

Challenges and Opportunities of the Regional Universities Forum for Capacity Building in Agriculture in Kenya, Malawi, Mozambique, Uganda and Zimbabwe

Malcolm Blackie¹
Paul Woomer²

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¹ Smallholder Agricultural Development, 9 Meadow Farm Drive, Norwich, UK NR4 6TR:
mblackie@netcom.co.uk

² FORMAT, P.O. Box 79, The Village Market, Nairobi, Kenya: plwoomer@africaonline.co.ke

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The RUFORUM staff at Makerere University provided excellent logistical support and ensured that all sites to be visited were fully briefed on the purposes of the study. This made for an efficient and enjoyable field programme. Mr. Jackson Lubeye proved an excellent driver and a good companion during the field visits. Professor Adipala Ekwamu was our guide and mentor as we worked through various drafts. His wisdom and insights contributed substantially to the final product.

Finally, a note of thanks to Dr. Bharati Patel, who provided such leadership in the implementation of the 'old' Forum, and whose inspiration has been a beacon in the further development of the concept.

Executive Summary

The Regional Universities FORUM for Capacity Building in Agriculture (RUFORUM) is an association of 10 faculties of agriculture in East and Southern Africa that recognises the important and largely unfulfilled position that universities occupy in contributing to the wellbeing of small-scale farmers throughout the sub-region. This report was commissioned to establish the competencies, needs and opportunities of the ten universities in eastern and southern Africa that are presently participating in RUFORUM. The objective was to transform the RUFORUM strategic plan into a plan of action.

The study notes that the university research mission has changed, and universities need explicitly to become integrated into the national and regional R&D communities. RUFORUM can be a powerful tool for the universities to use as they respond to this new environment through:

- *deepening ownership* by placing management of the RUFORUM with member universities,
- *broadening its agenda* to assist the rural poor beyond food security intervention, and,
- *increasing participation* by more departments in more universities

RUFORUM is an interactive and diversified mechanism to assist universities adjust to their changing and more appropriate roles within African society. Fundamental to success is a *well focused, prioritised, and efficiently implemented research and outreach agenda*. RUFORUM will have to work with participating universities and their partners to implement swiftly and effectively a new research and outreach paradigm which includes:

- *a research and outreach funding mechanism* owned by the participating universities,
- *a complementary human resource development strategy*, continuing to be based around MSc training, but importantly building other opportunities such as postdoctoral fellowships and PhD scholarships, and,
- *building physical capacity* (and restoring and enhancing existing capacities at participating institutions).

The key driver that RUFORUM has for creating change is its research and outreach funding mechanisms – *‘business unusual’*. At the core of the ‘business unusual’ strategy is a substantial and influential source of funding for research and outreach activities that works under radically different rules from those of the past. The focus is on quality and impact. The emphasis is on inclusion and openness – making the best use of talent and resources for the benefit of improving the livelihoods of poor rural communities. RUFORUM aims to create the basis for agricultural research and outreach systems that address quickly and effectively the needs of these communities

and open new opportunities to them. These objectives need to be facilitated through enhanced networking and coordination among the NARS organisations, with sector stakeholders, and with international organisations. This is achieved through a clear policy of research and outreach funds being linked clearly and effectively to the quality of outputs – *“funds follow quality”*.

Importantly, implementation of RUFORUM will require the mobilisation of a much wider range of partners to contribute to the task of delivering the broader and deeper agricultural research and outreach agenda envisaged. RUFORUM grants will support researchers who see themselves as participating directly in development and building the partnerships and networks that enable them to fulfil the expanded ‘business unusual’ mandate.

RUFORUM will need explicitly to position itself as a facilitating mechanism for the universities collectively to design strategic initiatives that address rural poverty. To achieve this, RUFORUM needs to raise additional resources. RUFORUM will not do this *on behalf of* participating universities, it will do this *with* participating universities. RUFORUM will work with these universities to put together strategic interventions at national, regional, and subregional levels and to facilitate the funding of these plans through skilful mobilisation of outside funds. The success of RUFORUM depends on its ability to bring in these funds. The well tested quality control, efficient disbursement, and monitoring and evaluation mechanisms of RUFORUM will be used to provide individual or team grants to implement the strategic theme.

The immediate task now is to develop key strategic themes which can form the basis of a fund raising effort around which RUFORUM can attract the needed financial support from appropriate donors. The output from implementation of these strategic themes will be high quality demand-driven research and outreach activities implemented to facilitate the widespread uptake of interventions and technologies that increase sustainable production, utilisation of, and access, to food as well as natural resources management in eastern and southern Africa. Proposed initial themes include:

- Increasing the Diversity and Roles of Legumes within Smallholder Farming Systems
- Understanding Farmer Organisations and Expanding their Capacities for Service Provision
- Striga Eradication in Africa: Integrating Cutting-Edge Technology, Intellectual Property and Smallholder Practice
- Re-vitalising African traditional crops and fruits, and exploring their roles in contemporary diets
- The sustainable management and conservation of fragile rangeland and cultivated drylands through focused research and community based interventions to enhance the quality of life of the rural poor

In all the above themes, there are several crosscutting issues which need to be properly incorporated as the themes are developed into programmes. These include:

- **Adding value:** a major emphasis in almost all national development strategies has to help the poor 'add value' to the commodities which they have for sale.
- **HIV/AIDS:** the HIV/AIDS pandemic adds a particular challenge to agricultural development in the region and impacts on agriculture in many ways.

RUFORUM will bring the following important strengths to university research funding applications:

- Access to a wider potential range of donors since these are able to invest in specific goals across a range of institutions (RUFORUM should also target existing donor themes such as the USAID-funded CRSP programmes)
- The thematic programme approach lends itself to the potential of supporting more institutions at higher levels of funding
- RUFORUM has established and well proven quality control mechanisms which can be applied across the diverse range of collaborators, thus enhancing the chance of overall success
- Ownership and leadership is strongly developed at several levels. Farmers, directly involved in proposal and project development not only benefit from the work but contribute to it; students gain experience and confidence from 'hands on' field work; academic staff are able to enhance their teaching programmes with 'real world' examples, while developing their departmental capacity to undertake research; universities become actively engaged as development partners with both donors and rural communities.

The process of developing a strategic initiative will go through several phases. Most strategic initiatives will go through most of these steps, but there will be cases where groups already have done much of the initial work and, where this is the case, it should be built upon.

Inception: the RUFORUM secretariat issues a 'call' for a *Thematic Concept Note*. The secretariat will work with either individual teams or encourage merged teams to produce an overall concept document. Potential donors should be involved and informed throughout the process. The concept development team will be tasked to develop the note into a fully costed and justified programme proposal.

Implementation: the programme is then funded by one or more donors. The RUFORUM secretariat manages the resources on behalf of the donor. Members of RUFORUM then put together project proposals (involving graduate students and other training activities) which RUFORUM puts through its proven review process.

Monitoring and evaluation: the RUFORUM secretariat will monitor the various research projects based on its established procedures (which should be continually reviewed and updated in the light of ongoing experience). It will require the normal

periodic reports from grantees and assemble these into appropriate format for reporting to the donors involved.

The approach allows the RUFORUM secretariat to develop a coherent programme in partnership with the best of African science. It will raise a nominal subscription from all participating universities but the bulk of its operations should be funded through overhead derived from managing collaborative grants.

The secretariat should also update and make available on the website, and through other means, its portfolio of successes to promote the track record of the programme. RUFORUM needs to highlight and develop its 'in house' expertise to help universities remain viable institutions through periods of difficulty (such as national economic distress). Through the networking opportunities created by RUFORUM, universities in countries where political or economic conditions are unfavourable can be kept operating at the highest possible standard. These institutions will be ready for action once the situation returns to normality and will quickly be able to play their role in national recovery exercises. This strategy can also be refined and developed to help participating universities adapt to change and to expand their role within the NARS.

