to date literature and research. The pressure on teaching facilities was seriously compromising quality as enrolments continued to rise without concurrent investment in infrastructure. This last was further exacerbated by the introduction of 'parallel programmes' where self funded students are encouraged to enroll. Parallel programmes help the immediate funding of university operations but has led to increased overcrowding, poor teaching, and inadequate supervision.

Limited Student Opportunities in Building Analytical Skills: there were some surprising problems. The overcrowding and lack of investment has led inevitably to few (if any) 'hands on' student practicals. But there was widespread comment from graduates and students that opportunities for interaction amongst students themselves, in the form of group discussions, tutorials, and seminar presentations, were inadequate. This resulted, in no small part, to the lack of critical and analytical skills that are so widely recognised.

Universities are not seen as Centers of Innovation: a particular worry was that the universities were not widely recognised as 'centres of innovation'. Most interviewees noted that there were plenty of very well educated and competent people at the universities – and university staffs are regularly consulted in the development of new programmes and initiatives. But universities are not seen as a reliable and fertile source of new knowledge. This is the result of two factors. Firstly, while individuals within universities, and, in some cases, whole departments, are carrying out some very innovative and

creative work, the university community has largely not embraced innovation as its core business. Secondly, and this is related directly to the failure to mainstream innovation for the rural sector, the structure and governance of universities is poorly suited to serving dispersed and poor rural communities, and interaction with stakeholders is poor. Thus there is poor 'ownership' of the universities by their stakeholders. And finally, as a consequence, faculties of agriculture are still not sufficiently integrated into the national and regional innovation systems.

National Agricultural Development Plans Underplay Skills Needs: as the consultants reviewed university programmes in the context of national plans for the development of the agricultural sector, a major discrepancy appeared – while all countries surveyed were planning for major increases in agricultural productivity, employment, and profitability, consideration of the human resources necessary to implement these plans was typically based on unrealistic and highly optimistic assumptions. As public sector support to agriculture has become more diversified, employment opportunities have shifted from public agencies to civil society and the private sector. But investment in human capital development overall has been constrained by public sector hiring freezes, eliminating an important avenue through which young graduates gain experience in the sector. The private sector has largely focused on attracting the more experienced and competent public employees that meet its mandate. Civil society has also poached heavily from the best of public sector agriculturalists, albeit often at a more junior and less experienced level. Many graduates of agriculture join other industries, seeing better opportunities there. The outcome is a large (and expanding) deficit of young people gaining experience in the sector – a recruitment 'black hole' for the not very distant future when the current generation of experienced African agriculturalists reach retirement

Faculties of Agriculture in the region[1] have significantly grown with many of the characteristics and problems that are symptomatic of African Higher Education in general. What follows is a brief overview of the problems and issues identified during the study to be facing the faculties of agriculture in the six countries. More detailed information on each of the faculties of agriculture is presented the proceeding sections country by country. Generally, the situation differed little by country although there are some issues that are particularly serious in Rwanda, Kenya as well as Zimbabwe and those are presented here below;

a) In Rwanda, the departments are under capacitated. For example the Department of Agricultural Economics and Agribusiness is currently headed by a Masters Degree Holder and the entire Department has only eight (8) teaching staff, of which one (1) is a PhD holder and the seven are Masters Holders. With this human resource, the teaching loads are increasing even at a greater rate, accompanied by large increases in the sizes of undergraduate classes and the latter holds true at Egerton University.
b) In contrast in these universities, the sizes of many MSc. Level classes are often small and not cost effective. The lack of fellowships or sponsorship for students is a factor as well as the proliferation of programmes. The problem is more serious at Egerton than elsewhere in the region (see below)
c) In Rwanda still, there exist only one Masters Programme in the Department of Soil Science. Other departments have no higher degrees that are; Masters and Doctor of Philosophy. Generally, the Faculty of Agriculture at the National University of Rwanda (NUR) has no PhD

[1] In this context of the study report "region" refers to Kenya, Rwanda and Uganda for East Africa and Zambia, Malawi and Zimbabwe for Southern Africa.

programme currently running and it has only one Masters Programme and no Post graduate diploma in place.

d) In almost all the faculties of agriculture that were surveyed, there seems to be reasonable staff numbers, but a closer look at the composition gives a less satisfactory picture. Many of the senior faculty staff have Doctor of Philosophies but are close to retirement. The more able senior faculty staff is on leave of absence working perhaps elsewhere for greener pastures. As a result, in many departments, much of the teaching load is carried by faculty staff with only M.Sc. degrees and this has contributed to prolonged finishing periods and production of substandard work.
e) Low salaries are a factor in the retention of the more able staff in faculties of agriculture, but equally important are the opportunities for professional development through supported research, sabbaticals, post doctoral fellowships, and sponsorships for PhDs. These have become much scarcer in recent years because of dwindling donor support for human capacity development in higher education, particularly in agriculture.
f) Research output is low and this attributed to factors such as high teaching loads, lack of post graduate students, limited availability of research grants and efforts to supplement inadequate salaries with incomes from other sources especially the privately driven programmes.
g) The curricula is being updated but this has to be continuous to develop the skills and orientation that graduates will need in a private-sector driven agriculture environment
h) The faculty staff at all levels felt the need to retool themselves with some of the more recent teaching methodologies and analytical techniques through undergoing pedagogical courses to enable them deliver better
i) Despite the large number of students in the University of Zimbabwe, there is yet to be a streamlined way of curriculum review; in the current situation individual lecturers update their curriculum by taking on new knowledge and technologies from research work, scientific publications and occasional from stakeholders' requests.

Recommendations

Particular efforts are required to broaden access to agricultural education overall. Firstly, increase recruitments of female students, secondly, improve institutional linkages (e.g., strategic partnerships, professional networks, collaboration incentives) and student's exchanges; thirdly, it is fact that too many children in Africa do not have adequate access to quality schooling – which restricts the pool of conventional entrants into the university system. The universities need urgently to develop and expand opportunities for this category of student to gain ready access through the university system at all levels. Importantly this would also at the same time increase female opportunities for advancement; retool staff and this was a major student concern, lobby for more resources and increasing access to knowledge for example through TEEAL, AGORA etc. CTA and RUFORUM need to provide guidance and help to these processes. Therefore, some initial pilots to test out the new ways of reengineering business processes are ideal. More specifically the donor community should come in to;

a. Increase the funding base of universities that shouldn't only look at staff salaries and students scholarships but also infrastructure
b. Universities developing training programmes that respond to national human resource development but also an urgent massive recruitment of young professionals to replace the aging staff.
c. The universities should also harness the existing capacities in the region for example the National University of Rwanda (NUR) should really engage with other more endowed

universities to help it rebuild its capacity; rather to say there should be effective rationalisation of resources.

PART A: Background

Faculties of Agriculture in the region have tremendously grown with many of the characteristics and setbacks that are symptomatic of African Higher Education generally. The needs for capacity building and retooling in African university faculties of Agriculture are enormous. Not only have the numbers taking Bachelor of Science degrees in various fields of Agriculture has augmented, but also most faculties have developed Master of Science and Doctoral degree programmes. The more aging senior faculty staffs is retiring or are serving on contract basis looking more lucrative assignments. This has left the burden of teaching and supervision increasingly being borne by more junior, equally inexperienced faculties, who often only have Master Degrees which sometimes are helped to get those degrees. This is then mounting pressure on faculties to be more relevant, more engaged in responding to emerging development and national problems, and to produce graduates that are ready to tackle the ever changing stakeholder and industry needs and demand driven research systems. This is all taking place in the context of declining support for higher education from funding agencies and respective national governments.

Agricultural Higher Education in Viewpoint

Post-secondary AET was established in Africa as far back as 1924. An essentially bifurcated system of agricultural education emerged from the colonial period, in which post-primary vocational education was targeted at the sons of traditional farmers, and post-secondary agricultural education was designed to lead the sons of the middle class into public employment. This dual legacy, and the separate expectations associated with each branch of it, has hindered the development of agricultural education in Africa up to the present. Extensive institutional infrastructure for agricultural education and training has been put in place since the 1960s. Africa now has roughly 200 public universities (compared with 20 in 1960) and about a hundred of them teach agriculture and natural resources management. In addition, private universities are beginning to complement these capacities with their own offerings.

The initial institution-building achievements of the 1970s and 1980s have given way to neglect since the 1990s. Donor assistance to African agriculture has declined sharply and, within that total, support for agricultural education and training in Africa has largely disappeared. Assistance for *formal* AET declined to just 0.7 percent of agricultural sector aid between 2000 and 2004. Government funding has tended to follow donor priorities. The ultimate cost of the government and donor pullback from AET has been to distance African professionals from knowledge networks, global information resources, and the cutting edge of technology transfer. This has left a severely depleted human resource pool in African agriculture.

However, under financing of Africa's agriculture sector appears poised to change. Recent signs may signal an encouraging turnaround in donor assistance to agriculture and to agriculture training, including the Commission for Africa Report, *Our Common Interest*, several donor initiatives focusing on skills development for agriculture, the 2003 Maputo Declaration by NEPAD, and the Framework for African Agricultural Productivity issued by NEPAD and the African Union in 2006. If additional investment in agriculture education and training materializes, the key question is *How should these*

additional funds be used? To help assess the current health of agricultural related institutions in eastern and southern Africa, CTA and RUFORUM contracted young scientists to help assist in reviewing and updating existing databases and information on tertiary educations institutions in Africa including student enrolment and courses offered,, assist in the evaluation and collation of lessons learned from improvements/innovations in the curriculum and conducting a mini survey among students at their institutions so that development partners can use the findings for devising better ways of allocating and leveraging resources for revitalising agricultural education and training in African Higher Education Institutions.

PART B: Approach

Study Design

The study was required to review and update existing databases and information on tertiary education institutions in Africa including students' enrolment and courses offered, evaluate and collate lessons learned from improvements/innovations in the curriculum and conduct a min survey among students at their institutions to inform policy as to how the demand for agricultural programmes is expressed in different areas where CTA and RUFORUM are operating in the region. Resources did not permit, at this stage, for a country visit to each of the CTA and RUFORUM countries. Instead, a sample of three countries was chosen in East Africa (Kenya, Uganda and Rwanda), in consultation with RUFORUM to represent the range of situations likely to be found in that region and three countries in Southern Africa Malawi, Zambia and Zimbabwe.

Methodology

The consultants aimed to collect the following data:

- The existing agricultural training programmes and recent reforms in curricula
- The nature of employers/potential employers and the employment of agricultural graduates – in informal, formal and self-employment.
- Academic staff levels, students enrolments, research and outreach activities
- The demand and need for agricultural related programmes in higher education institutions

Three main techniques were initially planned to gather primary data – a questionnaire survey, face to face key informant interviews using an interview question guide, and student group discussions. A common format was used across all countries. In the event, the quantitative survey proved less useful; the response was inadequate for any reasonable analysis as the information received was patchy and incomplete. The respondents claimed that the tool was rather heavy and they didn't have that time to answer every question. The team then resolved to focus on the informal survey technique, using key informants. Deans and Head/Chairmen of Departments became instrumental in seeking out and verifying the opinions of current students and recent graduates. The team determined that a critical element in understanding the demand for graduates was to gain a perspective on employment prospects and opportunities from those either seeking work or recently entering employment. In the event, this enabled the team to gather some extremely valuable information.

The methodology used in undertaking the informal survey was a 'cascading network'. RUFORUM provided the platform for an initial network of contacts across the surveyed universities in the region. Appointments were made to interview these contacts and they were interviewed using the attached

survey tool (Annex B). However, the interview approach agreed within the team allowed for expanded discussion beyond the set forth questions as information became available. Further key informants were sought on the advice of the original interviewees and the process repeated. The team specifically sought strong and candid inputs from both conventional and potential stakeholders and especially from the young. For some countries where the consultant were unable to physically visit, the Deans with help of graduate students were sent the soft copies of the survey tools and assisted in collecting the data; this is southern Africa in particular.

PART C: Finding of the Study: Eastern Africa

Brief Overview Statement: indicating 3 countries covered

Makerere University: It is the oldest university in East Africa with a well established faculty of agriculture

Egerton University: A university that was founded as an agricultural college and has maintained that agricultural focus

National University of Rwanda: is an example of a country emerging from conflicts but operating in an agricultural environment and strongly desires to rebuild its human resource

General Observations Eastern Africa

In Kenya, Agricultural Education and Training is provided at undergraduate and graduate degree levels by the five public universities[2], and recently there has been growth in private agricultural education and training institutions offering AET at different levels. The consensus of opinion from both within universities (staff and students) as well as from employers was that the quality of graduates and postgraduates being produced by Kenyan universities has deteriorated in recent years. In part this is related to increases in student numbers (without concurrent rises in budget allocations and infrastructure) and the resultant pressure on facilities such as lecture halls, laboratories and equipment noted eloquently a decade earlier by Eicher (1999). As important, however, is the widespread acknowledgement that courses have failed to keep pace with changes in technological advances and the farming environment, and, in addition, are not focused on priority farmer priority areas.

University Staff and Administrator Observations

Egerton University staff noted that agriculture was typically a last resort, and, furthermore, the popularity of the subject had fallen even further in recent years. The three most popular degrees are Food Science, Animal Science and Agribusiness Management. Both are significant in terms of this study. The annual intake for food science is normally forty five students but there are years that the intake is doubled because of overwhelming demand. This demand comes from the perception that the degree prepares students for self employment and entrepreneurship on completion. The agribusiness management programme is also popular because of wide-range of opportunities which go beyond the agricultural sector such as general management, accounting, and business practice.

The university is well equipped with resources to mount practicals in most fields. Nevertheless, the lack of “hands on” skills is recognised as a major challenge and one which is constantly demanded from employers in both public and private sectors[3]. Students have resisted some aspects of practical training, apparently claiming it reflects the needs of “the inferior and less educated diploma students and they expected more lectureship type of learning as they were training to become managers and officers”. The evidence from the Food Science Department suggests that this impression is somewhat misleading. What the students were objecting to was not practical training *per se* but the type of

[2] The Agricultural and Veterinary College of the University of Nairobi is one of the oldest in East Africa.

[3] Also private sector employers believe that graduates have unrealistic expectations of remuneration.

meaningless labour which adds little to the learning process. Where, as in Animal Science and Food Science, practical assignments are focused and linked to real problem solving, students respond positively to the opportunity to learn further skills.
An important source of income to public universities in Kenya comes from self-sponsored students (who pay fees double those received from publically funded students) - also popularly known as "parallel programmes". This, however, has led to overcrowding of courses and compromises in terms of quality.

Student Observations

Egerton University: the training was seen as too theoretical, the attachment too short, and their courses did not meet the expectations of their employers. They recommended more practicals, including longer period of attachment, with a formal structure, proper feedback and follow up between universities and industry. Attachments should be formally and collaboratively assessed by both the universities and industry. Too much teaching was out of date, there was insufficient emphasis on critical IT skills, and access to literature was poor. Students also noted the deleterious effect of over-enrolment as a result of the self-sponsored students' programme which severely compromised the quality of training.

Nairobi University: the group reported limited access to internet and modern computers. There was no inter-library loan facility and the university library was poorly stocked. The training involved too much theoretical teaching and few practicals. Field trips were rare and often did not take place. Most agricultural graduates moved out of the sector and took a different professional qualification such as accounting.

Rwanda: National University of Rwanda (NUR)

Rwanda's education system is still recovering from the tragedy of the genocide but is reasonably well funded. There is a major initiative to hire a large number of expatriate teachers for various subjects and disciplines including agriculture to cater for the massive skills gap in both schools and tertiary institutions.

University Staff and Administrator Observations

Student Observations

Students from NUR complained that practicals were not adequate and poorly conducted. Only a quarter of the teaching time was spent on practicals and there was an issue with the competence of laboratory technicians in conducting lab practicals. Students reported a problem of reference materials, with much of it out dated. They regretted having enrolled on the programme and felt it was substandard. Most students expressed the view that by the time they complete their studies they would only have 20-30% of what they anticipated. They felt the institution was rushing to introduce degree programmes without adequate resources (financial, human resources and facilities) and preparation and this was likely to damage its reputation as it would be producing substandard graduates.

Uganda: Makerere University

Students Observations

Similarly a group interviewed students at Makerere University comprised of fifteen final year and postgraduate students in the following programmes: crop science, animal science, agricultural economics, agribusiness management, Agricultural Extension and Education. Of the final year students, only two had selected agriculture as a first choice and in both cases because they knew

someone who had studied at Makerere University but of the others, several indicated that, in the end, agriculture had been the right option for them. With the larger class sizes, good attachments are hard to find and supervision has become poorer.

PART D: Finding of the Study: Southern Africa

Brief Overview Statement: indicating 3 Countries Covered

University of Malawi-Bunda College of Agriculture: has been a university with a stable history basically located in agricultural country and Bunda was established to build capacity for the agricultural sector for Malawi; but has also taken on a regional role to train for SADC and RUFORUM network in the areas of Aquaculture and Fisheries and agricultural economics and policy analysis. It is also within a country that has had frequent food shortages.

University of Zimbabwe: until recently a prime university in a striving agricultural and overall national economy but has not been spared by the political challenges that have affected the country in recent years. Thus, it has provided an opportunity of assessment of current status with the view of undertaking current challenges.

University of Zambia: A university based in a stable democracy. The country is still stable and placing agriculture more within the forefront of its economic development. Its economy previously depended on copper. Thus the diverse background and history and social political set up provided useful case scenarios for making references to the overall health of agricultural tertiary education in Eastern and Southern Africa.

The Study takes cognisance of the wider demand analysis study for agricultural graduates being undertaken by RUFORUM and SCARDA in eastern and Southern Africa. These studies engaged widely with faculty, former graduate students and employers but didn't focus on the current students and existing programmes, thus this study focused on existing programmes, the current staff capacities to implement these programmes and the views of the current students.

General Observations Southern Africa

In Southern Africa, the student's observations are presented. The students in their responses said that there is;

- little interaction between the students and stakeholders in the agricultural sector to understand the opportunities, and to know what is wanted or expected of them when they finally leave university to take up employment,
- absence of practical work.
- the attachment that the students do in the final year is insufficient to build students' confidence for the workplace challenges,
- insufficient efforts are made to visit private farms to negotiate for intern placements,
- poor access to Information Technology facilities, and the library services were described as "chaos",
- statistics, and communication and scientific writing were inadequate, and,
- the curriculum is outdated and overloaded, with some lecturer not up to the task.