RUFORUM is not a donor – rather it works with its members to raise funds for high quality research thrusts along thematic lines. Membership of RUFORUM is, therefore, open to all departments who can offer solutions to the pressing problems of rural poverty, within the constraints of the agreed thematic options. As new themes emerge, these can be validated through participatory discussions amongst RUFORUM participants and informed outsiders and developed as needed. This expands further the opportunities for interdisciplinary research and outreach.

Graduate training will remain at the core of RUFORUM. The establishment of post-doctorate opportunities in leading RUFORUM institutes may be seen as a useful, if not necessary, bridge to PhD training. RUFORUM activities, however, will also necessarily involve training of, and learning to work with, communities as essential component of moving research swiftly and efficiently from the laboratory to farmers' fields on a broad scale.

A major focus of RUFORUM will be electronic networking – to develop thematic thrusts, to put together programmes to address the defined problem areas in these thrusts, and to promote the best outcomes consequent on the programme implementation. These networks will be used to enhance quality, to introduce new ideas, and to bring to scale the best of the new opportunities which are developed. While research from the natural and social sciences has the potential to address the pervasive poverty of Africa, this potential has not been successfully incorporated into development strategies. With strong leadership especially from the research community itself and supportive guiding policies, this dismal picture can be altered at modest cost with substantial benefits to the livelihoods of poor farmers as research outputs are incorporated into development projects, programmes and policies. This is achieved through skilful networking of the best available talent (nationally and internationally) in a focused, problem orientated mode to integrate high quality technology into the development process.

List of recommendations

Recommendation 1:

RUFORUM, possibly through a form of nurturing grant, can help Bunda manage and develop ARDEF and thus acquire the status and influence through which it can achieve its ambition to become a national university for science and technology. The use of ‘in-house’ expertise and support for participating universities during periods of stress and expansion should become an integral part of the RUFORUM strategy.

Recommendation 2:

The experience from the ‘old’ Forum in terms of emphasising quality, focusing on the needs of the rural poor, building ownership and ensuring all grants leave an adequate ‘footprints’ (at both the university and the community level), and developing an uptake pathway strategy should be explicitly incorporated into RUFORUM.

Recommendation 3:

RUFORUM explicitly positions itself as a facilitating mechanism for the universities collectively to design strategic initiatives that address rural poverty. It will incorporate the successful components of the ‘old’ Forum in its own programme, and will expand its efforts to enhance those parts of the ‘old’ Forum which were neglected or omitted from that programme.

Recommendation 4:

RUFORUM should encourage the development of research ‘stables’ within the leading departments, for example by helping fund post-doctorate fellowships, as well as helping build strong and lasting connections to outreach programmes, rather than working with individual farmers on a project-by-project basis.

Recommendation 5:

The RUFORUM secretariat, in close consultation with senior participating RUFORUM scientists and other informed parties, develop key strategic themes into focused development proposals based on those formulated by the consultative stakeholders’ meetings. Further themes will be developed as RUFORUM continues its programme – either by revisiting the consultative process regularly (say, every second year or so) or else by a more formal priority setting exercise.

Recommendation 6:

RUFORUM must increasingly rely upon electronic communications and E-conferencing for programme development activities. The RUFORUM website can assist by posting information on the development and progress of various programmes and acknowledging outstanding contributions to them.

Recommendation 7:

The RUFORUM secretariat raise a nominal subscription from all participating universities but the bulk of its operations should be funded through overhead derived from managing collaborative grants. The secretariat should also update

and make available on the website and through other means its portfolio of successes to promote the track record of the programme.

Recommendation 8:

RUFORUM should promote and facilitate networks of specialisation rather than centres of excellence. Within such networks, centres of leadership (possibly the initiators of ‘research stables’) should be designated to enhance capacity and quality throughout the network.

Recommendation 9:

RUFORUM should adopt an explicit programme of graduate training enhancement. This will involve three levels of activity (1) building capacity in areas of general weakness (such as biometry), (2) increasing the reach and impact of existing state-of-the-art facilities at RUFORUM universities (for example, biotechnology and aquaculture), and (3) routinely and regularly raising the quality of existing graduate courses. These objectives will be achieved through the use of RUFORUM supported centres of leadership and networks of specialisation to create effective networking and distance learning exercises for both staff and students.

Introduction

The Regional Universities FORUM for Capacity Building in Agriculture (RUFORUM) is an association of 10 faculties of agriculture in East and Southern Africa that recognises the important and largely unfulfilled position that universities occupy in contributing to the wellbeing of small-scale farmers throughout the sub-region. This task may be addressed not only through better trained graduates entering the rural development workforce, but also by conducting more relevant and development-oriented research that is directly linked to participatory outreach programmes. In keeping with these needs, the RUFORUM conducted a series of national workshops in Kenya, Malawi, Mozambique, Uganda and Zimbabwe intended to explore opportunities for members to better work with one another and other rural development stakeholders that in turn led to the formalisation of five Strategic Goals:

- MSc and PhD programmes are responsive to stakeholder needs & national/regional development goals
- Shared research and training facilities and capacities are rationalised for enhanced economies of scope and scale
- Innovative training, research and outreach activities supported by adaptive management structures in universities contributing to policy and development practice
- Operational capacity and approaches for innovative quality and impact-oriented research for development mainstreamed in universities
- A dynamic regional platform for policy advocacy, lobbying, coordination and resource mobilisation for improved training, research and outreach by universities

A RUFORUM business plan is now under development that will direct the secretariat toward these Strategic Goals. To facilitate this business plan, a consultancy was launched to independently establish the competencies, needs and opportunities of every RUFORUM member. The authors of this report visited the ten universities in eastern and southern Africa that are presently participating in RUFORUM. Approximately two days were spent at each university, meeting with faculty and university administrators, past and perspective FORUM grantees, graduate students and technical staff. The specific responsibilities of the consultants included:

- Market RUFORUM and solicit for additional financial resources; identifying potential funding sources and contacts
- Transform the strategic plan into an action (operational plan), more specifically identify programmes for operating the strategic goals, including suggesting budgets and required competencies at the Secretariat level
- Assess opportunities for integrating universities in the broader NARS and development issues in the different countries

- Assess competencies/gaps/opportunities in the RUFORUM participating universities and identify possible centres of specialization to mount regional Ph.D and MSc programmes, and recommending 2-3 centres for piloting the regional training programmes
- Assess modalities for membership fees and expansion
- Ensure quality of the process and product
- Assessing demand and opportunity for mounting a regional Biometrics M.Sc Degree programme and the modalities
- assessing opportunities for transforming Bunda College of Agriculture into a full fledged university

The consultant report should include:

- Report of the fund raising drive including a list of potential funding sources and contact
- An operational plan for RUFORUM
- A report of the findings on the competencies/gaps/opportunity study, integration of universities in the broader NARS and national development, membership expansion and fees, and recommendations arising from the assignment.

An assessment of competencies and opportunities in the RUFORUM participating universities

The 'old Forum' was established by the Rockefeller Foundation in view of the significant shortages of appropriately trained development specialists (particularly at the MSc level). It was evident at that time (about 12 years ago) and remains true today that the universities of the region had (and have) useful (but underexploited) research and training skills. The assessment which follows highlights this potential. There are weaknesses – that would be true of any comparable review in any part of the world. But under the 'old Forum', the response of the universities to the opportunities that the programme offered to get actively involved in real world problems exceeded all expectations. The quality of activities, the commitment of both staff and students to achieving research objectives and outputs was high, and the work reported was of international standard (as indicated by publications and conference proceedings), and overall the students were supervised well. Graduating students have been well received by employers and many have gone on to further advanced training.