PART E: Existing Opportunities in the selected Universities

1. The existing programmes that are demand driven

2. Curriculum development that has involved a diversity of actors incorporating both technical and professional skill development for both staff and students
3. There are also ongoing efforts for peer review of academic programmes
4. Efforts are underway to established quality assurance mechanisms
5. Also new innovative programmes such as Agricultural and Rural Innovation Studies (ARIS) are being developed that will involve joint degree training among universities
6. The general staff exchange programmes
7. The SCARDA programme that includes Institutional training and has helped linking universities and NARIs for example at Makerere University the new Master of Science in Plant Breeding and Seed Systems involves joint training between a university and a NARI (NACCRI) and its well linked to private sector systems. Further more, both students and staff are linked to the home institutions of the students.
8. There are also efforts to strengthen pedagogy including development if e-resources.

PART F: Conclusions and Recommendations

Conclusions

Nevertheless, these are isolated cases and more systemic approaches are still need reorienting African universities to produce graduates for the markets of today and tomorrow. The challenge remains;

- Significant funding to universities that shouldn't only look at staff salaries and students scholarships but also infrastructure
- Universities developing training programmes that respond to national human resource development but also an urgent massive recruitment of young professionals to replace the aging staff.
- The universities should also harness the existing capacities in the region for example the National University of Rwanda (NUR) should really engage with other more endowed universities to help it rebuild its capacity; rather to say there should be effective rationalisation of resources.
- Improving Quality and Content of Training; Improving the image of agriculture will not only increase the quality and quantity of university applicants but also bring benefits to the whole sector and to the economy overall. The universities have a central role in leading and facilitating this change. There are major issues with the quality and focus of undergraduate training available within the surveyed countries.
- Enhancing the Quality of the Undergraduate Degree; develop a costed regional plan of action for rescuing the undergraduate degree. Bachelors' graduates are the public face of the university they are the recruits for the public sector, private business, civil society, and for further training. As a matter of urgency, a comprehensive plan for improving the quality of the bachelor level agriculture degree needs to be developed. RUFORUM, together with CTA, ANAFE and NEPAD need to develop a properly resourced and realistic plan for steadily enhancing and transforming the undergraduate degree in agriculture. Many of the needed

elements are, at present, being implemented partially by different universities within the region. The experience and competence are there they need to be coordinated and implemented within a common strategy across the regions.

- Develop a Comprehensive Attachment Programme. Too many of the attachment initiatives examined failed to meet their objectives. Monitoring was poor, and neither employer nor student (nor indeed the university) obtained much benefit. But, as the volunteering example from Bunda shows, students are keen to learn if provided with a conducive environment. Employers are discouraged when students are effectively 'dumped' on them and there is no feedback or review. The Food Science Department at Egerton finds itself regularly oversubscribed because students see the link between learning the needed skills and future employment prospects. It is probably not coincidental that that department is also one of the most innovative university departments in the region. RUFORUM and CTA need to provide guidance and help to this process. Therefore, some initial pilots to test out the new ways of doing business would be ideal.
- Understanding and Addressing Gender Issues; women comprise a small minority of agricultural students, and are inadequately represented at all levels of the agricultural industries (except as active farmers where they are over 50% of the workforce). There is considerable pent up demand for female agriculturalists to play a full role in the future development of the industry as customs and traditions often mean that women farmers are less likely to communicate adequately with male agricultural staff than with female. Consequently, all employers are seeking to increase the numbers of female graduates they employ as they are seen as vital to addressing the fundamental constraints of agricultural systems (especially, but not confined to, those in the smallholder subsector). Furthermore, the absence of women in the training system means that many potential excellent graduates are failing to enter the industry.

However, the data show there are important obstacles to increasing the numbers of women agricultural graduates. Probably the most important one is the poor teaching of science to girls in school. Girls are not encouraged to study science subjects and, for those that do, the standard of training is often inadequate. For the school female 'high fliers' in science, careers in the heath sector look more attractive and remunerative than those in agriculture (and recall that information on agricultural careers at school is typically poor in any event). For those with more modest school leaving qualifications, the favoured options are often the 'caring' disciplines such as food science, midwifery, nursing, or home economics. Very often these skills are acquired at diploma level and, if the women go on to further studies; it will not be in agriculture.

But this does mean that there are a useful number of female diploma holders in science related subjects who could, with attractive programmes, be attracted to take further qualifications in agriculture. Greater numbers of female students need urgently to be encouraged to participate in agricultural development at a professional level. While gender issues are widely accepted and many agricultural specialists are fully attuned to gender sensitivity, an understanding of how to mainstream gender issues and, importantly, to engage fully women at all levels of agricultural development is less evident. Broadening access will go some way to providing career opportunities for women (who are often

disadvantaged in education) to enter university level education. In addition, the experience of NUR in attracting female students at both graduate and undergraduate level should be examined.

- Spark Student and Public Interest in Agriculture; Progress in agriculture will be much slower if agricultural tertiary institutions cannot attract motivated and well prepared students. The prevailing African view of agriculture as the "occupation of last resort" needs to be challenged and changed. Changes to institutional admissions processes that would allow students to choose agricultural studies, rather than be "assigned" to them, would be a good place to start. Guest lecturers representing the spectrum of agricultural employment, field trips, and student attachments would also help.

Annex A: Detailed Selected Country Studies

East Africa

Uganda: Makerere University

Institutional Background

It was established in 1922; and has a current student's number of Thirty Six thousand Eight Hundred and Seventy Eight (36,878) and close to Two Thousand Eight Hundred and Ninety (2890) staff members. It was the first in Uganda and one of the oldest in Africa.

Faculty of Agriculture- Current Status

Training of Agricultural professionals in Uganda started in 1924 when a technical school was established on Makerere Hill to offer intermediate education in lead subjects of Agriculture, Medicine Education and veterinary sciences. A certificate in Agriculture was awarded after three years of training. In 1936 the course was strengthened by introducing basic science subjects, extending the duration from three to five years and upgrading from a certificate to a Diploma award in Agriculture.

These evolutionary aspects were a result of the De la Wair commission which recommended that Makerere becomes the center of Higher Education serving the needs of all East Africa territories of Kenya, Tanganyika, Zanzibar and Uganda. The college of Agriculture at Makerere thus started admitting larger numbers of students (40) in 1937, which was comparable to other courses such as medicine.

The subsequent developments lead to Makerere establishing a special relationship with the University of London in 1948 (as a constituent college of London University). In the process Professor Fergus Wilson was recruited to become the first Dean to fill the chair of the college of Agriculture at Makerere. Professor Wilson assumed his duties in 1952. He is credited for establishing the Faculty building on the main campus (1957) and the training/research infrastructure at the then Kabanyolo University Farm (presently, MUARIK).

The admission of the first intake of students in 1958, to pursue degree courses at Makerere, in Agriculture marked the span of the first full course (1958/1961) for the Bachelor of Science in Agriculture Science of the University of London. In 1961 the final batch of Diploma students completed their 3-year training while the first batch of 9 students completed their B.Sc. Agriculture Sciences.

The present Faculty of Agriculture comprises of seven departments namely; Animal Science, Agricultural Economics and Agribusiness, Agricultural Engineering, Agricultural Extension Education, Crop Science, Food Science and Technology and Soil Science.

Academic Programmes

Undergraduate Programme

There are eight undergraduate programmes offered in the Faculty of Agriculture and these run for a period ranging from three to four years:

1. B.Sc. Agriculture, with five options: Animal Science, Agricultural Economics, Agricultural Extension and Education, Crop Science and Soil Science.
2. B.Sc. Agricultural Engineering
3. B.Sc. Food Science and Technology
4. B.Sc Land Use and Management
5. B. Agricultural Extension Education
6. B. Agribusiness Management
7. B.Sc. Horticulture
8. Bachelor of Agricultural and Rural Innovations (BARI)

Postgraduate Programmes

The Faculty of Agriculture has continued to attract national and international students in its training and research programmes as a result of the purposeful diversification of its programmes which cope with changing clientele and societal needs. In addition to its strong undergraduate programmes with an enrolment of about six hundred (600) students, the Faculty has several postgraduate programmes with over one hundred (100) students. The postgraduate programmes are comprised of Masters, and Doctor of Philosophy.

Masters Programmes in the Faculty

Currently, there are a total of nine (9) M.Sc. Programmes in the Faculty and these programmes run for a specified period of two years maximum. These are:

Programme	Department
M. Agri-business Management	Agricultural Economics& Agribusiness
M.Sc. in Agricultural Economics	Agricultural Economics & Agribusiness
M.Sc. in Agricultural Engineering	Agricultural Engineering
M.Sc. in Agric. Extension Education	Agricultural Extension Education
M.Sc. in Applied Human Nutrition	Food Science & Technology
M.Sc. in Animal Science	Animal Science
M.Sc. in Crop Science	Crop Science
M.Sc. in Food Science and Technology	Food Science & Technology
M.Sc. in Soil Science	Soil Science

Doctor of Philosophy (Ph.D.) Programmes in the Faculty

Each of the 7 Departments of the Faculty offers a Ph.D. Programme in various fields of Crop, Animal and Soil Sciences; Agricultural Economics; Agribusiness; Food Science & Technology; Agricultural Engineering and Agricultural Extension Education with an expected duration of three to five years.

Student Enrolment

The data presented was what could be availed at the time of the study

Undergraduates			
Department	Diploma	Bachelor of Science	Postgraduate Diploma
Crop Science	00	411	00
Animal Science	00	34	00
Agricultural Engineering	00	453	00
Food Science and Technology	00	627	00
Soil Science	00	767	00
Agricultural Economics & Agribusiness	00	1,338	00
Agricultural Extension/Education	00	299	00
Others (Please specify) Dean's Office (BSc. Agriculture Years 1-3) before specialisation. Year 4-specialisation and therefore go to respective departments	00	1,237	00

Source: Dean's Office-Makerere University

Postgraduates		
Department	Master of Science	Doctor of Philosophy
Crop Science	146	
Animal Science	22	
Agricultural Engineering	03	
Food Science and Technology	137	
Soil Science	28	
Agricultural Economics & Agribusiness	147	
Agricultural Extension/Education	32	
Others (Please specify)		

Source: Dean's Office-Makerere University

Student Enrolment in the Past Five (5) Years

Programme Level	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009
Doctor of Philosophy	06	15	15	13	39
Master of Science	90	114	135	69	108
Bachelor of Science	931	994	1120	1175	Not availed
Postgraduate Diploma	00	00	00	00	00
Diploma	00	00	00	00	00

Source: Dean's Office-Makerere University

Academic Staff Establishment for the Period 2008/2009

Department	PhD Holder	M.Sc. Holder	B.Sc Holder	Rank of Staff						Total Staff
Ranking				P	AP	SL	L	AL	TA	

Agricultural Econ.& Agribusiness	10	07	01	00	01	05	05	03	05	19
Animal Science	09	06	00	02	01	03	04	03	02	15
Crop Science	17	03	00	04	01	05	06	02	02	20
Soil Science	09	07	00	02	02	05	03	03	01	16
Agricultural Engineering	02	13	00	00	00	02	02	08	03	15
Agricultural Extension/Education	07	09	00	00	00	02	05	07	02	16
Food Science and Technology	13	06	01	00	01	06	05	03	03	15

Legend: P: Professional; AP: Associate Professor; SL: Senior Lecturer; L: Lecturer; AL: Assistant Lecturer, TA: Teaching Assistant

Source: Makerere University, Faculty of Agriculture, Prospectus, July 2009

Research and Outreach Achievements

The Faculty of agriculture is undertaking research in following areas;

- Diary Development Project with Kakira Sugar Works, Kakira Out growers
- Transfer of Tissue Culture to Farmers in Partnership with Agro Genetics
- Production of Oil
- Reduction of toxic impact on the environment with BAT
- Development of tissue culture protocols for micro-propagation of cash and food crops like bananas, cassava, coffee, pineapples, sweet potatoes, yams, (ii) Serological and molecular diagnosis of plant viruses e.g. common bean mosaic virus, sweet potato viruses, cassava mosaic virus, and banana streak virus (iii) Identification of plant genes for pest/disease resistance, tolerance and high yield, and (iv) Molecular characterisation of crop varieties e.g. banana, and fungal, bacterial, phytoplasma and viral isolates
- Gender mainstreaming in the curriculum of the Faculty of Agriculture
- Equity implications of Reforms in financing the Delivery of Agricultural Extension Services: A collaborative Research with the University of Reading (on-going).
- Measures of Extension Impact: A study of Three Agricultural Extension programmes in Hoima District, Uganda.
- Evaluation of Agricultural Production in Rakai District, Uganda: The SWOT Analysis.
- Assessment of the Impact of On-farm Trials and Demonstrations in the South-West Region, Uganda.
- Factors affecting the sustainability of Terraces in Kabale District, Uganda.
- Participation of Youth in Agriculture: A case of Iganga District, Uganda.
- The relative importance of various skills and attributes for success in Business of Entry-Level Managers as perceived by ADC/IDEA Project Clients.
- Supply Response and Technology Adoption of Selected Ugandan Maize Farmers: Econometric Analysis and Policy Implications.
- Evaluation of the 1996 FAF/ADC Internship Program
- Beneficiary assessment of the village level participatory approach used by Uganda's Agricultural Extension Project.
- Protocols for development of value added products from matooke, orange freshed, sweet potatoes, milk, sorghum and Mulondo (*Mondia Whitei*).
- Development of nutrition Information, education and Communication (IEC) materials for use in different parts of Uganda.
- Sensitisation of communities in Northern, Western and Central Uganda on aspects of nutrition.
- Protocols for development of value added products from matooke, orange freshed, sweet potatoes, milk, sorghum and Mulondo (*Mondia Whitei*).

- Development of nutrition Information, education and Communication (IEC) materials for use in different parts of Uganda.
- Sensitisation of communities in Northern, Western and Central Uganda on aspects of nutrition.
- Development of processes for improving quality of fish, grains and fruits.
- Conducts research in all its areas of specialization. The following are some of the research projects that have been conducted.
- Adaptive development of a hand pushed Knapsack Sprayer.
- Development of Appropriate Animal Draft Power Technologies for Increased Agricultural Productivity for small-scale farming.
- Evaluation of Coffee Drying Technologies to enhance coffee quality through mould July 9, 2007of data for surface irrigation design and management at MUARIK.
- Hydrological Assessment design and construction of 25 valley tanks in Luwero, Nakasongola and Masindi Districts of Uganda.
- Formulation of guidelines for Rice growing in Wetlands and guidelines for crop production in Wetlands
- Technical evaluation of drying up of privately owned Valley Tanks in Mbarara.
- Introduction and Evaluation of Conservation Agriculture Technologies in the Lake Victoria basin

Collaborating Donor Agencies in the Faculty of Agriculture

The Faculty receives support from Government and Development Partners as indicted below in the table

Funding Agency	Training	Financial	Others
Danish DANIDA	√	√	√
AGRA	√	√	√
BIO-EARN	√	√	
ASARECA	√	√	
RUFORUM	√	√	
SCARDA	√	√	
MSI & World Bank	√	√	
USAID	√	√	
Rockefeller Foundation	√	√	
European Union	√	√	
NUFU	√	√	
NORAD	√	√	
International Foundation for Science (IFS)	√	√	
Swedish Sida/SAREC	√	√	√
Gatsby Charitable Foundation	√	√	√
African Green Revolution Alliance (AGRA)	√	√	

Curriculum Review, Lessons and or Innovations

Curriculum was developed in 1960 and has been subject to several reviews resulting to introduction of new programmes. The faculty has a curriculum review committee and the last review of the curriculum took place in 2004. The major driving force was the desire to harmonise programme courses and computerization of the academic structure; Qualifications of semester loads, minimum graduation loads and review of semester system. Changes in the curriculum were principally based on needs of the

Lecturers and students in that the Lecturers wanted to streamline programme structures/course codes and names, build in the recommendations of semester system review, build in the gender issues and incorporate needs for new skills development which were being demanded for by the students so as to meet market needs.

The next faculty review of the curriculum is scheduled for 2009 to accredit the new programmes by the National Council for Higher Education (NCHE). In the review process, a number of players are brought on board. Departments in the faculty play a vital role that is providing expert input in areas of specialization discipline and also sharing experiences and knowledge. External stakeholders are also engaged and these specifically help in identification of needs, participate in brain storming sessions to generate information, they are also a source of literature and also share R&D activities and related innovations.

The curriculum also includes case studies and community engagements and this is evident in the developed course materials, existing literature and research activities, policies and practices impacting training and methods, field studies for skills development and baseline studies to provide underpinnings for curriculum review. The faculty curriculum also reflects contemporary issues and emerging trends in agriculture for example the contribution being made in agricultural transformation such as generating relevant technologies and processes and value additions meeting community needs; Knowledge generation that improves functionality of agricultural value chains and through visibility and competitiveness of its products. In the faculty of agriculture innovation have taken effect in programmes such as Bachelor of Agricultural and Rural Innovations (BARI) that refocused on value chains and value addition and tailored to building capacity to respond to emerging challenges presented by the new government policies and practices as demanded by NAADs; Bachelor of Horticulture and Bachelor of Agribusiness which were all demand driven courses.

Availability of resources, subject content, sequencing of topics and physical facilities are factors that are considered in the review of the curriculum. This availability of resources is an issue because the faculty to scan through the available human resource and see if the proposed changes and new courses being introduced, the manpower is there to deliver on them. Besides this the human resource to deliver on them needs to be remunerated and these new programmes that have been developed have been made private meaning that they have to contribute to the resources required. The subject content has to be catered for to ensure that graduates deliver effectively to meet requirements of stakeholders at national, regional and international levels. The review also takes care of topic sequencing since delivery is action based learning which provides for learning from the known to new knowledge discovery generation. During this different methods are used for example peer learning groups which serve to enhance discovery learning and creativity and seminars are used to address cross cutting issues and enhance personal and efficient learning. The physical facilities are also considered for example the lecture theatres, libraries, computer laboratories with Internet connectivity and experimental laboratories of the faculty of agriculture so that when recruitments are being done, numbers are monitored to match the existing facilities in place for effective delivery.

There have been no pedagogical seminars attended in the past for the faculty staff but there glaring need for such seminars in the faculty so as to ensure effective course delivery. In the curriculum review process new courses were introduced in the curriculum and they were timely for example the Supervised Experiential Learning Projects (SELPs) – in Semester II and Recess term for year one and two are meant to help students gain practical skills from real-life experience as an integral part of the

learning process. The social skill for professional performance is to enhance delivery of innovations and technologies. Introduction of new courses in the curriculum has brought on board new implementation strategies for example departments now use audio visuals, Internet, field trips, peer reviewed learning and off course the traditional chalk and dictation of notes. The learning experiences are normally shared through seminars, conferences and exchange programmes.

Implementation of the new curriculum has brought with itself a number of challenges for example a lot of time is required for practical work which time isn't there as staff are busy into writing projects. The resources are also limited which has led to reduction of activities for example field trips. The other challenge is how to win commitment from other stakeholders. This comes as results of some staff are not willing to cooperate as part of the training team and others don't have the time to do this work wholeheartedly. Despite these challenges, there are positive attributes that this review process has had for example the new programmes were introduced as a result of the review due to the restructuring of existing courses and of which some are a source of income since they are private, new delivery methods and approaches were introduced too and the development of the private-public sector partnerships so as to upscale the outreach sector. The faculty is also satisfied with the review outcomes though they would like to have more reviews so as to address the emerging stake holder's demands. This is tied to globalization and changing societal needs makes it necessary to continuously review the curriculum to meet emerging challenges.

Needs and Future Outlooks of the Faculty

- Just like other Faculties of Agriculture, the Makerere University Faculty of Agriculture would like to enhance competitiveness through research and development as well as develop and engage in innovative outreach programmes
- The faculty would also like to develop a whole round agricultural scientists that can easily adopt to changing circumstances/challenges
- Increased donor support and institutional partnership and linkages.

Kenya: Egerton University

Agricultural Training in Kenya

Agricultural Education and Training is provided at undergraduate and graduate degree levels by the five public universities[4], and recently there has been growth in private agricultural education and training institutions offering AET at different levels. The consensus of opinion from both within universities (staff and students) as well as from employers was that the quality of graduates and postgraduates being produced by Kenyan universities has deteriorated in recent years. In part this is related to increases in student numbers (without concurrent rises in budget allocations and infrastructure) and the resultant pressure on facilities such as lecture halls, laboratories and equipment noted eloquently a decade earlier by Eicher (1999). As important, however, is the widespread acknowledgement that courses have failed to keep pace with changes in technological advances and the farming environment, and, in addition, are not focused on priority farmer priority areas.

Institutional Background

Egerton University is re oldest history among all institutions of higher learning in Kenya. It was founded in 1939 by Lord Maurice Egerton of Tatton, a British subject who settled in Kenya in the early 1920s.

[4] The Agricultural and Veterinary College of the University of Nairobi is one of the oldest in East Africa.

He thought of starting a school which would train white settler youth for careers in Agriculture. To facilitate the realization f his project, he donated 1,000 acres of the land he had bought for his personal use to the Government of Kenya. Egerton Farm School, as it came to be known admitted its first three students in 1939. They were accommodated in makeshift buildings. The construction of permanent buildings started the following year, when 45 students were admitted.

At the end of the Second World War in 1945, the school was temporarily closed. When it reopened it gave preference of admission to British ex-servicemen in the war as a way of rehabilitating them in civilian life. The first certificate course was started in March 1946 with 46 students. The nine-month courses continued up to 1949.

In 1950, the farm school was upgraded to an agricultural college, and the curriculum grew accordingly. Two years later, a one-year course and a two-year diploma course were being offered. The college also launched short courses to farmers and farmer managers. The Egerton agricultural college ordinance was enacted in 1955. Among other things, it provided for the establishment of a board of governors. During the same time, diploma courses similar to the national diploma in agriculture available at the Agricultural College in the United Kingdom were started. In 1958, Lord Egerton passed away. In his will, he had bequeathed an additional 3,000 acres of his Ngongogeri Farm to the college.

Shortly before independence, in 1961, the college opened its doors to all races in Kenya, as well as students from other countries in Africa. The first foreign students came from Tanzania, Uganda, Zambia, Malawi and Nigeria. The courses offered at the time were agricultural engineering, animal husbandry, dairy technology, forestry and management. Financially, the college relied on the annual subvention from the Kenyan Government, on tuition fees and on donations from various sources. In 1966, while Sir Michael Blundell served as the Chairman of the Board of Governors, the first African Principal of the College was appointed. This was Dr. William Odongo Omamo.

In 1979, the government of Kenya and the United States Agency for international Development (USAID) funded a major expansion of the institution. In 1986, Egerton agricultural college was gazette as a constituent college of the University of Nairobi. The following year, 1987, was momentous: it marked the establishment of Egerton University through an act of the parliament. The new autonomous, fully fledged institution retained the name of its founder as a sign of recognition of his benevolence, and continued to have as its motto the words inscribed in the Egerton family court of arms – *sic Donec* (Thus Until).

Today, besides its main campus in Njoro, the university incorporates laikipia, Kisii, Nakuru town and Kenyatta campuses. This expansion is not only territorial, but also academic. It is accompanied by continuous progress and the pursuit of excellence.

Faculty of Agriculture- Current Status

The Faculty of Agriculture is headed by a Dean who is the administrative and academic head. Assisting the Dean on a day to day administrative matters are two Assistant Registrars. The Faculty is the heir to Egerton College whose history dates back in 1939. However, the Faculty as it is today came into being in August 1986, when Egerton College was, by an Act of Parliament, elevated to the status of University College, affiliated to the University of Nairobi for the purpose of awarding degrees. The Faculty of Agriculture was challenged with the responsibility of launching three of the first five

degree programmes, namely; Bachelor of Science in Agricultural Engineering, Bachelor of Science in Animal Production and Bachelor of Science in Horticulture. The present Faculty of Agriculture comprises of eight departments namely; Animal Science, Animal Health, Agricultural Economics and Agribusiness, Diary and Food Science and Technology, Agronomy, Horticulture, Food Science and Technology and Soil Science.

Academic Programmes

Currently, the faculty offers five (7) Diploma courses, Eight (8) Bachelor of Science Programmes and fourteen (14) Masters of Science, One Postgraduate Diploma course and Nine (9) Doctorate Programmes. The faculty offers training at five levels:

- Three-year diploma programmes in: Animal Health, Diary Technology-Njoro, DTI-Naivasha, Horticulture (Regular and SSP), Farm Resource Management, Agriculture and Marketing (SSP)-Bukura Campus, Animal Tropical Health Management, Tropical Animal Sciences and Technology-SSP.
- Four-year Bachelor of Science programme in eight (8) disciplines: animal production, agriculture, diary science and technology, food science and technology, horticulture, agricultural economics and in agribusiness management.
- One –Year Postgraduate Diploma in Agricultural Information and Communication Management (AICM)
- Two-year M.Sc. degrees in: Agricultural Economics, Animal Production/ Nutrition, Animal Breeding and Genetics, Agribusiness Management, Agronomy (Crop Production), (Plant Breeding), (Dryland Farming), Crop Protection, Food Science, Horticulture, Soil Science, Livestock Production Systems, Agricultural and Applied Economics (collaborative programme) and Agricultural Information and Communication Management (AICM).
- Three-year thesis-based Doctorate of Philosophy in: Animal Sciences, Soil Sciences, Crop Sciences, Food Sciences, Agribusiness Management, Agricultural Economics, Horticulture, Plant Biotechnology, Agronomy with options in (Crop Production, Crop Protection, Plant Breeding and Dryland Farming)

Student Enrolment in the last 5 years

Programme Category	Number of Students									
	2004/2005		2005/2006		2006/2007		2007/2008		2008/2009	
	M	F	M	F	M	F	M	F	M	F
Diploma	142	55	156	56	72	46	80	48	93	46
Bachelor of Science	249	123	193	107	137	70	212	73	209	93
Post Graduate Diploma	-	-	-	-	-	-	-	-	-	-
Master of Science	8	1	10	2	7	1	27	7	33	14
Doctor of Philosophy	1	2	0	2	3	0	1	0	1	0
Totals										

Source: Field Surveys

Academic Staff Establishment for the Period 2008/2009

Department	PhD Holder	MSc. Holder	B.Sc Holder	Rank of Staff						Total Staff
Ranking				P	AP	SL	L	AL	TA	
Agronomy	13	10	00	02	02	09	10	00	00	23
Animal Science	17	12	00	03	02	09	15	00	00	29
Animal Health	01	10	01	00	01	10	00	01	00	12
Agricultural Economics and Agribusiness Management	16	14	00	00	01	12	10	07	00	30
Diary and Food Science and Technology	05	05	00	01	01	02	06	00	00	10
Horticulture										
Soil Science										

Source: Field Surveys

Research and Outreach Achievements

Project Title	Funding Agent
Indigenous Chicken Productivity for Improved Livelihoods in Kenya	Kenya Agricultural Productivity Project (KAPP)
Commercialisation of groundnut production through efficient on farm processing and value addition in Bomet and Vihiga Districts Project	Kenya Agricultural Productivity Project (KAPP)
Characterisation of understandable substances in the ruminant food chain in the Lake Victoria Basin on the basis of biophysical and anthropogenic plain	Lake Victoria Research Initiative (VICRES)
Social-Economic and Ecological impact of periodic sedimentation on the livelihoods of flood plain communities of Lake Victoria Basin	Lake Victoria Research Initiative (VICRES)
Ethno-botanical products for insect pest management in subsistence agriculture in the lake Victoria Basin	Lake Victoria Research Initiative (VICRES)
Case studies to Assess Agro biodiversity Issue in Mwingi and Bondo Districts	Food and Agricultural Organisation (FAO-FNP)
BOMOSA Cage fish farming in reservoirs, pond and Temporary water bodies in East Africa	European Commission
Dissemination of Research results in Semi-Arid and Arid Ecosystems with a focus on sustainable water resources management in Ethiopia	European Commission
Value chains for poverty reduction in the Agri-Food Sector –Problem Based Learning in Higher Education	European Union
The role of Indigenous Knowledge in promoting sustainable agricultural practices among indigenous vegetable farmers in Kakamega district	International Foundation for Science (IFS)
Gender-Labour Relations in Tobacco Production and their implication for socio-economic welfare in Kuria District-Kenya	International Foundation for Science (IFS)
Phenotypic characterisation of indigenous chicken (*Gallus Domesticus*) genetic resources in Kenya	International Foundation for Science (IFS)
Managing angular leaf spot of common bean (*phaseolus Vulgaris L*) through host resistance, antimicrobial plant extracts and cultural practices	International Foundation for Science (IFS)

Value chains for poverty reduction in the Agri-Food Sector-Problem Based Learning in Higher education	EDULINK-ACP
Developing a Strategy for sustainable income generation from a valuable medicinal plat-Prunu Africana Rombo and Taita Districts in East Africa	East African Academy of Sciences
Historical Analysis of the relationship between poverty and disease among commercial agricultural workers in Thika District, Kenya-1954 to 2008	The Organisation for Social Sciences Research in Eastern and Southern Africa (OSSREA)
Poverty, commercial Agricultural workers and infectious diseases in Kenya: A case study of Thika District 1945-2004	The Organisation for Social Sciences Research in Eastern and Southern Africa (OSSREA)
Community based Rain Water Harvesting and Conservation Technology transfer for improved Livelihoods in Selected parts of Busia District	Commission for Higher Education (CHE)
Improvements of Chickpea Productivity to Reinvigorate Smallholder Mixed Farming Systems in Western Kenya	Global Challenge Programme
Using improved pulse crop productivity to reinvigorate smallholder mixed farming systems in western Kenya	United States Agency for International Development (USAID)
The black rhino, the giraffe and elephants interactions in habitat utilisation: case study of Tsavo Conservation Area, Kenya	National Council for Science and Technology (NCST)
ICT and National Development in Kenya Challenges and Prospects of E-government	National Council for Science and Technology (NCST)
String Management Using Soya Bean Trap Crop in Western Kenya	National Council for Science and Technology (NCST)
Effectiveness of Gum Arabica *Acacia Senegal var Kerensis* in protecting d-limonene in orange Peel Essential oil from Oxidation	National Council for Science and Technology (NCST)
Human Wildlife Conflicts: Causes and mitigation measures in Tsavo Conservation Area, Kenya	National Council for Science and Technology (NCST)
Evaluation of *Euphorbia Tirucalli* as Dry Season Forage for camels in northern Kenya	National Council for Science and Technology (NCST)
Developing quality index for qualitative grading of major commercial fish	National Council for Science and Technology (NCST)
Evaluation of Agronomic and Morphological characters in Sorghum collections for the Dry Highlands of Kenya	Government of Kenya (GoK) and Egerton University
Developing a method to ensure safety and quality of Nile Perch from Lake Victoria	Government of Kenya (GoK) and Egerton University
Maximising benefits from indigenous chicken products in rural and urban markets	Government of Kenya (GoK) and Egerton University
An exploratory study of pest management practices and gender influences among small holder farmers in Bahati division of Nakuru District in Kenya	Government of Kenya (GoK) and Egerton University
A survey of pig production practice in Kakamega District, Kenya	Government of Kenya (GoK) and Egerton University
Influence of socio-economic and technology transfer factors on adoption of dairy goats among smallholder farmers in selected	Government of Kenya (GoK) and Egerton University

Districts of Kenya	
Degradation of wetland ecosystems and its implications on the government: a case study of Kisii district, Kenya	Government of Kenya (GoK) and Egerton University
Wetlands-Based Livelihoods in Kisii District Kenya Considering social welfare and environmental security	Government of Kenya (GoK) and Egerton University
Integration of Agro-forestry technology into local land management : a case study of Kisii highland, western Kenya	Government of Kenya (GoK) and Egerton University
Quantifying groundwater recharge in river Njoro Watershed, Kenya	Government of Kenya (GoK) and Egerton University
An assessment of the impact of credit from Microfinance institutions on small business enterprises among members of self help groups in Nakuru, Kenya	Government of Kenya (GoK) and Egerton University
Molecular Genetic Polymorphism of Kappa Casein Gene in Indigenous Kenyan goats: implications for better milk production traits	Government of Kenya (GoK) and Egerton University
Conservation, profitable cultivation and efficient processing of Aloe	Government of Kenya (GoK) and Egerton University
ON-GOING OUTREAH ACTIVITIES	
Community Based Diary Goat Project	
Egerton University Biogas Plant Project	
Community Based Local Chicken Project	
Solid Waste Management Project	
Organic Compost Making Project	
Soil and Water Conservation Project	
Bee Keeping Project	
Fish Farming Project	
Doing Goats Project	
Ambulating Services	

Source: Field Surveys

Collaborating Donor Agencies

Funding Agency	Training	Financial	Others
Kenya Agricultural Productivity Project (KAPP)	√		
Lake Victoria Research Initiative (VICRES)		√	
Food and Agricultural Organisation (FAO-FNP)		√	
European Commission (EC)		√	
European Union (EU)		√	
International Foundation for Science (IFS)	√	√	
EDULINK-ACP		√	
East African Academy of Sciences (EAAS)	√	√	
Organisation for Social Sciences Research in Eastern and Southern Africa (OSSREA)	√	√	
Commission for Higher Education (CHE)	√		
Global Challenge Programme	√	√	
United States Agency for International Development (USAID)	√	√	
National Council for Science and Technology (NCST)	√	√	
Government of Kenya (GoK)	√	√	
Egerton University (EU)	√	√	

Source: Field Surveys

Curriculum Review, Lessons and or Innovations

The University curriculum was developed way back as far as when the university was established. There exists a faculty curriculum review committee and the last review was held last year. The changes in the curriculum were reported to have been based on needs identified by the lecturers; this is so because the those lecturers that have had a chance to train from outside have been able to influence these changes as a way of incorporating what they have gained from courses offered outside their country during training. The students also play a part for example they are demanding for more practical courses that can help them better address industry and community demands.

The Faculty of Agriculture has scheduled it next review for 2012. In the Faculty, departments are resourceful as they develop the curriculum based on individual departmental strategic needs and they then forward to the faculty for scrutiny. The Faculty committee the sits and they discuss what the departments have submitted. After this exercise the reviewed documents are then sent back to individual departments to make the necessary adjustments before they are forwarded to university senate for approval. Normally, this involves external stakeholders and sometimes the needs identified by them sometimes calls for review of the curriculum. They are always invited for consultative workshops and this depends what the sort of review is it. For example if it is for undergraduates there exists the Board of Undergraduate studies that discusses and approves the changes identified and recommendations by the stakeholders and if it is the Postgraduate there is the Board of Postgraduate studies that that approves the higher degree curriculum review changes at Senate level.

When all this is done, the stakeholders together with academics at the faculty ensure that communities re engaged and this is ensure even at curriculum review these are integrated. For example there is what is called problem based learning under the framework of projects running at the faculty where students are asked to identify problems from the communities and work with communities to help and solve problems at hand. This is done in a collaborative manner so students develop topics in line with the field problem; they are attached to fields and later on assigned supervisors who follow them up in the field. At the end the students are awarded marks on presentation of the report and usually the communities where these students have been working are invited to attend the sessions. Modules such as entrepreneurship have been integrated in the curriculum in the faculty so that students are equipped with knowledge and skills of being job creators rather seekers and this is of the innovations to add on the development of new livestock species and policies.

Innovations in the curriculum are seen to be cutting across all programmes running especially the department of animal science and currently, it is one few departments undertaking a number of research projects. Such innovations take into consideration availability of resources both material and human. This is because it is a university wide policy for faculties not to develop curriculum that would not utilize the available resources in term of man power and physical facilities such as laboratories among others. In so doing, the subject content the sequencing of topics and availability of the infrastructure in terms of space are factored in. The staff has also had a chance to attend pedagogic seminars and these are annual or biennial and these are organized by the Faculty of Education based on the available resources. They said these are critical as they have helped academic staff to deliver effectively as most are not trained teachers something they are happy about. These seminars usually focus on content delivery and curriculum development.