The following sections provide evidence of real opportunities to use the skills and competences of the universities to bring about significant change in services to poor farmers in the region. The cost, as will be outlined in the final part of the report, is modest – the benefits from a skilfully executed programme are substantial.

Bunda College of Agriculture, Malawi

Assessment of competencies and opportunities

Bunda College is undergoing numerous structural changes. It has recently expanded its number of Faculties from one (Agriculture) to three (adding Development Studies and Environmental Sciences), with a corresponding addition of numerous departments (from six to 12). Many of the changes are facilitated by Bunda College's Strategic Plan (2005-2010) and its long-standing development partnership with NORAD and other Norwegian institutes (since 1999). Some of the changes appear superficial¹ but, by and large, the restructuring is designed to assist Bunda College's vision of becoming a full and independent University of Science and Technology. The campus is spacious and contains many new one-storey brick buildings. But, with a few exceptions, the laboratory facilities are aging and rely upon older methods. Nonetheless, these laboratories are well used - for example, the Soil Science Laboratory was found analyzing a large number of soil samples for Illovo Sugar Company during the student break in July 2005 as a means of income generation.

Student:instructor ratios are favourable, e.g. 1:4 in Crop Science and 1:9 in Agricultural Engineering, the number of PhD level staff are relatively few. 25 PhD holders in the whole college for 654 students (e.g. four of thirteen staff in Crop Science and two of eleven staff in Agricultural Engineering). The college recognises this shortcoming and has developed a PhD training plan but it will be many years

¹ such as removing horticulture from the Crop Science Department and reassigning it to Forestry within the new Faculty of Environmental Studies

before staff qualifications are improved. Staffing also reflects a shortage of women in all departments except for the Department of Home Economics and Human Nutrition although efforts are underway to narrow gender difference. At present, 12 staff members are PhD candidates, with most of these receiving training overseas. Some programmes are clearly in decline such as the Centre for Agricultural Research and Development (CARD), intended to serve as an agricultural policy research facility, as evidenced by its skeletal staffing, inoperative computers and neglected document collection.

The College plans to develop PhD programmes in Aquaculture and Fisheries, Agricultural Economics, Animal Science and Natural Resource Management starting in August 2006, although it recognises that some of these programmes will have an insufficient number of PhD faculty to supervise fully the incoming graduate students until its mid-term plans for staff development are realised.

Library

Bunda College has an impressive library facility. The library has 50000 scientific journals both in hard copy and in electronic format. The newly installed V-SAT has increased the bandwidth from 14.4 kilobytes to 128 kilobytes downlink and 256 kilobytes downlink, thereby enabling the college to access substantial electronic information (including e-journals for academic purposes)². Bunda Library is the national centre for the CTA Question and Answer Services (QAS). It also serves as a Food and Agriculture National depository. The Library has access to electronic journals through INASPs Programme for Enhanced Research information (PERI), FAOs Access to Global Online Research in Agriculture (AGORA) and The Essential Electronic Agriculture Library (TEEAL). With such a versatile library it should be quite possible to embark on the PhD Degree program in Aquaculture and Fisheries Science.

RUFORUM Opportunities

Aquaculture

Bunda College firmly believes in the Regional MSc approach and supports three such programmes in Aquaculture and Fisheries, Animal Science and Agricultural and Applied Economics. The Department of Aquaculture and Fisheries Science has 10 members of academic staff. Four have PhD degree qualifications, and two more staff members will graduate with PhDs by December 2005. Although the Animal Science Department recently lost its Regional MSc backer (DANIDA), the two other programmes are performing well (e.g. Aquaculture and Fisheries is training 12 MSc candidates from several African countries).

Outreach

Bunda College serves as a positive example of collaboration between a RUFORUM member and their national agricultural research counterpart, the Department of

² There is the potential to further increase the bandwidth to 256 kilobytes and 512 kilobytes for uplink and downlink, respectively.

Agricultural Research Services (DARS). This relationship is not necessarily related to proximity (travel between Bunda College and the DARS Chitedze Station requires 45 minutes) but rather to a network of strong interpersonal relations that results in a sense of partnership rather than rivalry between the two institutes. Reinforcing this collaboration is the relative paucity of specialists within both institutes as each could be described as being “one professional deep” in most scientific disciplines, causing them to seek assistance from one another. For example, DARS staff serve as guest lecturers at Bunda while Bunda staff are welcome to use DARS facilities and, less often, DARS staff will join Bunda College Faculty.

Bunda College is less adept at working with developmental interests and recognises the need to strengthen its outreach activities. A recent evaluation of Bunda College’s NORAD Project concluded that “the greatest shortfall of the project was the limited research and outreach projects stemming from it” and that Bunda researchers remain “accustomed to top-down approaches where they themselves define the problems ... and steer the remainder of the process”. It is widely recognised that findings from agricultural research at Bunda College are too seldom translated into simple extension messages intended for grassroots efforts. This is not to say that scientists at Bunda College do not work on-farm, but they seldom work in partnership with farmer associations and developmental interests. This shortcoming is recognised, and plans are underway to involve chapters of the National Smallholders’ Association of Malawi (NASFAM) in adaptive research during the next season (ironically, many Bunda graduates are employed by NASFAM but did not forge collaborative links with their former instructors).

Another opportunity exists to better integrate Bunda research within the Ministry of Agriculture’s Agricultural Development Divisions (ADD). For example, Bunda College falls within the Lilongwe ADD, the largest maize producer in the country and plans are underway to apply recent techniques in striga management through on-farm research. Another example is the Lungwena Nufu Project, where several research and development interests are working in south-east Malawi, including the Department of Crop Science to improve cassava and pulse production among a group of about 1000 farmers (by conducting 12 on-farm trials and accompanying farmer field days).

Transforming the Bunda College of Agriculture into a University of Science and Technology

Autonomy for the Bunda College of Agriculture was first proposed in 1995 and featured arguments that:

- widely separated colleges administered within the University Office at Zomba (in South Malawi) result in administrative inefficiencies and unnecessary duplication,
- a balanced distribution of resources throughout the various colleges within the University of Malawi is difficult to achieve and that the priorities established by individual colleges are often not respected by the university,
- the present network of several colleges within a single university has impeded the growth of those colleges in greatest demand, thereby restricting the

opportunities of university education Malawi (there were 30 applicants for every student enrolled in 1995), and,

- unlike other major colleges within the University of Malawi, Bunda College is isolated from the nearest city or large town and it must provide additional facilities to its students, faculty and staff that are not required by other colleges. Bunda College feels that the University has not responded positively to these needs.

The University of Malawi was founded through the University of Malawi Act passed by Parliament. As a result, the University of Malawi alone is currently mandated to bring higher education to Malawi's people. This has been achieved through the formation of a network of colleges throughout the country. The law will need to be changed before any of these colleges can become a separate university.

The highly centralised and authoritarian system which was in place when the University of Malawi Act was passed has given way to a more democratic and responsive form of government and, in consequence, there has been active debate over the past decade regarding a new University of Malawi Act. The Malawi Government has also announced plans to develop an additional university in Central Malawi, the University of Science and Technology.

Bunda College is well suited to become that university and is restructuring itself to assist this process. Presently, Bunda College is mounting renewed lobbying efforts to have the New Universities Act approved and to become a full and independent university. Bunda has also succeeded in attracting substantial development resources from NORAD for its future needs. A key element in this programme is a new research fund (which is provisionally called the Agricultural Research and Development Fund – ARDEF³). This fund is closely modelled on the Forum experience and provides a further example of 'scaling out' of Forum expertise. NORAD are putting the Bunda managed ARDEF through a very carefully scrutinised inception phase so as to ensure that the necessary quality control and focus is in place before the ARDEF is made fully operational. It is proposed that the immediate priorities of ARDEF should include:

- the development of gender-sensitive and appropriate on-farm technologies for improving food security and household income developed and in use by smallholder farmers in Blantyre, Machinga, Lilongwe and Mzuzu ADDs.
- the enhancement of the contribution of Bunda College and its partners in dealing with issues of poverty reduction, food security, natural resources and environmental management and HIV/AIDS mitigation.

This approach will directly, and at several levels, empower the users of research and create a demand led research system. With the overall development focus of the ARDEF, the need for credible and active collaboration with groups outside the

³ In the longer term, separate ARDEFs may be established (based on the experience of the pilot) to serve the whole of Malawi. In the first instance, the Bunda College managed ARDEF will serve Blantyre, Machinga, Lilongwe and Mzuzu Agricultural Development Divisions (ADDs).

conventional research community, and the requirement to consider uptake pathways as part of the research activity, the essential link between research – operating at a national scale – and extension and empowerment efforts operating at ADD and community scales – is implicit within the system.

ARDEF provides a unique opportunity for an African university, in a poor country, to provide major leadership in science and technology development for an agricultural based economy. RUFORUM needs to help this transformation through bringing in expertise from within its own ranks to assist Bunda. This will also serve to provide a model for other universities in the region as they work to change and modify their objectives and role within the NARS.

Recommendation 1:

RUFORUM, possibly through a form of nurturing grant, can help Bunda manage and develop ARDEF and thus acquire the status and influence through which it can achieve its ambition to become a national university for science and technology. The use of ‘in-house’ expertise and support for participating universities during periods of stress and expansion should become an integral part of the RUFORUM strategy.

University of Zimbabwe

Assessment of Competencies and Opportunities

The faculty of agriculture has four departments - Agricultural Economics; Animal Science; Crop Science; and Soil Science and Agricultural Engineering. These occupy three adjacent buildings on the University of Zimbabwe campus at Mt. Pleasant on the northern outskirts of Harare. These buildings house well designed and active laboratories, and provide office space and computer facilities for use by graduate students. The faculty is further supported by workshops, greenhouses and storage facilities located in nearby outbuildings, and by a large teaching and research farm about 20 km from the university. Each of the departments appears to maintain a reasonable balance between instruction and research, and the Department of Soil Science also provides soil analytical services to the public.

Some recent loss in faculty members has occurred but all of the faculty’s graduate programmes remain intact. It is important to note that while some agricultural sub-disciplines are no longer covered in depth, the number of PhD faculty remain among the highest within the RUFORUM. This depth is reflected within the planned expansion of instructional services. For example, a new MSc program in Soil and Environmental Management is being launched that not only relies upon the expertise of six PhD holders within the Department of Soil Science and Agricultural Engineering, but it has also identified adjunct professorships among professionals from other leading research institutions within Zimbabwe.

Some facilities within the faculty need modest rehabilitation. For example, the Crop Science greenhouse facility has fallen into disuse, with several glass panes missing or broken and benches collapsing. The resilience of UZ staff is reflected in their establishment of income generating activities, the profits from which are intended to rehabilitate this facility. Some laboratories have older, broken or disused instruments,

but again UZ technicians remain active through their reliance upon alternative procedures.

Animal Science is competent in nutrition, physiology and breeding, but lacks full capacity in animal biotechnology and biometrics. Agricultural Economics is strong in social and economic analyses, but has less expertise in agri-business development. The Department of Soil Science and Agricultural Engineering has a full complement of eight PhD staff. It is adding a new option of environmental management to its department and requires assistance in developing course materials. The Crop Science Department has been affected by staff loss but it retains a critical mass of PhD and MSc holders sufficient to continue its mandate for research and training (although some assistance in the areas of agronomy, plant biotechnology and weed management may be required in the future). The Department of Crop Science hosts an active Biometrics Section that also assists researchers within other faculty departments. The Biometrics Section has recently lost its license for Genstat, its preferred statistical software package, and asked if the RUFORUM can assist in renewing this licence. In the meanwhile, biometrics instruction relies upon Mini-Tab, a less versatile but simpler, more student-friendly package.

There is no consistent faculty policy concerning collaboration with the Agricultural Research and Extension Service (AREX) the Zimbabwean NARS. Rather, many faculty members work with the NARS through a network of interpersonal relationships, in large part because many faculty members were previously employed by the NARS. The faculty has focused its efforts within specific under-developed communal farming areas in central Zimbabwe and worked with farmer associations within these areas. An example of this approach are found in the multidisciplinary soyabean project led by the Department of Soil Science and Agricultural Engineering that provides seed, rhizobial inoculants, extension advice and marketing and food processing opportunities to Zimbabwe's farmers. A similar example may be found in the focus upon communal farmers within Chiyinka over several years through a series of projects led by the Department of Crop Science that has led to improvement in farmer's crop and soil management practices. The faculty members view themselves as the "leaders" within their respective partnerships - some of these projects could be strengthened through closer working rations with larger NGOs

RUFORUM Opportunities

The University of Zimbabwe continues to demonstrate leadership in several inter-university initiatives that could be facilitated through the RUFORUM. The Department of Agricultural Economics is one of five first-phase partners in the innovative Agricultural and Applied Economics program that supports a sandwich program for masters students. It is short of scholarship funds. The Department of Soil Science and Agricultural Engineering is forging mutually beneficial linkages with Bunda College of Agriculture (Malawi) and Kenyatta University (Kenya) as a means to strengthen its capacities in environmental studies.

The UZ faculty remain committed to the principles of higher education, and graduate students within the UZ Faculty of Agriculture remain productive throughout its laboratories, computer rooms and field facilities. Assistance from the RUFORUM was requested by some faculty to better access routine instructional and laboratory

supplies such as acrylic transparencies and filter papers. RUFORUM has recognised the need to support UZ at many levels so that the university's role within Zimbabwe's agricultural development continues. To this end, RUFORUM has provided a nurturing grant to support the training of 15 master's students. These students may require additional support so that they may better undertake their graduate research in about one year's time.

Agricultural Economics

The Regional MSc training programme in Agricultural Economics was cancelled in 2002 after GTZ cancelled its financial support. However UZ is one of the five 'jump start' departments that are launching the new Regional MSc in Agricultural and Applied Economics⁴.

Natural Resource Management

The Department of Soil Science and Agricultural Engineering is undergoing a curriculum change allowing for "taught" MSc in Applied Environmental Science that it hopes will attract enrolment from throughout southern Africa.

Africa University, Zimbabwe

Assessment of Competencies and Opportunities

Africa University is located near Mutare, Zimbabwe about 260 km southeast of Harare in Eastern Province along the border with Mozambique. The university is affiliated with the Methodist church and occupies a spacious (625 ha) campus with new, well-equipped buildings and detailed plans for expansion. The Faculty of Agriculture and Natural Resources occupies its own two storey building consisting of several wings and two large courtyards. The faculty consists of four departments offering six undergraduate options: Agribusiness; Agronomy; Animal Science; Horticulture; Natural Resources; and Irrigation and Water Management. Students taking the BSc in agriculture take common courses for the first two years and specialise in the final year. The faculty has 13 lecturers, 6 holding PhD degrees. Currently, the faculty also hosts two visiting professors. For the past several years, the faculty has offered only one MSc programme in Crop Production, but it plans to add another in Agribusiness later in 2005.