During the review process, new programmes have merged for example in animal science department there are programmes such as Non conventional animal production and policy which are running and they are a result of review exercise; and these were identified as necessary since they are tied to emerging issues. The review of the curriculum brings with itself a lot of changes and among those highlighted is the new delivery methods adopted to effectively deliver the curriculum. Such delivery strategies involve use of audio-visuals, Internet to access latest literature, field trips, the traditional chalk and dictation of notes. The experiences acquired from the changes in delivery are usually shared through seminars and conferences organized by the faculty. The staff also acknowledged that there was faced with a number of challenges among which financial and human resource being critical. They also said there are positive and negative points with this whole process. Among the positives they cited the increase in students' numbers (enrolments) for the new programmes and on the negative side, they are having a heavy teaching load due to human resource constraints and the need to upgrade the existing facilities to match up with the increasing numbers.
The whole faculty was contented with the outcomes of the review since the new developed curriculum now addresses emerging issues for the country and for the students. And others said they are not that much impressed with the outcomes because it is a time consuming exercise and tedious and requires updating one's skills to deliver effectively.

Need and Future Outlooks

1. Strengthening the research component
2. Human resource development
3. Infrastructure development and upgrade
4. More donors funding
5. Staff development: the faculty identified the areas as critical for short courses for staff development: proposal writing so as to win grants, data management, ICT in agriculture for example Web 2.0.
6. There is need to develop "ctualize" centers/laboratories for specific areas of research and graduate training, which would be well equipped and staffed.

Faculty of Environment Current Status- Egerton University

The Faculty of Environment and Resources Development (FERD) is a multi-disciplinary, dynamic, client and research oriented facility, dedicated to training human capacity and conducting research in all aspects of natural resource, environmental management and socioeconomic development. The faculty offers strong teaching, research and outreach programmes leading to Certificate, Diploma, Bachelor of Science, Master of Science and Doctor of Philosophy degrees in Natural Resources Management, Environmental Science, Geography and Ecotourism and Hospitality Management.

FERD was founded in January 1999 in response to national and international needs for sustainable management of natural resources and the environment. The need for sustainable management has been brought about by increase in human population, which has placed enormous demands on resources. An increasing population, growing industrial sector and agricultural production in Kenya are the major threats/challenges that require holistic approaches to management.

The programmes in the Faculty emphasize "hands-on" experience to equip students with practical research skills for mitigating and/or solving both local and global environmental problems. Students are required to take core and elective courses, but specialise in any of the Faculty thematic areas:

1. Environmental planning and management
2. Natural resource management
3. Biodiversity management
4. Earth science systems
5. Environment and society
6. Eco-tourism and Hospitality management

Academic Programmes

The Faculty currently offers courses leading to Certificate, Diploma, Bachelor of Science, Master of Science and Doctor of Philosophy in: , Environmental Science, Natural Resources and Ecotourism and Hospitality Management

The programmes in Environmental Science are based on the following broad areas.

- Environmental health; Environmental Policy and Law, Environmental Planning and Management, Water and Sanitation, Disaster Management, Climate Change, Biodiversity Conservation, Environmental Research and Technology, Environmental Pollution and Control, Environment and sustainable Development, Renewable and Non Renewable energy resources, Programmes in Natural Resources Management are based on the following broad areas, Forestry resources, Wildlife resources, Arid and semi arid Land resources, Non renewable resources (Mineral Resources) and Human Ecology.

The programmes in Ecotourism and Hospitality management are based on the following broad areas

- Wildlife based tourism, Communication, Cultural and Community studies, Entrepreneurship, Hospitality and Foreign Languages,
- The programmes in Wildlife Enterprise and management are based on the following broad areas
- Wildlife Management, Nature Conservation, Community Participation and Benefit sharing in Wildlife Enterprise with stakeholders.

Proposed Programmes

FERD endeavors to improve and expand the current Certificate Diploma B.Sc., MSc. And PhD programmes to meet the needs and challenges of the society and job market. However, the faculty plans to venture into short client-driven professional courses that target various professionals who are working in various government and private sectors. Some of the proposed programmes include:

Department of Environmental Science:

- Certificate course in Environmental Management
- MSc. In Environmental and Occupational Health

Student Enrolment

Department of Natural Resources

Year	B.Sc.	SSP	M.Sc.	Ph.D.	*Total*
2008/2009	80	05	6	3	96
2009/2010	84	10	8	5	107

Source: Field Surveys

Department of Environmental Science

Year	B.Sc.	SSP	M.Sc.	Ph.D.	*Total*
2008/2009	110	6	18	5	133

2009/2010	120	75	20	6	221

Source: Field Surveys

Staff Establishment as of 2008/2009

Department	PhD Holder	MSc. Holder	B.Sc Holder	Rank of Staff						Total Staff
Ranking				P	AP	SL	L	AL	TA	
Natural Resources	04	03	00	00	00	02	02	03	00	07
Environmental Science	03	07	00	00	00	02	05	03	00	10

Source: Field Surveys

Research and Outreach Achievements

The Faculty is currently focusing on training with little or no research activities due to limited human and financial support.

Collaborating Donor Agencies in the Faculty of Agriculture

The University is currently supporting all faculty activities

Curriculum Review and Lessons/Innovations in FERD

The faculty curriculum was established in the year 2002. There exists a curriculum review committee at the FERD. The Faculty held its last review two month ago that in April 2009 and its major driving force was the need to have programmes that meet market needs. The changes in the curriculum were seen to be mostly identified by first, lecturers who were pointed out to be more averse with the changing social, economic and academic needs of students. Students too were noted to be identifiers with the sole reason being that it is the students who choose courses that are marketable to them so that they do not become unemployed after campus.

The next curriculum review of the faculty is scheduled for February 2010. Departments in the Faculty do play a fundamental role in curriculum development and these identify and develop new courses and push curriculum for approval by Senate. The Faculty also engages stakeholders and these help in determining whether the programmes meet the standards generally accepted by the commission for higher education in Kenya.

The curriculum takes into account real world examples; at faculty level these are brought in based on the texts used for teaching and which are recommended. The curriculum is thoroughly discussed and approved by experts who consider all key areas. The curriculum also reflect contemporary issues as it addresses day to day activities as they take place in the society. It is modified /revised always to meet the changing needs of the society. Within the faculty innovations were seen to have taken place in the Bachelor of Science in Natural Resources Development because of availability of trained personnel and outreach activities carried out. These innovations in the curriculum are tied to availability of resources both material and human resources. The availability of trained personnel in any thematic areas of the faculty has prompted the need for more programmes to accommodate the increasing needs for the consumers of the products. Another factor pointed out is the subject content and they said the innovations are made with an aim of getting the information necessary for the students when they leave college so that they meet the ever changing community needs.

Thirdly sequencing of topics was among the other considerations that bring about innovations in the curriculum simply because this ensures consistency and coherency in the flow of information and it

also offers basic insights to the learners so that they can predict the outcomes of their learning activities. Other factors identified includes marketability, it is argued that when programmes are reviewed and innovated they meet the market demands of the job industry.

The faculty staff also undergoes pedagogy seminars since they acknowledged they are not teachers by professionals. This is mainly in the form of academic advising and classroom presentation and they are held in the university. During review of the curriculum, no new courses were introduced. And the main teaching strategies used in the implementation of the curriculum includes, audio-visuals, internet, traditional chalk and dictation of notes, field trips and academic research papers by students. The acquired information is shared through seminars, symposia, conferences, exchange programmes and group discussions and presentations.

In the review process the faculty is faced with challenges associated with financial resources and institutional commitment. The review process has had positive attributes such as tailoring the programmes to meet the job market demands. No negative attributes were identified and the faculty as a whole feel satisfied with the outcomes of the review process because the faculty graduates are immediately employed after studies.

Faculty Future Outlooks and Needs

Some of the outlooks are highlighted as below;
In the School of Natural Resources Management the following Research Centers need to be established:-

- Centre for tropical forestry and watershed research
- Centre for non renewable resources research

The School of Environmental Science wishes to develop the following centers for research excellence in the next 10 years:

- Centre for Geo-technological and Environmental Risk Analysis
- Centre for Policy analysis, Rural and Urban Development
- Centre for Pollution Prevention and Control
- Centre for Environmental Policy and Law
- Centre for Environmental Impact Assessment
- Centre for Disaster Awareness and Preparedness
- Centre for Poverty, Environment and Development

Rwanda: National University of Rwanda

Agricultural Training in Rwanda

Only 20% of those that complete primary school proceed into secondary education. Science study is encouraged through differential funding. Science students (including those taking agriculture) receive US$3000 per student for science disciplines and US$2800 for arts disciplines from the state (compared to US$1375 and US$1175 in Kenya). Rwanda agricultural students on internship are paid US$2 per day - their Kenyan counterparts are paid nothing. In addition students on internship in Rwanda are followed-up by members of staff of their universities to assess progress, whilst in Kenya internship assessment is based on a student's own report.

At the National University of Rwanda (NUR), about 30% of the teaching staff are currently, are undertaking further education. The national aim is for 10% of population to be graduates, which is

widely regarded as the minimum for a knowledge economy[5]. Presently there are 273 undergraduates. Agriculture is now a 4 year programme with options in Crop Science, Agricultural Economics and Agribusiness Management, Soil Science and Animal Science. In terms of overall science degrees, students' preference agriculture comes after medicine and pharmacy.

Institutional Background

The National University of Rwanda (NUR) was created in 1963 conjointly by the Rwandan government and the Congregation of the Dominicans from the Province of Quebec (Canada). NUR was then composed of three academic units: the Faculty of Medicine, the Faculty of Social Sciences and the Teacher Training College (ENS). At that time, it had 51 students and 16 lecturers. By 2005, the university had 8221 students and 425 lecturers. For the university to achieve its goal of providing quality education, several faculties have been setup as decentralised units to create a conducive environment for students and academic staff.

The Faculty of Agriculture

The Faculty of Agriculture implements NUR mission of: Teaching, Research, and Outreach. The Faculty is currently made up of: Four Departments and these are;

1. Animal Science formerly Animal Production (AP)
2. Crop Science formerly Crop Production and Horticulture (PVH)
3. Soil and Environmental Management (SGE) and,
4. Agricultural Economic and Agribusiness formerly Agro-economics and Agribusiness (AGEC)

Academic Programmes

The Faculty of Agriculture offers four undergraduate programmes. All share most of their first year, covering the basic physical and human science needed for an understanding of agriculture and its context and introducing study skills and ICT. The first three among those listed below share modules during the rest of the programme – e.g. soil fertility watershed management, agricultural engineering, geosciences and agricultural economics and farm management, and they include a period of internship.

1. Bachelor of Science Animal Science – Duration is Four Years
2. Bachelor of Science Crop Science– Duration is Four Years
3. Bachelor of Science Soil Science and Environmental Management
4. Bachelor of Agricultural Economics and Agribusiness

There exists only one Masters Programme that is Master of Science Agro forestry and Soil Management which aims at responding to challenges facing rural communities such as environmental degradation due to the over-increasing pressure on lands, problems of decline of soil fertility, and sedimentation of marshlands, which affects the sustainability of rural livelihoods in the country. The duration for the Masters programme is two years where the last year students are expected to write a thesis. The Faculty also has one post graduate Diploma in Irrigation and Drainage whose duration is one year. These post graduate courses are mounted in the Department of Soil and Environmental Management (SGE). There are no Doctoral and Diploma programmes at the Faculty and there is need to introduce these programmes.

[5] Most developed countries have achieved 20% graduates as a percentage of the total population

It was not possible to find data about student's enrolments by gender and per programme category for the Undergraduate students as these records were scattered in various Faculties. The Faculty Dean said students admitted to undertake agriculture take their first year in the Faculty of Science where they are taught generalities and thereafter they join the Faculty of Agriculture in Second year. So, it was not possible to establish these numbers as per the original table provided in the survey tool. For the post graduate diploma in Irrigation, enrolments are as shown in the table and this is so because this was a one year project that drew participants from Rwanda, DR Congo, Sudan and Burundi. The Masters programme in the Department of Soil and Environment Management started in 2006 with thirteen male students and intake for the academic year 2009 was due to take place in September so numbers weren't available.

Students Enrolment over the over the last 5 years

Programme Category	Number of Students									
	2005		2006		2007		2008		2009	
Bachelor of Science	263		258		290		548			822
	M	F	M	F	M	F	M	F	M	F
Post Graduate Diploma	00	00	00	00	46	4	00	00	00	00
	M	F	M	F	M	F	M	F	M	F
Master of Science	00	00	13	0	13	00	18	05	-	-

Source: Field Surveys

Staff Establishment at Faculty of Agriculture for the period 2008/2009

Department	PhD Holder	M.Sc. Holder	B.Sc Holder	Rank of Staff						Total Staff
Ranking				P	AP	SL	L	AL	TA	
Agricultural Econ. & Agribusiness	01	07	00	00	00	01	0	07	00	07
Animal Science	01	05	00	00	00	00	03	03	00	06
Crop Science	05	08	00	01	01	03	01	07	00	13
Soil and Environmental Management	06	04	00	02	01	03	02	02	00	10

Source: Field Surveys

Research and Outreach Activities

The university is currently doing training and not very much engaged in research apart from Doctoral research activities.

Collaborative Donor Agencies

Sida-SAREC was mentioned to be the leading donor university wide and as it provides capacity building for staff to undertake Doctoral training in Sweden and financing of Information and Communication Technology equipments, Internet inclusive and subscription to Electronic Journals for students and staff to access. Other Donors on board are as enumerated in the table below.

Discussions with the Dean also indicated that for now the Faculty does not have particular donor agencies that are funding it but rather all the support is goes through the University Administration that then allocates resources as per the needs of different Faculties.

Funding Agencies	Type of support		
Agency	Training	Financial	Others
Sida-SAREC-Major Donor	√	√	
Belgium Government	√	√	
NUFFIC	√	√	
DelPHE-British Council	√	√	
SSP-CP	√	√	
USAID	√	√	Community Service

Source: Field Surveys

Curriculum Review and Lessons/Innovations

The Faculty of Agriculture Curriculum was developed in 2005and revalidated in 2007. There is no curriculum review committee at the Faculty but within the Faculty, the curriculum is reviewed by Lecturers in each department and then submits proposals to the Faculty Board. The Faculty the reviews all the proposals for approval and thereafter the approved proposals are sent to the Director of Quality who sends them to external reviewers and together with University Senate the proposals are approved. The approved proposals are forwarded to the National High Education Council for approval and validation before the University can execute them. The major driving force for the revalidation of the curriculum in 2007 was the need to move away from teacher centered to student centered system of learning, abandoning the courses system to modular system as requested by the National Qualifications Framework headed by the National High Education Council of Rwanda.

The changes in the curriculum were not based on Lecturers nor students needs but rather needs identified by the national stakeholders- due to demand driven products. The Faculty also was not aware when the next review is scheduled as they have little control and say and since it is the responsibility of the National Qualifications Framework headed by the National High Education Council. Specifically the departments in the Faculty, their role in the review of the curriculum is to develop programme proposals, module descriptions, module specifications ad identification of resources for teaching and then submit the proposals to the Faculty Plenary for further discussions. In this process it was also acknowledged that external stakeholders were not engaged in the development and review of undergraduate programmes but they were brought on board in reviewing and developing postgraduate programmes, where they were invited to consultative workshops for curriculum orientation and to identify training needs and gaps.

Real world examples and case studies for community engagement are integrated during curriculum review and development for example in student's research projects in the fourth year finalists who engage communities during field visits. Also the staff for example in the Department of Crop Science, they have what they call the Global Plant Clinic where they go to the field interacting with communities and indentifying problems related to food and industrial crops. It was also mentioned that the existing curriculum does not reflect contemporary issues and emerging trends in agriculture for example climate variability and change. The Faculty also recognized this as a need for the next curriculum review and suggested that modules on climate change and variability should be incorporated.

The Faculty also recognized that there are programmes where innovations have been seen to take effect and this mainly in the Post graduate diploma in Irrigation and the Masters programme in Agro forestry as students have one or two years of specializations students have had acquired new skills say in using GIS and Remote sensing, application of Agribusiness and soft skills in ICT introduction in the curriculum where students no longer depend on Secretaries but are able to typeset their assignments and dissertations, this way the impact of these innovations has been evaluated.

Among the factors that have been considered in effecting the above innovations includes, availability of resources and the Faculty says despite challenges like insufficient human and financial resources, the Government of Rwanda pays the University staff to teach students who are able to solve problems the country is facing as it is not that willing to hire machineries from outside the country to come and solve their own problems which they better understand and can thus solve without using external manpower who have less or no knowledge of the country problems. The subject content is another and this comes into play especially when designing case studies, they need to be tailored to solving particular problem from the stakeholders. And the sequencing of topics is critical as each module has pre-requisites and within each module, the major topics are covered each one having a pre-requisite.

There has been no pedagogic seminar for the Faculty staff ever since the curriculum was developed in 2005 and there is expressed need for this. In the revalidation exercise held in 2007 new courses such as ICT were introduced. The faculty also acknowledged that the revalidation was necessary as this was the only opportunity to address the stakeholders' training needs and to scale down the five year undergraduate degree programmes to four years. There is thus built trust that every after a period of four years the University has to churn out students to go and help the country in addressing emerging development challenges.

In the implementation of the new curriculum, teaching strategies such audio visuals, traditional chalk and dictating of notes, the Internet and Field trips are being used. When it comes to sharing experiences, monthly seminars and conferences are the main methods used. The Faculty has also experiences challenges in terms of time, financial and human resources and institutional commitment.

The review process has also had positive and negative attributes, among the positive is the reduction of the programme duration for undergraduate courses from five years to four years, recognition status and awards at various levels as the student progresses for example if a student drops out after completing year one the university awards the student a certificate of higher education, after second year, she or he receives a diploma in higher education, third year first semester, the university awards the student an Advanced diploma in Higher education, third year second semester, the students receives an Ordinary degree and if she/he complete the degree the university awards a Honour a step up that is not in other institutions around a student goes bear handed. Besides these positive attributes, review of the curriculum has brought along negative attributes such as lack of resources human and financial, adapting to the new form of delivery and understanding the content both for the teachers and students is still a problem. There has also been resistance from students who find the new modular system cumbersome and yet the time period is too short to cover the content, this restrains them.