The faculty contains several large laboratories (e.g. soil science, animal science, horticulture) but these are dual purpose, intended for both teaching and research. Nonetheless, these laboratories contain an impressive array of (operating) scientific instruments. The large campus contains a botanical garden, research fields, an irrigated commercial farm, livestock operations and a natural refuge. The library of Africa University is very impressive in its size and operations. The library includes many computer work stations for literature searches and on-line access to journals. For example, Africa University hosts the first on-line TEEAL installed within the FORUM and it seems to operate extremely well.

⁴ Additional information on this programme is provided under the section on the University of Nairobi

A staff training programme is intended to increase the number of PhD faculty among those currently holding MSc (6 at present), but this results in a current shortage of lecturers. Some of the best lecturers have recently left for universities in South Africa or been recruited by international organisations. Despite the staff size, the faculty is quite active in research and is currently engaged in 12 projects, four of which have a strong on-farm or outreach component. Only one faculty member, Dr. Tagwira (the current Dean), has been awarded a past FORUM grant, and the remaining staff appear to have weak proposal development skills.

The relationship between Africa University and AREX remains informal, and is based upon individual personal cooperation between their respective scientists.

Africa University was recently awarded a “nurturing” grant by the RUFORUM that will support 10 MSc students starting next month. These students will begin their studies in mid-August and be expected to develop a research proposal over the next several months. This serves as both an opportunity for the RUFORUM to influence the research directions in a manner consistent with the Strategic Goals, but also as a challenge because the MSc scholarships contain very little funds for research.

RUFORUM Opportunities

Agribusiness development

Africa University seeks to expand the size and importance of its Agribusiness programme. Agribusiness and value added processing have been overlooked in the past and Africa University has made these into priority areas. During a stakeholders’ consultation with several farmer organisations in 2005, Africa University was urged to complete its MSc programme, that is now scheduled for launching in August 2006. In the past, Africa University conducted short-term agribusiness training throughout the country during a 3 year project funded by The Kellogg Foundation (ending in early-2004) and the university feels that during this project it greatly improved its perspectives and capacities in agribusiness training. This expansion will be done in conjunction with the Faculty of Management and Administration that will greatly increase the staffing devoted to this area of study. Keeping in mind the large proportion of international students enrolled in Africa University (20%), any new programmes occupies a somewhat regional position.

Information technology

Africa University has real opportunity to better utilise distance learning. The Information and Communication Technology Department is currently installing two large “virtual” lecture theaters that will permit interactive teaching through large, projected real-time teleconferencing.

Outreach

Africa University is committed to outreach at all levels (administrators, faculty and support staff), and appears considerably ahead of many other RUFORUM members in this area. It recognises the limitations resulting from its small size and has targeted its

outreach efforts accordingly by promoting specific enterprises (e.g. mushroom cultivation, wood processing) over a limited geographical area (e.g. Chimanimani). Other RUFORUM members stand to learn from this example.

Its most successful outreach programme is the ongoing Chimanimani Integrated Rural Development Project started in 2001 through a grant from The Kellogg Foundation that has visibly improved the lives of 500 households in terms of their community organisation, the establishment of schools, and the production of higher value crops. One component of this project has funded 90 rural enterprises⁵ in areas such as fruit processing and mushroom production. The faculty is currently preparing a US \$6 million proposal to establish a farmer training centre that will offer short-term training to farmers and extension agents and serve as an information centre for many farm enterprises.

Eduardo Mondlane University, Mozambique

Assessment of Competencies and Opportunities

The Faculty of Agriculture and Forestry Engineering is located within the main campus of Eduardo Mondlane University in northern Maputo. The faculty contains three Departments - Crop Production and Protection (P&P); Rural Engineering; and Forest Engineering, Agricultural economics and agricultural extension are accommodated within Crop P&P, while soil science and food science operate as sections within Rural Engineering. All three departments are located within a three storey building shared with the Department of Biology.

Space is adequate but becoming crowded. This required that the faculty construct additional outbuildings to house the Department of Graduate Studies, started in 2001. This department offers MSc degrees in four fields - Plant Production and Protection; Natural Resources and Wildlife; Rural Development and Wildlife; and Agrarian Economics. The faculty graduate programme has 36 first year and 40 second year students. Nine of the first year students are supported through a recent “bridging grant” awarded by the RUFORUM.

PhD holders occupy 4 of 30, 2 of 12 and 7 of 16 lecturer positions within the Departments of Crop Production and Protection, Rural Engineering, and Forest Engineering, respectively. Efforts are under way to correct this situation. For example, the Crop Production and Protection Department currently has seven members of staff away on PhD study leave.

The MSc programme is still immature. To date, only 14 students have graduated and 14 have dropped out. The drop outs were attributed to the “high” cost of tuition (\$2400 per year) and few scholarship opportunities. The graduate programme seems to have been restructured every year of its short existence (with programmes in Agribusiness and Agricultural Extension initiated, and then withdrawn; and other programmes merged or renamed). These changes reflected difficulties in arranging PhD-level supervision of Masters students within some disciplines. Hopefully this

⁵ Each enterprise is eligible for loans up to US \$2000 and the programme has experienced 95% success in loan repayment.

situation is now stabilised into the current four programme areas and that future changes will reflect new disciplines for MSc studies. English language skills are variable and difficulties in written and scientific English have likely contributed to the weak history in FORUM grants preparation.

Most opportunities for Eduardo Mondlane University as a RUFORUM member, relate to the positive attitudes held by its staff and students, and the stream of donor support that is enjoyed by the university and other institutions, particularly IIAM (the Mozambican NARS). Many of the laboratories at the university are excellently equipped and the technicians appear well trained. A five-year capacity building programme within the faculty funded by the Government of Italy is entering a second, more implementation-oriented phase.

IIAM (the Mozambican NARS) urgently requires assistance in crop protection, composting technology and biometrics. In the past, IIAM viewed the university as primarily a source of trained personnel (and staff upgrading) but now it seeks fuller research collaboration, particularly to train its staff in more advanced methods of biotechnology.

Neither the Faculty of Agronomy nor IIAM appear to have strong experience in adaptive, farmer participatory research in collaboration with developmental interests

RUFORUM Opportunities

Horticulture, biotechnology, and tissue culture

The Department of Crop Production and Protection has great potential to contribute to a regional graduate programme in biotechnology. At the main campus in Maputo, a project involving cowpea and sunflower first funded by the Government in Italy in 2001, and entering a second 5-year phase in 2006 has developed capacities in biotechnology and crop protection. The same project developed a biotechnology centre at the nearby Faculty of Veterinary Sciences. These facilities routinely conduct DNA hybridisation and have excellent “visualisation” facilities. The biotechnology centre is presently involved in genetic characterisation, but with little additional resources that could expand into the area of transformation. Another biotechnology centre is being developed at the nearby IIAM. Presently, the laboratory is extremely well equipped to conduct plant tissue culture but has plans, institutional will, donor support and generous space to expand their operations. Complementing the capacity for graduate training in biotechnology at Eduardo Mondlane University is the recently completed MSc training facility adjacent to the Agronomia building. Three small buildings house lecture theatres, computer rooms and a study centre specifically designed to support the Faculty’s graduate students. RUFORUM proposals could seek to “piggyback” with the cowpea and sunflower development components of the other project.

However, it is important to note that the university has a very limited human resource base, and one not adequate for graduate level training of the standard promoted by RUFORUM. RUFORUM, therefore, needs to help support human resource development in biotechnology, with students from Mozambique (both university and national system staff) trained at Makerere and Kenyatta Universities.

Jomo Kenyatta University of Agriculture and Technology

Assessment of Competencies and Opportunities

JKUAT has evolved from a middle level constituent college of nearby Kenyatta University. As a university, it has retained a strong emphasis on providing all students with ‘hands-on’ practical skills, as well as retaining avenues for candidates with lower level qualifications to enter university education through accelerated progress through its degree structure. It has an extensive and relatively well maintained campus about 20 kms outside Nairobi.

The Faculty of Agriculture has three departments – Biomechanical and Environmental Engineering; Food Science and Technology; and Horticulture. The Faculty of Science has six departments – Chemistry; Biochemistry; Botany; Mathematics and Statistics; Physics; and Zoology. The Faculty of Engineering has four departments – Civil Engineering; Electric and Electronic Engineering; Mechanical Engineering; and Geomatic Engineering and Geospatial Information Systems. There is also a School of Architecture and several institutes (those of particular relevance to RUFORUM include the Institute of Computer Science and Information Technology, the Institute for Human Resource Development, the Institute for Biotechnology Research, and the JKUAT Information Technology Centre).

There is a well developed strategic plan for the period 2004-2014 which includes a comprehensive SWOT analysis of the university. The vision of the university is to be “a world class institution of excellence for development”. The teaching facilities for both graduates and undergraduates are well maintained although some of the equipment is old. However, even the older equipment is in good working order generally and is easily accessible to students. The technical staff are exceptionally well qualified and many have obtained degrees up to the MSc level through studies at JKUAT. Student accommodation is of a good standard. Graduate students typically rent accommodation in the nearby town where there is a reasonable supply of suitable lodgings. JKUAT has extensive experience in hosting students from the region and all departments in the Faculty of Agriculture have regional students at undergraduate and sometimes graduate level in their programmes.

The campus has a good library and an additional science library is under construction. All undergraduate students are required to undertake work experience placements and relationships with placement employers are reported as good. Undergraduate class sizes are deliberately constrained and are typically in the range of around 30 students per class. The quality of undergraduate projects and other practical work which was made available was of a very high standard.

RUFORUM Opportunities

Information Technology

JKUAT students and staff have exceptionally good access to computing facilities and the internet. There are well equipped computer labs in all departments with the necessary software available. The entire university is networked which has been achieved through use of internal human resources largely. The university builds its

own PCs which are then made available to students at very reasonable prices which further improves access to computing facilities. The focus, especially of the JKUAT Information Technology Centre, is on ensuring that all staff and students at the university have the skills necessary to make use of modern information technology in their own areas of expertise. The transfer of this experience to other RUFORUM universities would add significantly to the ability of those universities to meet their objectives.

Statistics and biometrics

The Department of Mathematics and Statistics has a professor with a PhD in statistics as well as several lecturers and other staff members at the MSc level. All are working towards their doctorates. The department already provides ongoing advice on experimental design and analysis to staff and students in the Faculty of Agriculture. In 2003, a plan for further training of Faculty of Agriculture staff and the acquisition of needed equipment and software was developed and has been partially implemented to date. Much of the equipment and software has been purchased and some of the equipment is in hand.

Food Science and Technology

The department has a very well qualified staff at both the academic and the technical levels. JKUAT already hosts students from the region in the area of food science and technology. The labs are generally well equipped, clean, and maintained to a high standard. Regional students come in groups of as many as 20 to use these labs and receive a high standard of training. Makerere University and Namibia University have used the department for staff training and for curriculum development.

Horticulture, biotechnology, and tissue culture

The Department of Horticulture works closely with industry leaders in Kenya and has a good reputation for the quality of its work especially in support of the rapidly growing export industries. This expertise is an important resource as the growth in flower and vegetable exports expands. The department is hosting students from elsewhere in the region. It has a successful banana tissue culture programme which is directly linked to providing improved and disease free banana materials in a commercially viable system to smallholders throughout Kenya. This facility could be expanded and improved to allow more advanced biotechnology applications to be introduced. However, at present, the necessary equipment is not in place and the available laboratory would need significant upgrading to undertake this role. As noted elsewhere, nearby Kenyatta University has an excellent operational biotechnology facility.

Social Science

The social science capacity of JKUAT is housed in the Institute for Human Resource Development. This has a useful focus on the development of entrepreneurship and on marketing from a 'bottom up' perspective. While the IHRD provides support to the social science needs of JKUAT research programmes, greater mainstreaming of

socioeconomic issues is needed to balance the very strong technical bias of many of the research efforts. That said, the rather unique characteristics of IHRD could provide a valuable input into a regional effort to improve social science capacity at RUFORUM universities.

Self Help and Continuing Education

JKUAT has valuable experience in raising resources from its own efforts and in making good use of small amounts of money. Examples include the remarkable university wide computer network and the use of 'in house' expertise for infrastructure development. The School of Architecture has developed plans for new buildings and facilities which served to enable these to be developed at very reasonable cost. Both the experience in raising funds from student based activities and the use of 'hands on' student and staff skills to improve the university generally will be valuable to the many other RUFORUM universities struggling to improve their infrastructure.

Kenyatta University

Assessment of Competencies and Opportunities

Kenyatta University is based on a spacious campus some 15 kms outside Nairobi. It has a focus on science, arts, and culture. In common with neighbouring JKUAT, it caters for increasing numbers of self sponsored students which are an important source of income to the university. It is developing a ten year strategic plan with support from the Rockefeller Foundation.

There are five major schools at the university – Business; Education; Environmental Studies and Human Sciences; Humanities and Social Sciences; and Pure and Applied Science. It also has a major distance learning programme based around e-learning and hosts the regional campus of the African Virtual University. There is a nationally biosafety certified laboratory⁶ in the Department of Biochemistry and Biotechnology which is undertaking state of the art crop genetic transformations and providing training opportunities at MSc and PhD levels to both national and regional students. A recently introduced Masters degree in Public Health is open to disciplines other than the conventional medical specialities. In particular, the emphasis in the HIV/AIDS component is the recognition that the disease is not just a medical problem. Some 120 students participate in the course through the e-learning facilities. Associated research projects are strongly community based and undertaken in collaboration with other departments at the university.

There is good collaboration with KARI and the local IARCs. Members of the university have been successful in obtaining grants from ASARECA in stiff competition with other institutions. Issues of natural resource conservation and management are important components of the university's teaching and research agenda.

⁶ The only other certified lab is at KARI

With some notable exceptions, lab facilities are relatively old and there is a widespread recognition that equipment and computing facilities need substantial updating and improving. There is adequate student accommodation on site but, as with JKUAT, graduate students typically rent accommodation off campus. KU has had a number of Forum grants and several of the students have proceeded on to PhD studies. There is an evidently good relationship between graduate students and their supervisors.

RUFORUM Opportunities

Distance learning

KU has a well appointed distance learning facility, with experienced and enthusiastic staff. This could be a valuable asset to RUFORUM as part of any regional training exercises developed. The centre provides support for training from diploma to PhD levels. Within Kenya, this is supported through provincial centres but the approach could relatively easily be applied through regional university facilities.

Biotechnology

The Department of Biochemistry and Biotechnology has an outstanding biosafety certified laboratory which is already providing training to graduate students from across the region. The laboratory is well equipped and has excellent experienced leadership. The work being undertaken is of international standard and is being supported by through competitive grants obtained from Rockefeller Foundation, ASARECA, and other international agencies. The necessary linkages to the NARS and other concerned agencies are in place. There are plans to extend the facility in the near future to provide greater student working space.

The department provides the only training in the region in biosafety at undergraduate and graduate levels. It currently has space for around 20 MSc level students at any one time.

Natural Resource Management

The School of Environmental Studies and Human Sciences provides a valuable base from which to develop a wider focus on the resource management problems faced by rural communities. The school has developed a strong outreach programme and there are good collaborations in place with other departments at KU, as well as with outside agencies. An important focus of efforts at KU is to link science, technology, communities and the environment. Members of the school have made extensive use of earlier Forum grants to build larger programmes around improved resource use and involving a number of other donors. The initiative in public health with particular reference to HIV/AIDS is of significance in that it specifically involves non-medical expertise into research and training in this difficult area.