There is thus need to put in place strategies for building capacity at Master's and Doctoral level, develop short course training programmes targeting people from both public and private sector for income generation and purchase of equipments for example computers and laboratory equipments to effectively implement the new curriculum. The faculty also feels not satisfied with the curriculum as the process of transition is fast and there is lack of preparedness from the staff and students. Also, the faculty feels there should be a way in which it is represented in the National Qualifications Framework which finally approves the programmes but sometimes they make decision minus consultation with staff at the Faculty who initially develops the programmes. They also feel there still need to constantly revisit the curriculum, to include for example emerging global problems such as climate change, or even when the market or new stakeholder demands are identified.

Needs and Outlooks

There is need introduce Master's and Doctorate programmes in each department

- Engage in community outreach activities
- Short course training in for example proposal writing and data handling
- Conduct research along value chains
- Introduction of new programmes such as food science and technologies, Agricultural Engineering and Mechanisation and Water Engineering
- Building the capacity of the Faculty and strengthening the existing human resource base
- Building Capacity for the University of Agriculture and Natural Resources instead of Faculty of Agriculture only.

Southern Africa

Zambia: University of Zambia

Institutional Background

The University of Zambia situated on an area of about 290 hectares on Great East Road, 9 kilometers from Lusaka town center was legally established in 1965 through an Act of Parliament and the foundation stone was laid on 13th July 1966. The institutional head is the Vice Chancellor. The University has 9 Schools (Humanities and Social Sciences, Natural Sciences, Education, Law, Medicine, Engineering, Mines, Veterinary Medicine and Agricultural Sciences). In its 9 Schools, the University of Zambia has a current enrollment of 10,600 students and the current staff number is 2,800.

The Faculty of Agriculture- Current Status

The School of Agricultural Sciences has about 450 students. It has five (5) Departments namely: Agricultural Economics and Extension Education; Animal Science; Crop Science; Food Science and Technology and Soil Science Departments with 45 professionally qualified academic staff and over 60 support staff.

The School offers both undergraduate and postgraduate degree programmes. There are two undergraduate degree programmes: a five (5) year Bachelor of Agricultural Sciences and a recently introduced five year Bachelor of Food Science and Technology which started in 1997. The Schools mandate is teaching, research and outreach. The first graduates in the Bachelor of Food Science and Technology graduated in 2004.

The Master of Science (MSc) postgraduate degrees are in Agronomy (Crop and Soil Science), Crop Breeding and Seed Systems, Agriculture Economics and Animal Science. The School was the Centre of Excellence in MSc in Agronomy in the Southern African Development Committee (SADC) region. This programme has produced over a hundred and thirty graduates from the region since its inception in 1988.

The School has enjoyed good International and National linkages over the years. Rockefeller Foundation provided training and research grants for MSc program in agronomy from 2003 to 2006 for students from the SADC Region training at the University of Zambia. Currently RUFORUM supports MSc training in 3 Departments. There is also a SADC/ EU training grant for Seed System from 2007 to 2011.

The School has departmental laboratories, a 5 Ha field Station on campus and a Seven hundred (700) Ha university farm for training and research. The departmental laboratories provide soil and plant analyses, food chemistry, nutrition and microbiology analysis, animal feed analysis, production of mushroom spawn and tissue culture services. The Food Chemistry and Microbiology laboratories are in the process of accreditation and participate in the inter Laboratory testing schemes through Agriculture Laboratories of Southern Africa (agriLASA).

Academic Programmes

Undergraduate Programmes

There are two Undergraduate programmes offered in the Faculty of Agriculture and these run for a period of five years: B.Sc Agriculture (five options) Animal Science, Agricultural Economics, Agricultural Extension and Education, Crop Science and Soil Science. And the other programme is the Bachelor of Science and Technology

Post graduate Programmes

At the post graduate level, there are only four Master programmes as enumerated below;

1. Master of Science Agronomy (Crop and Soil Science)
2. Master of Science Crop Breeding and Seed Systems
3. Master of Science Agricultural Economics and,
4. Master of Science Animal Science

Doctor of Philosophy (Ph.D.) Programmes in the Faculty

The Doctoral programmes offered are in the fields of Crop Science, Animal Science, Soil Science and Agricultural Economics

Student Enrolment at both Postgraduate and Undergraduate levels in the past 5 years

a) Undergraduate

Department	Diploma	B.Sc.	Postgraduate Diploma
Crop Science		150	
Animal Science		40	
Food Science & Technology		45	
Soil Science		50	
Agricultural Economics & Agribusiness		160	
Others(please specify)			

Source: Field surveys

b) Postgraduate

Department	MSC	PhD
Crop Science	45	2
Animal Science	10	1
Agricultural Engineering		
Food Science & Technology		
Soil Science	14	5
Agricultural Economics & Agribusiness	3	
Others (please specify)		

Source: Field surveys

Student Enrolments in the Faculty for the past 5 years

Year	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009
PhD		2	3	6	8

MSc	10	10	12	17	24
B.Sc.	330	320	335	389	450
Diploma	None	None	None	None	None

Source: Field surveys

Academic Staff Levels

The current staff distribution in the Faculty during the 2008/2009 Academic Year

Department	PhD Holder	MSc. Holder	B.Sc Holder	Rank of Staff						Total Staff
Crop Science	5	6	2	P	AP	SL 5	L 8	AL	TA	13
Animal Science	6	3	2			6	5			11
Agricultural Engineering										
Food Science & Technology	1	6	2			1	5	3		9
Soil Science	5	2	1	1	1	3	3			8
Agricultural Economics & Agribusiness	2	8				2	6	2		10
Agricultural Extension/Education										

Source: Field surveys

Key: P: Professor, AP: Associate Professor, SL: Senior Lecturer, L: Lecturer: AL: Assistant Lecturer and TA: Assistant Lecturer

A) Research and Outreach Activities

The existing research activities that the Faculty is currently undertaking are presented in the table below

Name of Researchers/ Consultants	Title of Research Project	Donor	Expected Date of Completion of Project	Duration of Project
Thomson Kalinda, Fabian Maimbo, Priscilla Hamukwala and Diana Banda	In the Shadow of a Conflict: Impacts of Zimbabwe's Land Reform on Rural Poverty and Development in Mozambique, South Africa and Zambia	NORAGRIC	February 2010	2 years
Thomson Kalinda, Gelson Tembo and Elias Kuntashula	Diagnosing Maize Environments, Seed Systems and Identifying Big-impact Investment Paths	Bill & Melinda Gates Foundation (B&MGF) and International Maize and Wheat Improvement	December 2010	3 years

		Center (CIMMYT)		
Priscilla Hamukwala and Gelson Tembo	Factors Impeding Improved Seed Use By Sorghum & Pearl Millet Smallholders: A Value Chain Study in Zambia	Norman Borlaug Research Grant-USAID	October 2009	1 year
F. Haazele and K. Walubita	Production Potential and Production Requirements for Japanese Quail (*Coturnix coturnix japonica*) under Zambian Conditions	Sector Pool Fund	Programme ongoing	1 year
J. Simbaya, P.C. Sianangama, K.E. Yambayamba, V. Simoongwe	Development of feeding strategies for improved meat and milk production in Palabana and Njolwe dairy tenant schemes	International Atomic Energy Agency (IAEA) AND GRZ	April 2010	2 years
K.E. Yambayamba and M.N. Musukwa	Evaluation of Local Chickens for Increased Productivity Among Smallholder Producers in Zambia	National Science & Technology Council (NSTC)	July 2010	1 year
K. Munyinda and D.M. Lungu	Jatropha Improvement Through Induced Mutation in In-vitro Mutagenesis	IAEA	2014	5 years
P.H. Sohati, E. Kaimoyo and K. Munyinda	Screening Cowpea mutants against Aphis craccivora	IAEA	2011	5 years
K. Munyinda, D.M. Lungu and M. Mwala	Selection of Cowpea Mutants for Desirable Traits	IAEA	2010	5 years
D.M. Lungu, P.H. Sohati and K. Munyinda	Breeding for Bruchid Tolerance/Resistance in Susceptible Common Bean Varieties	IAEA	2015	5 years
K. Munyinda and R. Chanda	Effect of Management on Nutrient Content of Biofortified Carioca Mutant Derived Lines	IAEA	2012	3 years
P.H. Sohati and K. Munyinda	Evaluation of Carioca Mutant Derived Bean Lines for Tolerance to Bean Stem Maggot	IAEA	2012	3 years
K. Munyinda and M. Mwala	Field Evaluation of Sakala Bean Mutants	IAEA	2010	5 years
K Munyinda	Evaluation of Micronutrients in Carioca, Solwezi Rose, Lyambai and Lukupa Mutants through Neutron Activation Analysis	IAEA	2012	5 years
K. Munyinda and M. Mwala	Maize Mother Baby Trial in Palabana and Silver Rest Area in 2007/08	CIMMYT	2014	5 years
T.T. Kambikambi	Evaluation of Efficacy of Imazapyr-Resistant (IR) Maize (Zea mays L.) for Control of Parasitic Witchweed (Striga asiatica L.)	CIMMYT	2012	3 years
K. Munyinda and M. Mwala	Regional Maize Trials with Germplasm Adapted to Sub-Saharan Africa	CIMMYT	2009	1 year
K. Munyinda and M. Chisi	Effect of Plant Population on Biomass and Sugar Accumulation on Sweet Sorghum Varieties	CEEEZ; Common Fund for Commodities	2010	3 years
K. Munyinda and P.H. Sohati	Control of Stem Borers in Sweet Sorghum	CEEEZ; Common Fund for Commodities	2010	3 years
K. Munyinda	Effect of Maize Inoculant on Sweet	CEEEZ; Common	2010	3 years

	Sorghum Stem and Grain Yield	Fund for Commodities		
K. Munyinda and M. Chisi	Breeding for Sugar Content in Highly Productive Grain Sorghums	CEEEZ; Common Fund for Commodities	2014	5 years
K. Munyinda and M. Chisi	Time of Harvest for Stem and Grain Yield of Promising Sweet Sorghum Varieties	CEEEZ; Common Fund for Commodities	2012	3 years
K. Munyinda and M. Chisi	Effect of N and P on Biomass and Sugar Accumulation in Sweet Sorghum Varieties	CEEEZ; Common Fund for Commodities	2010	3 years
K. Munyinda	Evaluation of Biomass in Sommerset and NIRS Mutant Derived Velvet Bean Lines	IAEA	2009	5 years
K. Munyinda	Selection of Biomass in W. Green and W. Sam Velvet Bean Varieties (Mucuna Pruriens) through Induced Mutation	IAEA	2010	5 years
K. Munyinda	Selection of Seed Yield in W. Green and W. Sam Velvet Bean Varieties (Mucuna Pruriens) through Induced Mutation	IAEA	2010	5 years
K. Munyinda	Evaluation of seed yield in Sommerset and NIRS Mutant Derived Velvet Bean Lines	IAEA	2009	5 years
K. Munyinda	Evaluation of Nitrogen Fixation in Sommerset and NIRS Mutant Derived Velvet Bean Lines	IAEA	2012	3 years
K. Munyinda	Evaluation of L-Dopa Concentration in Velvet Bean Mutants	IAEA	2012	3 years
D. Jackson, (UNL), H.B Moonga, J. Shindano, T. Hachibamba, V. Nyau, M. Mwale (UNZA)	Replication and Scale-Up of an Extension-Product Development Assistance Model for Zambia: A Strategy to Promote Increased Use of Sorghum and Millet	Intsormil in collaboration with University of Nebraska	September 2010	3 years
Bridget O'Connor (KATC), B.H. Chishala, B. Moonga, E. Kuntashula, K. Munyinda, S. Ngandu and F. Haazele	Permaculture Trial	Regional Schools and Colleges Permaculture Education (RESCOPE)	June 2010	1 year
John Volk (PhD Student) and B.H. Chishala (Supervisor)	Heavy Metal Uptake of Crops Grown with Contaminated Irrigation Water	Department for International Development (DfID)	December 2009	4 years
J. Simbaya, P. Hamukwala, L.M. Chabala, M.M. Mwale and J.C.N. Lungu	Agriculture, Science, and Technology Innovation Systems: The Case of the Zambia Dairy Sub-Sector	CTA	August 2009	8 months
Elijah Phiri, Olusegun Yerokun and Moses Mwale	Evaluation of Evapotranspiration of Paprika (Capsicum Annum L.) Under Drip Irrigation Using Isotopic Techniques	International Atomic Energy Agency (IAEA)	September 2011	3 years

Funding Donor Agencies

Funding Agencies	Type of support		
Agency	Training	Financial	Others
SADC/EU	MSC		
Ministry of Science and Technology (Zambia)	MSC and PhD		
Omnia Fertilizer Ltd	B. Agric Science Degree		Renovation of Infrastructure

Lessons/innovations in attempts to improve the Agricultural Curriculum

The undergraduate curriculum was developed in 1988; the curriculum review committee last met in 1993 for undergraduate courses and the major driving force was as a result of stakeholders' requests. A number of lecturers had come back from MSc and PhD studies and they felt the curriculum was lacking in some ways. Stakeholders were subsequently consulted by questionnaires but the response was poor. Students participated in deliberations through Board of Studies representations. The next curriculum review is ongoing and is almost complete for undergraduate courses. A one day stakeholder consultation was carried out and the Departments are now in the process of consolidating the inputs. In general, it is departments that initiate the process of developing the faculty curriculum by developing the course contents. The external stake holders are engaged through a stakeholder workshop to enlist their views on the current curriculum based on what they perceive from the performance of graduates. Lecturers learn contemporary and emerging issues from workshops, research results, internet and lobby to include them in curricula. Consensus though must be reached before inclusion into the new curriculum.

Teaching strategies that have been used in the implementation of the new curriculum include the use of audiovisuals, the internet, traditional chalk and notes dictation in addition to field trips. Seminars and conferences as well as back to office reports are the methods used to share learning experiences amongst the staff. The challenges encountered in implementing the new curriculum include financial resources which are a big challenge. The faculty raises its own funds through consultancies for implementing curricula. Human resources is also a big problem especially given that that there has been a freeze on employment for a few years now and it is part-time lecturers that are the current solution to fill this gap.

The review of the curriculum has also faced some problems given that most staff prefer to keep teaching the same courses they have taught for years. This has been difficult to change despite the fact that curriculum review leads to dropping of some sections in order to fit in emerging issues. Sometimes this has led to the dilution of the University level academics in order to please the stakeholders by infusing a lot of practical aspects. Some suggestions to counteract these attributes

include reminding staff members that University training is not the same as certificate and Diploma training. Theoretical aspects must be included. After stakeholder consultations, the final decisions must be left to the academics.The curriculum should be tested for a few years in order to gauge how good it is given that it is also an expensive venture if you want to do it right. As University of Zambia there is a need for assistance in reviewing the MSc curricula, to develop coursework for PhD in all departments and to comprehensively review the current undergraduate curricula.

Zimbabwe: University of Zimbabwe

Institutional background

The University of Zimbabwe was established in January 1953. The institutional head is Professor Levi Nyagura and the current student number is 12, 526 and the current permanent teaching staff members are 537 although there is a large number of full-time temporary lecturers. The university has 10 faculties which are Education, Arts, Agriculture, Engineering, Social Studies, Law, Commerce, Science, Medicine and Veterinary Science. The Chancellor of the University is the reigning President of Zimbabwe, Mr. Mugabe and he is the one who appoints the Vice Chancellor and two pro-vice chancellors.

Faculty of Agriculture- Current Status

Faculty of Agriculture has four departments and these are:

1. Soil Science and Agricultural Engineering
2. Animal Science
3. Crop Science
4. Agricultural Economics

Currently the university has three undergraduate degree programmes that fall in the following categories:

- B.Sc Agricultural Engineering
- B.Sc Applied Environmental Science
- B.Sc Agriculture

The postgraduate degrees include and MPhil and PhD by research only, there are no taught classes. At Masters level the students can research on any of the four disciplines for the undergraduate degree programmes and they can also embark on cross-disciplinary research work.

Student Enrolment at both Graduate and Undergraduate Levels in the past 5 years

c) Undergraduate

Total number of Undergraduate students in the departments of the Faculty over the last 5 years			
Department	Diploma	B.Sc.	Postgraduate Diploma
Crop Science		200	
Animal Science		220	
Agricultural Engineering		75	
Soil Science		60	
Agricultural Economics & Agribusiness		120	
Agricultural Extension/Education			
Others(please specify)			

Postgraduate

Department	M.Sc.	PhD
Crop Science	60	3
Animal Science	None	None
Agricultural Engineering	50	2
Soil Science	75	4
Agricultural Economics & Agribusiness	75	
Others (please specify)		

Source: Field Surveys

The student enrolment in the faculty for the past 5 years
Student Enrolment in the Past Five (5) Years

Programme Level	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009
Doctor of Philosophy					
Master of Science	41	41	64	64	42
Bachelor of Science	450	436	451	450	452
Postgraduate Diploma					
Diploma					

Source: Field Surveys

Academic Staff Levels
The current staff distribution in the Faculty during the 2008/2009 Academic Year

Department	PhD Holder	MSc. Holder	B.Sc Holder	Rank of Staff						Total Staff
				P	AP	SL	L	AL	TA	
Crop Science	3	8								Not grouped
Animal Science	2	7								Not grouped
Agricultural Engineering	2	8								Not grouped
Food Science & Technology										
Soil Science	2	8								Not grouped
Agricultural Economics & Agribusiness	3	6								Not grouped
Agricultural Extension/Education										

Source: Field Surveys
Key: P: Professor, AP: Associate Professor, SL: Senior Lecturer, L: Lecturer: AL: Assistant Lecturer and TA: Assistant Lecturer
Research

Currently there is very little research because of the lack of donor funding. The on-going research work though is in the fields of:

1. Soil fertility
2. Soya bean work
3. Weed and pest management

Funding Donor Agencies

Funding Agencies	Type of support		
Agency	Training	Financial	Others
ICART/EU	Masters in Dairy Science and Technology		
Rockefeller Foundation	Masters in Applied Economics		

Lessons/innovations in attempts to improve the Agricultural Curriculum

The curriculum for the University of Zimbabwe was developed between 1985 and 1990 but as of now there is no curriculum review committee. Individual lecturers update their curriculum by taking on new knowledge and technologies from research work, scientific publications and occasionally informal requests from stakeholders. However, with any new programme introduced into the faculty, stakeholders are consulted before the programme is approved by the Academic Committee and the Senate. There have not been any pedagogical seminars for staff to improve on delivery of curriculum. The teaching strategies includes the use of chalk and dictation of notes, learning experiences are shared in seminars and exchange programs.