Statistics and biometrics

The Department of Sociology runs a number of useful courses in participatory methods and data analysis. It has a strong programme in gender analysis and collaborates with KARI in the co-supervision of social science students taking degrees at KU and Wageningen. The element of experience in the handling of social science data is of particular relevance to the RUFORUM as many students need to be exposed to these techniques.

Self Help

The biotechnology laboratory at KU was largely built through the imaginative use of a Rockefeller grant. Instead of using the overhead in the grant for general university purposes, the Department of Biochemistry and Biotechnology agreed with both the donor and the university administration that the funds should be earmarked for lab infrastructure. A remarkably spacious and well appointed laboratory was designed and built at very reasonable cost as a result. This experience provides a model which RUFORUM may highlight as one way in which to develop physical as well as intellectual capacity at the institutional level.

University of Nairobi

Assessment of Competencies and Opportunities

The University of Nairobi has a Faculty of Agriculture and Veterinary Science at Kabete campus, some 15 kms from Nairobi. The campus is extensive, with substantial (if somewhat neglected) buildings. It has several field facilities associated with the campus – from a field station on the Kabete site itself, to other facilities around Nairobi, and as far away as the Kenya coast. It is the oldest faculty of agriculture in the region and its staff are actively involved in many research activities (including Forum grants). The agriculture part of the faculty composes 8 departments although the university as a whole is undergoing a comprehensive restructuring which will result in many departments being merged. The present departments include Animal Production; Agricultural Economics; Crop Protection; Crop Science; Environmental and Biosystems Engineering; Food Technology and Nutrition; Range Management; and Soil Science.

The university has some considerable depth in terms of staff numbers in most departments, especially in comparison to several of the southern African universities. It has a wide range of taught MSc degrees covering the major disciplines within departments. Staff members have participated in the Forum over a number of years but unfortunately there were no past or current students available at the time of the visit.

The laboratory facilities are (generally) run down. Much of the equipment is decades old and it is to the credit of the staff that even some of this old equipment is still functional. Most labs require significant renovation although there is good quality work being undertaken even in these unpromising circumstances. The faculty does have a good postgraduate and staff computer lab with space for around 30 individuals at any one time. This equipment is reasonably up to date and is supported by the necessary biometric software. Sadly a key individual in the lab was lost to cancer

recently but there remains a good core of qualified staff, which is complemented by links to ICRAF and Reading University in Britain.

Library facilities are poor. The university is networked to the internet but access is slow and limited. Some research projects have their own internet facilities but this is not a long term solution to a common problem throughout the campus. Many staff had had to purchase their own computers as university provided facilities are inadequate.

RUFORUM Opportunities

Agrometeorology

The Department of Crop Science has an ongoing collaboration with the Kenya Meteorological Office and is developing expertise in enhancing weather forecasting to include crop production/weather models. The Kenya Meteorological Office serves the East and Central Africa region so this work has regional implications. The effort also involves capacity building at the Meteorological Office to enhance the understanding of agricultural components of the models as well as collaboration with Reading University. The Reading link has been valuable in keeping the postgraduate biometry lab up to date with equipment and software.

Biotechnology

The Department of Crop Science has a small but effective programme in tissue culture focusing on citrus greening problems.

Natural Resource Management

Natural resource management issues are almost entirely handled through the Department of Range Management. This is the only department amongst the participating Forum universities which is focusing explicitly on the management of natural resources in the extensive semi-arid and arid lands found throughout much of southern and eastern Africa. The department has a strong multi-disciplinary programme in place and is well networked into the major relevant national and regional initiatives. Graduate students are taken from the region and the department is collaborating with national and international institutes in the area of research. It has a well appointed field station which developed when the department was initiated with World Bank funding. The station was later turned over for general use by the university but current plan is for this station to return to the department.

Applied Nutrition

The Faculty has a large applied nutrition department and runs a popular MSc degree in Applied Human Nutrition. It has extensive laboratory and teaching facilities and an operational (although very old) pilot food processing plant. With scholarships from a number of agencies, it has regularly mounted its MSc course for regional students. With some change in focus to improve interdisciplinarity and an emphasis on a rather broader range of applied nutrition topics, this department could be a valuable resource for Forum supported work.

Statistics and biometrics

The Department of Crop Science hosts a small biometric lab for use by faculty staff and students. It is well equipped and with a reasonable staff complement. The Forum has used this facility in the past for running biometric courses – as have a number of other agencies. The department can call on neighbouring IARC institutes for additional support in this area. It does not have expertise in the handling of social science data, although this could be provided through the Department of Agricultural Economics.

Agricultural Economics

The Department, along with several other Forum universities⁷, is participating in the Collaborative MSc Programme in Agricultural and Applied Economics which aims to equip professionals with knowledge and skills essential for transforming the currently underdeveloped agro-food sectors and rural economies of Eastern, Central and Southern Africa to perform well in an environmentally sustainable fashion. Its underlying premise is that such highly trained local professionals must address the challenges posed by far reaching changes in global and local economies, technology, and marketing by adapting their advanced knowledge and methods to the particular institutional, political and economic circumstances of the region. Heads of departments of agricultural economics in the Eastern and Southern Africa region have formed the Agricultural Economics Education Board (AEEB) which oversees the overall implementation of the programme. Students may undertake specialised study in one of the following fields:

- Agriculture and Rural Development
- Agricultural Policy and Trade
- Agribusiness Management
- Environment and Natural Resource Management

Infrastructure

Many of the University of Nairobi facilities were built to a high standard. Although lack of maintenance has resulted in an overall decline in the quality of the facilities, there is the core of an excellent science campus waiting to be restored. RUFORUM could substantially increase the quality and focus of training opportunities available to graduate students and staff in Kenya and the region through a well-focused effort to help the university recover the benefits from the underutilised resource of buildings which presently make up the Kabete campus.

⁷The departments are: Botswana (Botswana College of Agriculture, *University of Botswana*); Ethiopia (*Alemaya University*); Kenya (*Egerton University*, *Jomo Kenyatta University of Agriculture and Technology*, *Moi University*, *University of Nairobi*); Malawi (*University of Malawi*); Mozambique (*Eduardo Mondlane University*), Rwanda (*Universite nationale*), South Africa (*University of Pretoria*, *Stellenbosch University*); Swaziland (*University of Swaziland*); Tanzania (*Sokoine University*); Uganda (*Makerere University*), Zambia (*University of Zambia*), Zimbabwe (*University of Zimbabwe*)

Egerton University

Assessment of Competencies and Opportunities

Egerton University has its main campus at Njoro about 200kms from Nairobi. It is in the heart of the high potential agricultural land in Kenya, but with ready access to the lower potential areas of the Rift Valley. It has a substantial, well developed campus and associated farm and experiment station. Of direct relevance to RUFORUM is the Faculty of Agriculture at the Njoro campus.

The faculty evolved from an agricultural college first established in 1939, offering diploma courses in various fields of agriculture. It became a college of the University of Nairobi in 1986 and has subsequently become a university in its own right. It presently has departments of agricultural economics and agribusiness management; agronomy; animal health; dairy and food science and technology; horticulture; and soil science. Besides offering degrees at all levels in most major disciplines, it also teaches its traditional diploma courses. Some of these were discontinued when the institution acquired university status but several have been reinstated due to demand from the industry.

There is a substantial core of well qualified staff in most departments as well as ongoing active research activities. There is an innovative crop improvement programme in place and the agronomy and soils departments have had several Forum grants in the past. Laboratory facilities are very short of space and up to date equipment. Typically research and teaching labs are shared. Internet access is very poor and most staff have private internet accounts for their work. Library facilities are also very limited but the faculty makes use of TEEAL.