The challenges faced in curriculum implementation include:

1. Financial resources
2. Human resources
3. Institutional commitment

Faculty and Future Outlooks

Not provided

Malawi: University of Malawi

Institutional background

The University of Malawi (UNIMA) has five colleges and a central office under a federal administration set up. These colleges are located at different geographical regions: Bunda and Kamuzu College of Nursing at Lilongwe, 300 kms from the central office; Polytechnic and College of Medicine in Blantyre, 60 kms from the central office and Chancellor College in Zomba. The University has the following research centers: the Centre for Social Research, Centre for Language Studies, Centre for educational Research and Training, Agricultural Policy Research Unit, Nursing, Midwifery and Health Sciences Research Centre and Gender Study Unit.

The University of Malawi was founded under the University of Malawi (Provisional Council) Act in October 1964. This was soon after the nation's independence after a survey was carried out by the American Council on Education and the then British Inter-University Council on Higher Education

Overseas. Teaching commenced on September, 29th 1965 with 90 students compared with the current 6,000 students on degree, diploma and certificate programmes. Undergraduate students are admitted under the Normal Entry Programme and are admitted to the University after obtaining their Malawi School Certificate of Education (equivalent to the British O' level (GCE) and passing the University Entrance Examinations. The University of Malawi also admits A' level candidates. The University also runs mature-entry programs for students with Diplomas and/ or course related work experience. It also runs several post graduate programmes.

Bunda College of Agriculture- Current Status

Bunda College is situated in Lilongwe in the central region of the country, 35.2 km from the capital city. It has 151 members of academic and administrative staff and 775 students pursuing a variety of courses offered at the different faculties. The various faculties and departments are:

- Faculty of Agriculture (departments are: Agricultural engineering, Animal science, Crop Science, Home Economics and Human Nutrition, and Language and development Communication)
- Faculty of Environmental Sciences (departments are: Aquaculture and Fisheries Science, Natural resources Management and Horticulture and Forestry)
- Faculty of Developmental Studies (departments are: Agribusiness management, Extension, Agriculture and applied economics

Academic Programs

Bunda College of Agriculture runs the following programs: at an Undergraduate level; B.Sc in Agriculture; Agribusiness; Irrigation Engineering; Environmental Science; Natural Resources Management; Forestry; Horticulture; Aquaculture and Fisheries Sciences; Extension (Mid Career); Seed Technology; Social Forestry; Animal Science; Agronomy; Crop Protection; Soil Science; and Agricultural Economics

Post graduate Programmes

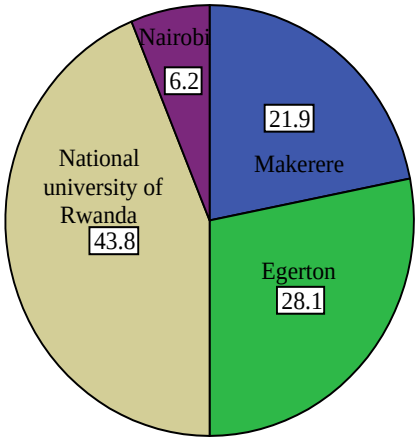
The College runs eight (8) Master Programmes in the following areas; M. Sc in Agricultural Economics; Agricultural Extension and Rural Development; Food Science and Human Nutrition; Family Sciences; Agribusiness Management; Social Forestry; Agriculture; Agricultural Economics;
PhD in Animal Sciences

Section III: Mini Survey among Students at the visited Universities in East Africa

Social Demographic Characteristics of Student Respondents

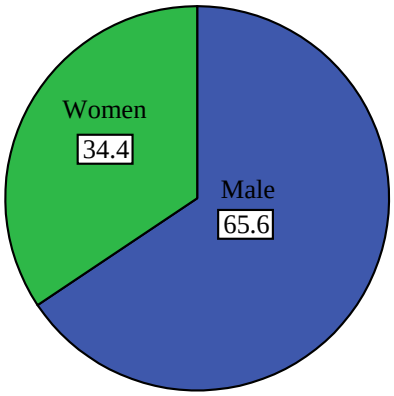
The social demographic characteristics of the sampled students which include university attended, faculty/department to which the students belong, sex, and level of study and area of specialization are discussed below.

Fig 1: Percentage Composition of Students Respondents from Universities in East Africa



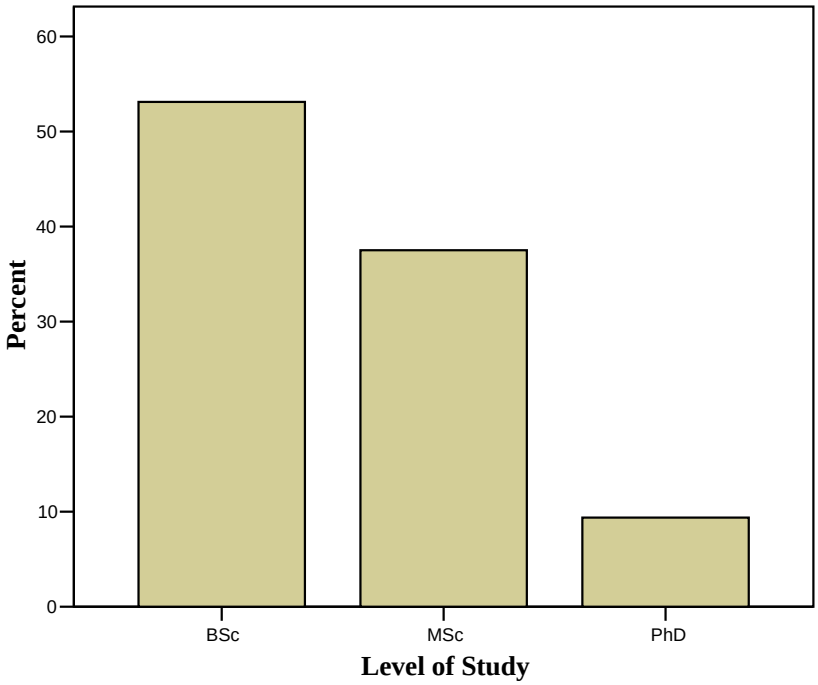
Survey results show that most (43.8%) of the respondents were from National university of Rwanda, Egerton university respondents followed in number with 28.1%, Makerere university students were 21.9% and University of Nairobi had the least (6.3%) number of students. Furthermore, among the interviewed students 65.6% of them were male, while the remaining 34.4% were female (fig 2)

Fig 2: Gender of Student Respondents



In addition, survey findings indicate that none of the students was at diploma level. However, majority (53.1%) of the respondents were at bachelors (BSc) level while 37.5% were at masters (MSc) level. Only 9.4% were at PhD level and this is clearly stipulated in the figure 3 below;

Fig 3: Levels Study for Student Respondnets



Below are the different levels of study respective to the different universities the respondents attended (Table 2).

Table 1: Students Respondents and their Level of Education

UNIVERSITY	LEVEL OF STUDY							
	Diploma		BSc		MSc		PhD	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Makerere	-	-	5	71.4	2	28.6	-	-
Egerton	-	-	-	-	8	88.9	1	11.1
University of Nairobi	-	-	-	-	-	-	2	100
National University of Rwanda	-	-	12	85.7	2	14.3	-	-

Freq=frequency of respondents at respective levels, Percent= percentage of respondents at respective study levels

From the table above, none of the respondents was at diploma level. Makerere University had 71.4% of her respondents at BSc level and the remaining 28.6% were at MSc level. On the other hand, University of Nairobi had 100% of her respondents at PhD level, which was contrary to her counterparts. Furthermore, Egerton University had most (88.9%) of her respondents at MSc level while the least (11.1%) at PhD level. The national university of Rwanda like Makerere University had most (85.7) of her respondents at BSc level, and the least (14.3) at MSc level. Further still, the survey went ahead to find out he different departments the interviewed students belonged to, and their areas of specialisation too. This is shown in table 1 below;

Table 2 Departments and Areas of Specialisation

SPECIALISATION	FREQUENCY	PERCENT
Horticulture	2	6.3
Animal Science	11	34.3

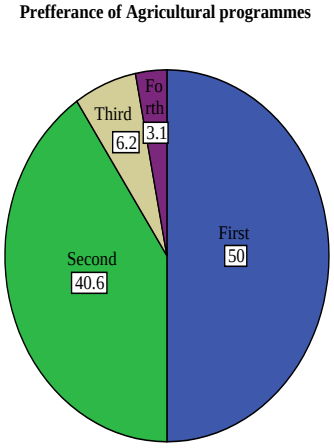
Agronomy	2	6.3
Extension Education	3	9.4
Crop Science	5	15.6
Agricultural Information and Communication Management	1	3.1
Dry Land Resource Management	2	6.3
Agricultural Economics and Agribusiness	1	3.1
Soil Management	3	9.4
DEPARTMENT		
Crop Science	6	18.8
Extension Education	2	6.3
Animal Science	10	31.3
Agricultural Economics and Agribusiness	2	6.3
Agricultural Information and Communication and Management	4	12.5
Education and Communication Studies	1	3.1
Dry Land Resource Management	2	6.3
Soil Science	5	15.6

According to the survey, most (34.3%) of the interviewed students specialised in animal science and the next area of specialisation was crop science with 15.6% of the total number of students. On the contrary, the least areas specialised in as per the survey where agricultural information and communication and agricultural economics and agribusiness, both of which had 3.1% of the total number of students.

However, it is noted that most of the interviewed students' area of specialisation was within the department to which they belonged. This therefore leaves animal science department with majority of the students (31.3%), followed by crop science with 18.8% students. On the other hand, more (15.6%) students belonged to the soil department, than actually specialized in soil sciences. Only 3.1% of the students belonged to the education and communication studies department.

Assessment of need for Agricultural Programs in Respective Countries

Discussed below is the preference of agricultural programs at the time of applying to join the university (fig 4).



According to the survey, 50% of the students preferred agricultural courses to any other courses offered. This was shown by their decisions to put it as first choice at the time of applying to join the university. In addition, 40.6% put agricultural courses as second, 6.2% as third and 3.1% as forth choice. The reasons as to why some of them got to do agricultural courses yet they were not their first choices are shown in figure 4 below.

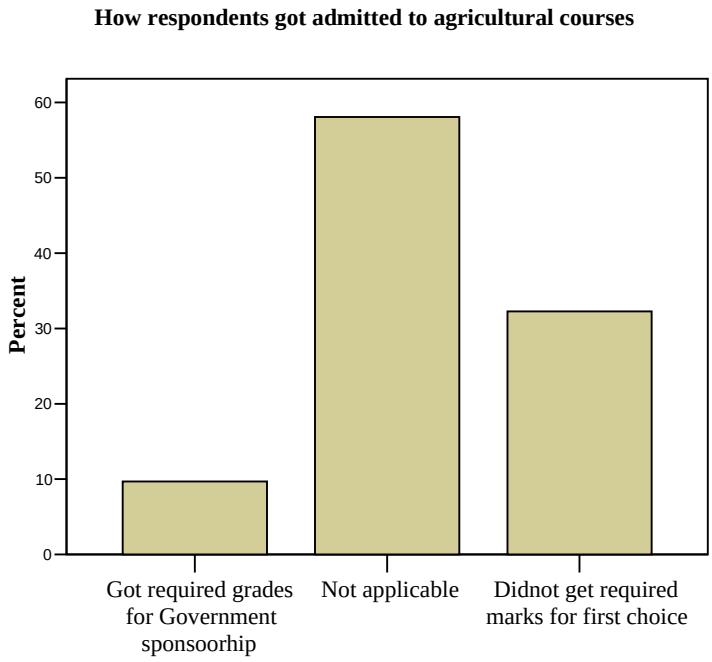


Fig: 5: Students Admission to Agricultural Programmes

Majority of the respondents preferred agricultural courses, justifying the 56.3% that are not applicable. In addition, 9.4% took up the courses simply because they were getting government sponsorship and could not sponsor themselves for any other course, while 31.3% did not get the required marks to go for their first choices, and so were left with no option but to take up agricultural courses. The survey went ahead to find out the motivation factors behind the respondents joining agricultural courses (table 3). This means that progress in agriculture will be much slower if agricultural tertiary institutions cannot attract motivated and well prepared students. The prevailing African view of agriculture as the "occupation of last resort" needs to be challenged and changed. Changes to institutional admissions processes that would allow students to choose agricultural studies, rather than be "assigned" to them, would be a good place to start. Guest lecturers representing the spectrum of agricultural employment, field trips, and student attachments would also help thus the need to spark student and public interest in agriculture.

Table 3 : Motivation to Join Course

Factor	Frequency	Percent
Family influence	2	6.3
Career guidance	5	15.6
Job opportunity with in the career	13	40.6
Grades attained at high school	8	25.0
Inspired by another person	3	9.4
Peer influence	1	3.1

Participants reported job opportunity with in the career (40.6%) to be the major motivating factor for their joining of agricultural courses, and this was followed by the grades attained at high school (25%). The later implies that they were not there out of choice, but they were there out of a circumstance. Family (6.3%) and Peer (3.1%) influence were reported as the least motivating factors of joining agricultural courses throughout the respondents from different universities.

Students Appraisal to their Curricular

The survey went ahead to assess how well the knowledge gained helped the interviewed students to undertake analysis, synthesis and problem solving. These are captured in table 4 and thereafter discussed.

Table 4: How Gained Knowledge Helped in Analysis, Synthesis and Problem Solving

	No not at all		Not sure		Yes very much so		Yes a little	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Analysis	1	3.1	2	6.3	16	50	12	37.5
Synthesis	2	6.3	4	12.5	15	46.9	10	31.3
Problem solving	1	3.1	1	3.1	18	56.3	11	34.4

Freq=frequency of interviewed students, Percent= Percentage of interviewed students

The results show that 50%, 46.9% and 56.3% of the sampled students could do analysis, synthesis and problem solving respectively very much so, implying that at the different universities, interviewed students' capabilities in these fields are high. On the contrary, 6.3% of the students could not synthesise at all, which is an absurd fact. Acting now seems to be the only remedy in Sub-Saharan Africa by realigning the visions and mandates of Agricultural Tertiary Institutions with national development aspirations by promoting new types of educational programs that are less encyclopedic and more strategically attuned to the different needs of social and productive actors. However, curriculum modernization efforts are underway in Eastern and Southern Africa with encouragement from ASARECA and RUFORUM.

Table 5: Interaction with Peer and Constraints Faced

Interactions with Peers	Yes (96.9 %)			No (3.1%)
	Form on Interaction	Freq	Percent	
	Practical	17	53.1	
	Internship	7	21.9	
	Lectures	7	21.9	
	Teaching facilities	16	50	
	Staff availability	4	12.5	
	Staff competence	3	9.4	
	Course Scheduling	3	9.4	
Constraints Faced	Yes (87.5%)	No (12.5%)	Percent	
	Form of Constraints	Freq	Percent	
	Moderately equipped	18	56.3	
	Less equipped	5	15.6	
	Not equipped	1	3.1	

A few sampled students from the newly introduced Masters programme, Agricultural Information and Communication Technology, lamented that courses such as Communication for Innovation, Web Content Design and Development, Fundamentals of AICM and Knowledge Management were properly conducted; this is because they have been able to acquire new knowledge such as development of knowledge repositories, interactive and relevant to the societal needs. Among the least interesting in this category includes Human Resource Management, Database Management and Computer Programming. The students tied this to poor delivery of content, lack of practical skills developed and too much content covered within a very short time and irrelevance. This also explains why sometimes they cannot do synthesis since it is too much material that needs to be assimilated in s short time. Similar studies have indicated that practical instruction receives insufficient emphasis and here hands-on training for students is minimal, work placements are limited (but receiving increasing attention), and no country offers job placements services to graduating students. Work placements

are essential, not a luxury, for Africa. They expose students to actual problems of production, processing, and marketing. They connect classroom teaching with the real world. Supervision of practical training is weak. Learners are left alone without any guidance, no demonstrations, few explanations, and farm work is not linked with academic learning objectives (Vandenbosch 2006:76). However, some refreshing exceptions exist. In Ethiopia, students undertake an eight-month apprenticeship as part of their training (Vandenbosch 2006:79).

In Animal Science courses such as animal behaviour, genetics, biotechnology, energy and protein nutrition, animal feeds, feeding and feed resources, animal breeding and genetics, ruminant nutrition and rumen environment were listed among the most interesting courses. This is so because, they form the core of animal nutrition especially microbial organisms, good delivery by the lecturers and their interests in courses especially genetics as many want to specialise there. Other reasons included their applicability at home farms, they form key factors which influence animal production performance and inquisitiveness. Among the least interesting courses enumerated were; biochemistry, biometrics, animal physiology, basic sciences and non ruminant nutrition. Most students attributed this to the approach used by the lecturers as not being good, their inability to add much to the existing knowledge and cannot be very helpful to local farmers, they are not practicable and not directly related to the field experience and lastly students said these courses are too demanding to master the content.

Under crop protection, horticulture and soil science, at Egerton University courses such as soil fertility and soil plant relationship, plant breeding, phytopathology, plant physiology, Integrated Pest Management in vegetable production, post harvest handling and physiology products are among the most interesting courses; reason(s) being that these courses deal with realities in the field, for example some students commented that for one to treat a disease one needs to know it and thus take preventive measures for example, by knowing crops (plants) and their characters one can help in ensuring food security. Entomology was listed as the least interesting courses in the department of crop protection, horticulture and soil science. This was as a result of dislike by most students. This comes as a result of poor delivery, when you try to memorise terms you get confused instead and there is less or no practical at all.

For Drylands Resource Management, at University of Nairobi, Ecology of Drylands, the Changing Paradigms of Rangeland Ecology, Geographical Information Systems and Remote Sensing are the most interesting courses in this PhD programme. This is because a course like Ecology of Drylands addresses the common held misconception of rangeland ecosystems and pastoral livestock production, and with GIS and Remote Sensing it is easy and quick to see how to evaluate natural resources and this makes this tool important for manager in institutions. Drylands economies and Drylands livelihoods are the least interesting courses under this programme. The reasons as to why they are least interesting include the poor mode of delivery and the content was quite narrow in perspective. This is especially for Drylands livelihoods. For Drylands Economics, students said it is too hard to grasp everything within a very short time and the calculations were not friendly.

In Agricultural Extension and Education at Makerere University, courses, soil fertility and nutrition, Agronomy, Program development and evaluation and research methods. This is because of the Lecturers are always prepared to deliver and students can follow because of the methods presentation and mastery of the subject content. Among the least interesting courses includes livestock management, introduction to animal agriculture, Genetics and comparative extension systems. Students said these were generally hard and questions tricky to attempt. The practicals were also limited and the persons in charge were rude and rough. Others said the courses had a lot of notes that caused confusion with some topics such as SWOT poorly delivered in classroom. Students however, pointed out that courses such as Agronomy, introduction to extension methods, Adult education and training, Monitoring and Evaluation and Community mobilisation techniques have been more useful in shaping their professional careers.

Among the most interesting course(s) listed by student at graduate level included agro forestry system, soil erosion and water conservation, research methodology, applied soil science and research methodology. These are found to be interesting because they have helped them to go deep into soil studies. For research

methodology, it has enabled them to conduct research, interpret results and take informed decisions. The soil erosion and water conservation and agro forestry systems have enabled them solve problems they are facing in Rwanda related to Agriculture such as erosion and food insecurity.

At this level, there were no least interesting courses/lectures/topics listed. However students recognized courses such as GIS and Remote Sensing, Agro forestry systems, Soil erosion and water conservation and Applied soil science as courses they have found useful in shaping their professional careers. Students also said they have been able to relate theory to practice for example they said some laboratory analyses showed them a link between theory and practice and they have done some treatments in the rural areas. They also acknowledged that the knowledge acquired has enabled them to do synthesis necessary to bring together elements of subject matter from various sources to solve problems. This is possible through reflecting on the courses offered and selecting which particular module can be applied to a particular problem at hand.

Suggestions for inclusions in the curriculum, students suggested that, there should be introduction of shot courses on proposal writing and data management. They said these would help them to deal with their thesis write up and find funds. Others talked of Information and communication technologies courses as these would them type set and word process their coursework and dissertations and also use them in this technology era.

Suggestions from Students to Improve Curriculum

- Include entrepreneurship courses to cut across all undergraduate programmes during through their college lifetime
- Introduce modules on projects conception and management of enterprises
- Industrial placement which should be accessed
- Improve the existing ICT infrastructure and library services
- Monitor staff availability during delivery hours
- There should be courses that empathise hands on with topics on good writing skills
- Improve interactions between interuniversity students
- Introduce ICT in the traditional agricultural courses
- Refresher courses for lecturers to deliver effectively
- Senior Lecturer should be equipped with ICT skills for effective delivery and to cope with technology
- Provide life skill workshops
- More practical lectures
- Field visits should be intensified
- ICT based course should be more practical
- More emphasis should be put on practical
- Specialisation should be done earlier than fourth year
- Introduce entrepreneurial courses
- More practical courses should be embedded in the course

Employment and Industrial Placement for Graduates

The findings from the study indicate that about 60% find it easy to be absorbed into workplaces (Table 6) and about 34.3% found it difficult and close to 5.7% barely having a response as they said had they were stills students and thinking of jobs to them was far fetched at the time the study was being conducted. However, those who said it was easy said this is possible because; all the students do internship there, have gained a lot of practical skills in agriculture; the university is the best in the country; capacity gaps in these job sectors; the reputation of the universities, uniqueness of the programmes to emerging societal needs.

Table 6: Ease of being accepted in Employment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	21	60.0	63.6	63.6
	no	12	34.3	36.4	100.0
	Total	33	94.3	100.0	
Missing	System	2	5.7		
Total		35	100.0		

On the contrary those who said no; said this is so because; they (trainers) don't want to train them further in applied skills for causes related to job security, these job sectors want people with a lot of experience; need people with higher degrees, weak functional linkages between the universities and employers, organisations not being objective in recruitment, job market saturated, poor reporting and writing skills, graduates are too theoretical and others look at internship as time wasting.

Responses on whether Internship was job tailored

Most respondents about 68.6% (Table 7) said the internship was job tailored due to the fact that the exercise addressed issues in their area of study, gave them further insights in their fields of specialisation; contained stuff from area of study; acquired more skills, helped them to translate theory into practice hence meeting their expectations. Those who said no 22.9% related this to being attached to firms that were outside their interests and others said the duration of the training was too short to accumulate enough skills. The least percentage 8.6% hardly had a response to this question and never attempted.

Table 7: Internship Tailored to Jobs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	24	68.6	75.0	75.0
	no	8	22.9	25.0	100.0
	Total	32	91.4	100.0	
Missing	System	3	8.6		
Total		35	100.0		

What however, seems to be interesting is whether this knowledge acquired from the placements is adaptable. Most respondents close to 82.9% (Table 8) contended that their internship training was adaptable because; it was cross cutting different disciplines, imparted skills in them, equipped skills to the trainees; simple and course related, serves as a strong basis for students career and an eye opener. Those who said no (5%) on further investigation it was discovered that they were in their earlier years into BSc programme and had not been subjected such training; and one of the respondent (2.9%) had no answer with sole explanation of being unable to understand what the whole study exercise and the questions were about.

Table 8: Adaptability of the Training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	29	82.9	85.3	85.3

	no	5	14.3	14.7	100.0
	Total	34	97.1	100.0	
Missing	System	1	2.9		
Total		35	100.0		

Causes of Unemployment among Agriculture and related field Graduates

The students provided the reasons below as to why they end up unemployed at the end of the course: deteriorating agriculture sector; graduates lacking relevant skills, failure to apply skills practically, failure to express themselves, graduates don't have problem solving skills, graduates lack ICT skills, half baked graduates, job seekers not job creators, lack of capital, lack of entrepreneurial skills, lack of job opportunities out there; lack of more investment in agriculture; lack skills for job creation; limited investment in agriculture,; loss of focus of agric sector; more theory than practical in the curriculum offered, negative attitude of graduates towards work, non commercialized agriculture, poor communication skills and poor economies in the region. However, they went a head to provide solutions to solve the problem of unemployment among the graduates and following are the solutions:

Proposals to solve unemployment among graduates

Most students emphasised coming out strongly on practical courses as this is what the industry demands, governments advancing loans to graduates, attract private sector to invest in agriculture, better support from government to universities, career guidance to students, commercialisation of agriculture; give graduates entrepreneurial skills; embrace ICT in agricultural programmes at all levels of training, industrialize agriculture and entrepreneurship, introduce more exchange programmes for both students and staff, train job creators not job seekers, working towards self employment, build more agricultural processing industries to accommodate university outputs, introduce more of community development skills related courses such as data gathering and analysis, participatory rural appraisal, training in agricultural services immediately after graduation for some two years to help graduates associate the theories learnt at university to the practicals; this is because theories are general but when dealing with practicals in specific places there are chances of bridging knowledge gaps which theories don't bring out clearly, initiate self employing ventures, tailor research along value chains

Section IV: Mini Survey among Students at the Universities in Southern Africa

Social Demographic Characteristics of Student Respondents

The social demographic characteristics of the interviewed sampled students which include university attended, faculty/department to which the students belong, sex, and level of study and area of specialization are discussed below.

Table 9: Composition of Students from Universities in Southern Africa

University	Frequency	Percent
University of Malawi	19	22.4
University of Zimbabwe	10	11.8
University of Zambia	46	54.1
Eduardo Mondlane University	10	11.8

Survey results show that most respondents (54.1) were from University of Zambia, followed by University of Malawi with (22.4%), and University of Zimbabwe and Eduardo Mondlane University registering equal representation of 11.8% each as indicated in the table 9 above.

Most respondents (68.2%) were males, while the remaining 31.8% were females (fig 6); which is similar to the results obtained from the east African institutions. The explanation to this is that at most times when the study was being done the males showed interest and they were the ones available and they looked at this study as an opportunity for getting opportunities to further their education career so they were very keen and largely participated in the study. On the other hand the some female students approached wanted money so as to respond to the questionnaire and others said they were busy with coursework and field work.

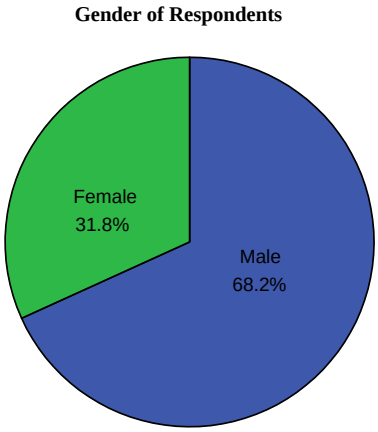


Fig 6: Gender of Respondents

In addition, survey findings indicate that most training in the four universities sampled in the southern Africa is done at Bachelor level (63.5%) with funding from government and through private means. This is a clear indication that training at graduate level is still limited. In all the four universities only 2.4% of the respondents were pursing PhD and only 34.1% Masters' degree; this is indicated in figure 7 below;

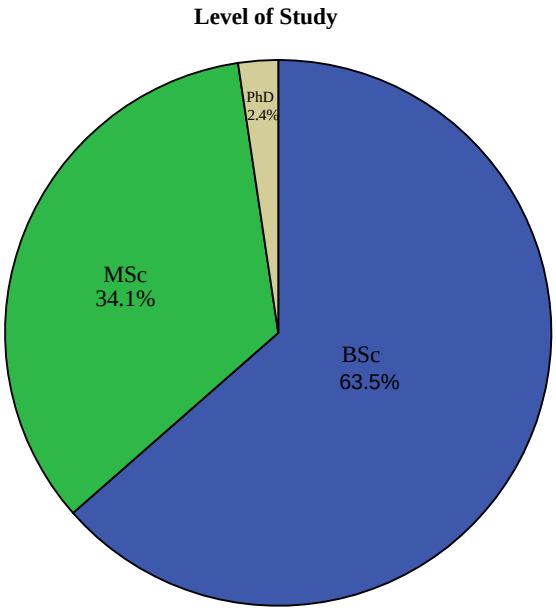


Fig 7: Level of Study the Students Respondent

Below are the different levels of study respective to the different universities the respondents attended (Table 9).

Table 10: Students Respondents and their Level of Education

UNIVERSITY	LEVEL OF STUDY							
	Diploma		BSc		MSc		PhD	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
University of Zambia	-	-	34	73.9	12	26.1	-	-
University of Malawi	-	-	19	100	-	-	-	-
University of Zimbabwe	-	-	-	-	8	80	2	20
Eduardo Mondlane University	-	-	1	10	9	90	-	-

Freq=frequency of respondents at respective levels, Percent= percentage of respondents at respective study levels

From the table above, no response was got from Diploma holders. University of Zambia had 73.9% of her respondents at BSc level and the remaining 26.1% were at MSc level. On the other hand, University of Malawi had 100% of her respondents at BSc. level, which was contrary to her counterparts this, can be explained in that at the time of the study most of these were in the filed checking on experiments and busy with coursework. Furthermore, University of Zimbabwe had most (80%) of her respondents at MSc level while the least (20%) at PhD level. Eduardo Mondlane University had one respondent at BSc. Level and nine at Masters, with none at PhD. Comparing representation from eastern Africa one can therefore assert that there is need to train more students at graduate level in countries especially Mozambique and this calls for more funding. There was however concerns that the capacity to develop grant winning proposals in southern Africa universities is still limited despite efforts in region by institutions such as RUFORUM, SADC and CTA to retool staff in proposal and scientific writing. Further still, the survey went ahead to find out the different departments the interviewed students belonged to, and their areas of specialisation too. This is shown in table 10 below;

According to the survey, most (21.2%) (table 11) of the interviewed students specialised in Agriculture and the next area of specialisation was Soil Science with 14.1% of the total number of students. On the contrary, the least areas specialised in as per the survey were Agricultural and Applied Economics, Rural development, crop science, nutrition and home economics. Students explained that these are good courses but the existing infrastructure doesn't support hands-on which most employers look for in the development world. Secondly they said these courses lack competent staff when it comes to delivery and the resources in terms of reading materials are limited.

Table 11: Students Specialisation by Department

Faculty/ Department	Frequency	Percent
Development Studies	4	4.70
Environmental Sciences	3	3.50
Nutrition and Home Economics	3	3.50
Agricultural and Applied Economics	2	2.40
Rural Development	3	3.50
Agriculture	18	21.2
Animal Science	8	9.40
Crop Science	3	3.50
Soil Science	12	14.1
Agricultural Economics	8	9.40

Veterinary Medicine	8	9.40
Agronomy and Forestry Engineering	8	9.40

Assessment of need for Agricultural Programs in Respective Countries

According to the survey, 51.8% of the students preferred agricultural courses to any other courses offered. This was shown by their decisions to put it as first choice at the time of applying to join the university. In addition, 30.6% put agricultural courses as second, 15.3% as third and 1.2% as forth and other choices. The reasons as to why some of them got to do agricultural courses yet they were not their first choices are shown in table 12 below; includes letter of request to the Dean, selection by University, good A level grades, : This shows that the demand still exists but lacking significant investment in terms of capacity building and infrastructural development.

Choice	Frequency	Percent
First	44	51.8
Second	26	30.6
Third	13	15.3
Fourth	1	1.2
Other	1	1.2

Table 12: Choice of Agricultural Programme at University Entry

The survey went ahead to find out the motivation factors behind the respondents joining agricultural courses (table 12).

Table 13: Motivation to Join Course

Motivator	Frequency	Percent
Family influence	7	8.2
Career Guidance	25	29.4
Job opportunity within the career	23	27.1
Peer influence	8	9.4
Grades attained at high school	6	7.1
Inspired by another person	16	18.8

Participants reported (table 13) career guidance (29.4%) to be the major motivating factor for their joining of agricultural courses, and this was followed by existing job opportunities within the career (27.1%) and inspiration by another person (18.8%). Family influence (8.2%), Grades attained at high school (7.1%) and Peer influence (9.4%) were reported as the least motivating factors of joining agricultural courses throughout the respondents from the tertiary institutions in Southern Africa

Students Appraisal to their Curricular

The survey went ahead to assess how well the knowledge gained helped the interviewed students to analyse, synthesise and solve problems. Table 14 indicated that the acquired knowledge supported them in analytical skills (81.2%) in the sampled universities with about 9.4% not sure of this and 1.2 % contending that it has not been useful whatsoever. In terms of synthesis, students acknowledged that yes the acquired knowledge is useful (71.8) in synthesizing problems and tackling challenges as they come, 18.8% were not sure and in terms of conflict resolution, the students are able to use the acquired knowledge to manage conflicts and this has helped them to get along the varsity of

nationalities they are studying with and even in the employment sector. This implies that at the different universities, interviewed students' capabilities in these fields are high.

Table 14: How Gained Knowledge Helped in Analysis, Synthesis and Problem Solving

Analytical Skills	**Frequency**	**Percent**
Not at all	1	1.2
Not sure	8	9.4
Yes, very much	69	81.2
Synthesis Skills	**Frequency**	**Percent**
Not sure	16	18.8
Yes, very much	61	71.8
Yes, a little	8	9.4
Conflict Resolution	**Frequency**	**Percent**
Not sure	12	14.1
Yes, very much	62	72.9
Yes, a little	11	12.9

As shown in table 15 below, 97.6% of the students confirmed having interacted with their peers despite constrains there existing. And they indicated these interactions to been mostly through practical, Internships, and lectures (34.1%). They also indicated that they are limited when it comes to associating with technocrats whom they described as being ever busy with their schedules something they said is not right. They indicated that they need more of these people to mentor them and equip them with skills demand by the job world but the many times they try it turn out to be frustrating. They also expressed the issue of communication specifically language problems and they don't sometimes interact freely because they feel they will be laughed at because their language problems.

Table 15: Interaction with Peer and Constraints Faced

	Frequency	Percent
Yes	83	97.6
No	2	2.4
Form of interaction if any	Frequency	Percent
Practical	27	31.8
Internships	13	15.3
technical/ didactic visits	4	4.7
Lectures	11	12.9

Practical, internships, technical/ didactic visits, lecture	29	34.1

The most interesting courses for the respondents were developmental economics, crop science, animal nutrition, surgery, as well as agricultural trade. The reasons the students gave for their interest in these courses were that the courses were practical and realistic (41.9%), they understood the course contents clearly (31.4%) and that they knew that the courses were important for their career development (26.7%). Students also talked of the least interesting courses (Table18) and they attributed this to ill preparedness of the lecturers, too much literature to read among others. From the survey it is clearly seen that animal physiology and statistics were among the most little interesting as compared to courses like chemistry and cotton production which they said are more practical and there exist enormous opportunities in the field in their respective countries.

Table 16: Interesting Courses

Course	Frequency	Percent
Developmental Economics	11	12.9
Agricultural trade	6	7.1
Animal Nutrition	6	7.1
Resource Management	3	3.5
Food and nutrition	5	5.9
Irrigation water management	3	3.5
Biotechnology	2	2.4
Nutritional Biochemistry	3	3.5
Animal Breeding	2	2.4
Crop Science	7	8.2
Entomology	3	3.5
Agribusiness	4	4.7
Plant Breeding	4	4.7
Biostatistics	3	3.5
Surgery	6	7.1
Public Health	2	2.4
Research Methods	2	2.4
Human Capital	4	4.7

Table 17: Least Interesting Courses

Course	Frequency	Percent
Agriculture and environment	8	9.4
plant physiology	7	8.2
Econometrics	5	5.9
animal physiology	9	10.6
crop husbandry	5	5.9
livestock management	4	4.7
Chemistry	4	4.7
Statistics	9	10.6

Pathology	4	4.7
communication skills	2	2.4
Entomology	3	3.5
Cotton production	2	2.4

Of the sampled students there was a variation of the different courses that they didn't find interesting, like animal physiology, animal products and technology, livestock management, agricultural engineering amongst others as shown in the table below but the overriding factor behind all these choices is that they found the courses difficult to understand (30.6%), followed by being given too much information which is repeated in different course units and years of study (23.5%), another 20.0% of the students felt that some of the material being lectured is not applicable to real life situations because it is too theoretical.

Table 18: Reason for being Least Interesting Courses

Reason	Frequency	Percent
Difficult to understand	26	30.6
too much information	20	23.5
not applicable to real life situations/ profession	17	20.0
course delivery not good	10	11.8
Insufficient course content	3	3.5
Not relevant to the course	2	2.4

Suggestions from Students to Improve Curriculum

- Include entrepreneurship courses to cut across all undergraduate programmes during through their college lifetime
- Introduce modules on projects conception and management of enterprises
- Industrial placement which should be accessed
- Improve the existing ICT infrastructure and library services
- Monitor staff availability during delivery hours
- There should be courses that empathise hands on with topics on good writing skills
- Improve interactions between interuniversity students
- Introduce ICT in the traditional agricultural courses
- Refresher courses for lecturers to deliver effectively
- Senior Lecturer should be equipped with ICT skills for effective delivery and to cope with technology
- Provide life skill workshops
- More practical lectures

- Field visits should be intensified
- ICT based course should be more practical
- More emphasis should be put on practical
- Specialisation should be done earlier than fourth year
- Introduce entrepreneurial courses
- More practical courses should be embedded in the course

Employment and Industrial Placement for Graduates

The findings from the study indicate that about 24.4% believe that there are guaranteed jobs after internship considering that the work been done at the internship does not differ markedly from that at employment. Others said that there was job saturation and that the potential employers prefer not to have interns because there are people who are already employed to do that work. Other students felt that the inexperience of the students deters some potential employers for taking them up for industrial placements (20.9%) while still others were of the view that there were inadequate finances to support the interns (11.6%). It a nutshell, the students were of the view that internship was a very good practise, in fact if the sessions were more frequent and for longer periods of time, the student would be better able to face the working world and possible be an employer him/herself.

Table 18: Ease of being accepted in Employment

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	50	58.1	58.1	58.1
No	36	41.9	41.9	100.0
Total	86	100.0	100.0	

On the contrary those who said no; said this is so because; they (trainers) don't want to train them further in applied skills for causes related to job security, these job sectors want people with a lot of experience; need people with higher degrees, weak functional linkages between the universities and employers, organisations not being objective in recruitment, job market saturated, poor reporting and writing skills, graduates are too theoretical and others look at internship as time wasting.

Responses on whether Internship was job tailored

Most respondents about 54.1.8% (Table 19) said the internship was job tailored due to the fact that the exercise addressed issues in their area of study, gave them further insights in their fields of specialisation; contained stuff from area of study; acquired more skills, helped them to translate theory into practice hence meeting their expectations. Those who said no 45.9% related this to being attached to firms that were outside their interests and others said the duration of the training was too short to accumulate enough skills. The least percentage 8.6% hardly had a response to this question and never attempted.

Table 19: Internship Tailored to Jobs

	Frequency	Percent
Yes	46	54.1
No	39	45.9

What however, seems to be interesting is whether this knowledge acquired from the placements is adaptable. Most respondents 54.1% contended that their internship training was adaptable because it was cross cutting different disciplines, imparted skills in them, equipped skills to the trainees; simple and course related, serves as a strong basis for students' careers. Those who said no (45.9%) on further investigation it was discovered that they were in their earlier years into BSc programme and had not been subjected such training, some others had been frustrated by the system while looking for placements and had been turned down by several potential employers on the basis that there were students and that there was already someone else doing the work they were to do.

Causes of Unemployment among Agriculture and related field Graduates

The students provided the reasons below as to why they end up unemployed at the end of the course: deteriorating agriculture sector; graduates lacking relevant skills and experience, failure to apply skills practically, failure to express themselves, graduates don't have problem solving skills, graduates lack ICT skills, half baked graduates, job seekers not job creators, lack of capital, lack of entrepreneurial skills, lack of job opportunities out there; lack of more investment in agriculture; lack skills for job creation; limited investment in agriculture,; loss of focus of agric sector; more theory than practical in the curriculum offered, negative attitude of graduates towards work, non commercialized agriculture, poor communication skills, poor economies in the region, there are many fresh, unemployed graduates thus there is a lot of competition, there are few potential employers especially the Government; there is late retirement so there is no room for new employees and also there is unemployment as a result of graduates wanting better paying jobs hence not taking up certain jobs because of very low pay. Some employers prefer less qualified employees whom they will give a smaller salary compared to a university graduate. However, they went a head to provide solutions to solve the problem of unemployment among the graduates and following are the solutions:

Proposals to solve unemployment among graduates

Most students emphasised coming out strongly on practical courses as this is what the industry demands, governments advancing loans to graduates for self employment, attract private sector to invest in agriculture, better support from government to universities, career guidance to students and linking students to private/ public sectors before they leave tertiary institutions, commercialisation of agriculture; give graduates entrepreneurial skills, curriculum review to keep up with the needs of the working world; embrace ICT in agricultural programmes at all levels of training, industrialize agriculture and entrepreneurship, introduce more exchange programmes for both students and staff, train job creators not job seekers, working towards self employment, build more agricultural processing industries to accommodate university outputs, introduce more of community development skills related courses such as data gathering and analysis, participatory rural appraisal, training in agricultural services immediately after graduation for some two years to help graduates associate the theories learnt at university to the practicals; this is because theories are general but when dealing with practicals in specific places there are chances of bridging knowledge gaps which theories don't bring out clearly, initiate self employing ventures, tailor research along value chains

ANNEX B: SURVEY TOOL FOR STUDENTS

I have been randomly selected by RUFORUM, as a young graduate to undertake a study and update the existing databases on higher education in Agriculture at African Tertiary Education Institutions and contribute to improving the outreach and impact of the work of University networks and CTA and its other partners; NEPAD and FARA. The findings will be used by Universities in identifying training and capacity building needs for the universities faculties of agriculture and other related faculties in East Africa.

Your role as a stake holder is to kindly to respond to the following questions and confidentiality will be highly observed.

Demographic Characteristics of Respondents

a) University:……

b) Faulty/Department:……

c) Gender

☐ Male
☐ Female

d) Level of the study

☐ Diploma
☐ B.Sc
☐ MSc
☐ PhD

e) Area of specialization

☐ Horticulture,
☐ Animal science,
☐ Entomology,
☐ Agronomy,
☐ Food science,
☐ (Others please specify)……..

Objective 1: Assessment of the need for Agricultural Programs in Respective Countries

1. Indicate the preference of agricultural programmes at the time of applying to join the University

☐ First
☐ Second
☐ Third

☐ Fourth
☐ (Other please specify)……

2. If Agriculture was not your first choice, please explain how you got admitted in this course

---

What motivated you to join the course?

☐ Family influence
☐ Career guidance
☐ Job opportunity within the career
☐ Peer influence
☐ Grades attained at high school
☐ Inspired by another person
☐ Others please specify

Students' Appraisal of their curricula to suggest areas of improvement

3. From your curricular, list the most interesting course(s)/lecture(s)/topic

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---

4. Why did you find them interesting?

---

5. From your curricula, list the least interesting course(s)/lecture(s)/topic

---

---

6. Explain why you found them less interesting?

---

7. In your opinion, which course(s) do you find more useful in shaping your professional career?

---

8. Has your training helped you to relate theory to practice?

☐ Yes
☐ No

9. Explain your answer

---

10. Did the knowledge gained give you the capacity for a synthesis necessary to bring together elements of subject matter from various sources to solve problems?

☐ Yes
☐ No

11. Explain your answer

---

12. Please to indicate how well the knowledge you have gained helps you undertake the following

	No not at all	Not sure	Yes very much so	Yes a little
Analysis				
Synthesis				
Problem Solving				

13. In the course of your training were there interactions between you and your peers?

☐ Yes
☐ No

14. If yes, what form were the interactions? (Please tick appropriately)

☐ Practical
☐ Internships?
☐ Technical/didactic visits?
☐ Lectures?

15. From your experience, what would you suggest to be added to that curriculum? (Justify your answer)

16. What constraints did you experience in terms of the following?

☐ Teaching facilities
☐ Staff availability
☐ Staff competence
☐ Course scheduling
☐ Others (please specify)

17. Please indicate whether you feel adequately prepared for a professional career with the following

Public sector	Yes	No
Private sector		
Civil society		

Others specify		

18. If no, please explain _____

19. How adequate do you feel equipped with entrepreneurial skills?

- ☐ Adequately equipped
- ☐ Moderately equipped
- ☐ Less equipped
- ☐ Not

20. What proposals/suggestions do you make for improvement of this curriculum? _____

Objective: Opportunities for Employment

21. Is it easy to be accepted in a private sector, industries, NGO's (International and National) for internships?

- ☐ Yes
- ☐ No

22. Explain your answer

P. Is the internship job tailored?

- ☐ Yes
- ☐ No

25. Explain _____

26. Is the training adaptable?

- ☐ Yes
- ☐ No

27. Explain
28. What do you think is the major cause of unemployment among agricultural graduates? _____
29. What proposals do you think could solve the problem of unemployment among agricultural graduates?

Thank You

ANNEX C: KEY INFORMAT TOOL FOR DEANS OF FACULTIES OF AGRICULTURE

I have been randomly selected by RUFORUM, as a young graduate to undertake a study and update the existing databases on higher education in Agriculture at African Tertiary Education Institutions so as to contribute to improving the outreach and impact of the work of University networks and CTA and its other partners; NEPAD and FARA. The findings will be used by Universities in identifying training

and capacity building needs for the universities faculties of agriculture and other related faculties in East Africa.

Your role as a stake holder is to kindly to respond to the following questions and confidentiality will be highly observed.

Institutional Profile:
Year Established:……..
Institutional Head (Vice Chancellor/ Rector): ……
Current Students Number: ……
Current Staff Number:……..
Brief Background:……

Contact Detail:
Postal Address……..
Physical Address……..
Tel:…..
Fax:……
Email: ……

Objective 1: To establish the current state of Agricultural education programs at selected African universities, and assess the effectiveness of delivery

What degree programs exist in the faculty at?

a) Undergraduate Level

b) Post Graduate Level

List the departments in the Faculty?

What is the expected duration for the programs enumerated above?

1. Under graduate
2. Postgraduate

What level of training does each department offer?

Total number of student enrolment in the four programme categories of the faculty of Agriculture over the last 5 years

Programme Category	Number of Students									
	2004/2005		2005/2006		2006/2007		2007/2008		2008/2009	
Diploma	M	F	M	F	M	F	M	F	M	F

Bachelor of Science										
Post Graduate Diploma										
Master of Science										
Doctor of Philosophy										
Totals										

Academic Staff Levels

What is the current staff distribution in the Faculty during the 2008/2009 Academic Year?

Department	PhD Holder	MSc. Holder	B.Sc Holder	Rank of Staff						Total Staff
Crop Science				P	AP	SL	L	AL	TA	
Animal Science										
Agricultural Engineering										
Food Science & Technology										
Soil Science										
Agricultural Economics & Agribusiness										
Agricultural Extension/Education										

Key: P: Professor, AP: Associate Professor, SL: Senior Lecturer, L: Lecturer: AL: Assistant Lecturer and TA: Assistant Lecturer

B) Research and Outreach Activities

What are the existing research activities that the Faculty is currently undertaking?

C) Funding Donor Agencies

Funding Agencies	Type of support		
Agency	Training	Financial	Others

Objective: To evaluate and collate lessons/innovations in attempts to improve the Agricultural Curriculum

When was the curriculum developed?

Does the Faculty have a curriculum review committee?

- ☐ Yes
- ☐ No

If yes, when was the last review?

What was the major driving force?

Were changes in your curriculum based on needs identified by?

Lecturers

- ☐ Yes
- ☐ No

Please explain your choice of alternative above

Students

- ☐ Yes
- ☐ No

Please explain your choice of alternative above

When is the next curriculum review scheduled?

What roles do departments play in developing the faculty curriculum?

How are external stake holders engaged?

How are real world examples, case studies and opportunities for community engagement and service learning integrated into the curriculum?

How do the curriculum and other learning experiences reflect contemporary issues and emerging trends in agriculture?

In which programs did the innovations take effect and why?

Did these innovations in the curriculum take into consideration the following?

(i) Availability of resources (Both material and human resources) in the institution?

- ☐ Yes
- ☐ No

Please explain your choice of alternative above

(ii) The subject content----------

- ☐ Yes

☐ No

Please explain your choice of alternative above

(iii) The sequencing of topics (modules with the content that is applied in other modules covered first)? ----------

☐ Yes
☐ No

Please explain your choice of alternative above

(iv) Others (please specify)----------

☐ Yes
☐ No

Please explain your choice of alternative above

7. Have you attended any pedagogic seminar to effectively teach some aspects of the new curriculum?

☐ Yes
☐ No

If yes, what kind of training did you undergo and where?

Were there new courses introduced in the curriculum?

☐ Yes
☐ No

If yes, were they necessary?

9. What teaching strategies have been used in the implementation of the new curriculum (Please tick appropriately)

☐ Audio- visuals
☐ Use of internet
☐ Traditional chalk and dictating of notes
☐ Field trips
☐ Others (please specify)

10. What methods do you use to share learning experiences (Please Tick Appropriately)

☐ Seminars
☐ Symposia
☐ Conferences
☐ Exchange programs
☐ Others (please specify)

11. What challenges did you face with implementing the new curriculum in terms of the following

☐ Time
☐ Financial Resources
☐ Human Resources

- ☐ Institutional Commitment
- ☐ Commitment from other stake holders
- ☐ Others (please specify)

12. What positive/negative attributes has the review of the curriculum introduced in the system?

_____

13. If the review has negative attributes what suggestions would you make to counteract these attributes?

_____

14. Do you feel satisfied with the outcomes of the review?

- ☐ Yes
- ☐ No

15. Explain your choice of alternative above

_____

16. What do you see as the needs and future outlooks of the Faculty?

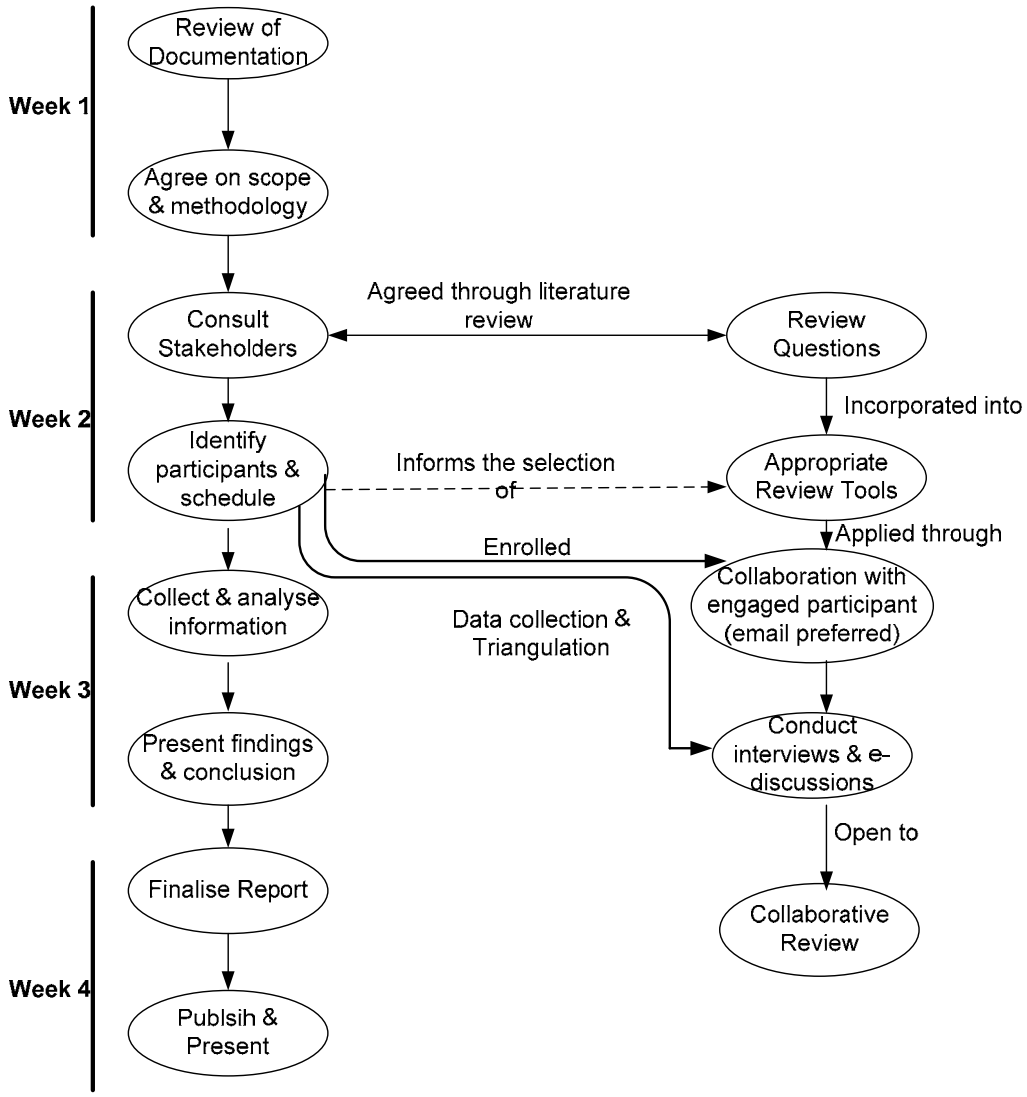
_____

Thank You for the Responses

ANNEX D: IMPLEMENTATION SCHEDULE

Task	Target Date	Week Number: 0	1	2	3	4	5	6	7	8
Meet with Regional Coordinator for Briefing	Completed									
Establish Advisory Panel	Completed									
Review documentation to define review criteria	Completed									
Set up collaboration Platform	Completed									
Deliver Inception Plan	30 June 2009									
Develop Study Tools	5 July 2009									
Engage Stakeholder and Partners	10 July 2009									
Consult Stakeholders	12 July 2009									
Identify respondents and agree on final interview list	15 July 2009									
Arrange for Interviews	17 July 2009									
Conduct Interviews and e-discussions	20 July 2009									
Collect, Collate and Analyze Information	23 July 2009									
Discuss Findings with RUFORUM	25 July 2009									
Present Draft of Findings	26 July 2009									
Report Review (Internal & External)	28 July 2009									
Finalise Draft Report	30 July 2009									
Printing and Delivery to RUFORUM	2 August 2009									
Oral Presentation of findings & Conclusions	Ministerial Meeting									

ANNEX E: PROCESS SCHEMATIC FOR THE STUDY



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