On campus is a 30 bed hotel for the use of visitors and short course participants. A neighbouring CMRT building developed in collaboration with CIMMYT has a 60 bed facility, together with necessary conference and meeting rooms.

RUFORUM Opportunities

Natural Resource Management and Soils

The agronomy department is doing some work in the semi-arid areas on dryland farming and on acidic soils. It has an interest in developing this work further. Egerton is well sited to be able to develop a capacity in this regard. There is also work being undertaken on organic farming and in crop improvement and management that could contribute to an effort with this focus.

Agricultural Economics

The Department is another of the initial 'launch' departments for the Collaborative MSc Programme in Agricultural and Applied Economics described under the University of Nairobi. However, computer and literature access will be problematic in this department, at least in the immediate future.

Food Science and Technology

Egerton has a small but effective programme in this area. It has a particularly interesting focus on improving food utilisation and reducing food losses at the community level. In this regard, it differs from other food science departments which tend to take a more industrial approach to food technology. Tapping into the interests and capacity of the group at Egerton could provide a valuable and pertinent entry point for a 'value-added' strategy based around household and community food security. The Egerton programme offers considerable potential for development and leadership in this important area due to its close linkages with the farming communities.

Horticulture, biotechnology, and tissue culture

The university has an active horticulture programme which actively collaborates with this sector of the industry. It has a useful research and outreach programme based around both the production of vegetables and flowers under small scale greenhouses. This is linked to a strong practical training effort for all participating students. Tissue culture facilities are in the process of being developed.

Infrastructure

The conference and workshop facilities at Egerton can readily be exploited by RUFORUM for various meetings and short courses. The university has considerable experience in running these for both local and regional groups and has the necessary arrangements in place for participant collection and drop off. The road from Nairobi is busy as it is a major route to the land locked countries to the west, but is in reasonable condition most of the way. However, the lack of good internet facilities may be a drawback in some situations.

Outreach

Through its diploma and research programmes, Egerton has established a reputation for effective outreach. This has also been helped by the availability of on-campus accommodation.

Biodiversity

Egerton has a botanic garden of some 100 ha which is intended to serve as a botanic gene bank for rare and endangered indigenous species. It consists of an area of natural forest containing around 600 species (together with associated birds and small animals). A collection of 400 species has also been planted in the garden. The garden was established in 2002 and is in the early stages of development. Nevertheless, this is an important resource for Kenya and the region.

Moi University

Assessment of Competencies and Opportunities

Moi University Chepkoilel Campus is sited just outside Eldoret in Western Kenya. The main campus is also just outside the town but on a distant site. The Chepkoilel campus houses the School of Agriculture and Biotechnology with five departments – crop science and seed technology; soil science; horticulture; rural engineering; and agricultural and resource economics. The school is presently undergoing restructuring and several departments may be merged. Importantly, the agricultural economics group will move to join the School of Business on the main campus. New departments of biotechnology; animal science and management; and family and consumer science are anticipated.

The school of agriculture and biotechnology was developed from a small teachers training college with minimal infrastructural investment. Departments are housed in what was staff accommodation, often remote from their labs and field facilities, and in very cramped and unsatisfactory conditions. Library facilities are limited and dated (although TEEAL is available and with reasonable access) and internet access is poor. Most of the laboratories were developed as demonstration facilities for teacher trainees and have been modified as best possible with the resources available. An important exception is the Crop Science and Seed Technology department which, with support from the Netherlands government, has relatively new facilities on the university farm. The department of soil science has been allowed to take over one of the older crop science labs, which it uses intensively for teaching and for research. Rockefeller Foundation is supporting the development of biotechnology facilities at the school on a similar basis to that provided at Kenyatta University.

RUFORUM Opportunities

Natural Resource Management and Soils

The soil science department has a highly innovative programme, based in part on earlier Forum grants, of improving the productivity of cropping systems through the skilful introduction of legumes and improved soil nutrient management. This is usefully complemented by crop improvement work, especially in green beans, in the crop science department. The soils department is also working on the enhanced utilisation of the difficult vertisol soils found in many of the transitional zones between the high and lower potential areas. Several significant technological innovations have been developed and are being actively promoted through collaborations with NGOs and other agencies. The department has developed a strong outreach programme and there are good collaborations in place with other departments at MU, as well as with outside agencies. The soils team have made significant and impressive efforts to link science, technology, communities and the environment.

The department also has an interest in further developing its programme in the semi-arid areas and has capacity to undertake work in this field. Several of its ongoing programmes are directly relevant to an initiative in this area.

Horticulture, biotechnology, and tissue culture

The department of crop science and seed technology is working on developing improved seed materials for the horticultural industry, with a particular emphasis on

utilising locally well adapted germplasm. The intention is to provide opportunities for local producers to gain access to export markets such as green beans. This work is combined with investigative studies to broaden the cropping systems through enhanced exploitation of residual moisture (mirroring, in a slightly different context, work being done in the soils department).

A biotechnology lab on a comparable scale to that at Kenyatta University is planned and funding has been obtained from the Rockefeller Foundation.

Outreach

MU, in its soil science department especially, has developed an outstanding outreach programme. It has excellent linkages with a number of international and local NGOs through which it promotes its findings. Department members note that additional training and sensitisation of potential partners is needed in order to develop such collaborations. They have achieved quite remarkable results under very difficult circumstances and their experience and knowledge of this area should be utilised by RUFORUM to help develop an outreach strategy for the overall programme.

Makerere University

Assessment of Competencies and Opportunities

Makerere is the senior university in the region and is well endowed with an extensive and largely well appointed campus in Kampala. The faculty of agriculture is sited on the Kampala campus but also has a farm at Kabanyolo about 20 kms outside the city. Kabanyolo also houses the Makerere University Agricultural Research Institute (MUARIK), an outreach facility (the Continuing Agriculture Education Centre) and the Agricultural Policy Research Centre. The faculty has seven departments – agricultural economics and agribusiness management; agricultural engineering; agricultural extension education; crop science; food science and technology; and soil science. Most departments have considerable depth in terms of staff capacity although a few (agricultural engineering for example) have suffered staff losses as qualified individuals have moved elsewhere.

The faculty offers MSc and PhD programmes in all the main disciplines and is one of the ‘jump start’ departments in the regional applied and agricultural economics MSc programme. MUARIK has some 400 ha of land, together with research facilities and laboratories for faculty departments. The crop science department has a well equipped molecular biology laboratory. Internet access and computer availability is generally satisfactory throughout the faculty.

The faculty has supported some 11 Forum research projects and is a partner in the USAID funded HEPAD and APEP projects which support 6 PhD and 1 MSc students. Overall, through its participation in the national Plan for the Modernisation of Agriculture (PMA), the faculty and its programmes are exceptionally well integrated into national policy initiatives.

RUFORUM Opportunities

Natural Resource Management and Soils

The soil science department has a well established and highly respected research programme across a wide range of applied and basic science problem areas. It is recognised as a leader regionally in several of these areas. An MSc in Land Use Management is planned for the 2005/6 academic year. A GIS facility with the necessary equipment is available at MUARIK.

Some 26 MSc Forum students have been trained by the department and there are currently a further 8 undertaking their studies. The department has introduced some valuable interventions such as field testing kits for soil nutrients and developing improved fertility through biological nitrogen fixation. It has a strong outreach orientation – through field days, research activities and close collaboration with key extension providers. It has extensive ongoing collaborations in place with international and regional research groups.

Horticulture, biotechnology, and tissue culture

The department of crop science has a well established biotechnology facility which continues to be upgraded. There is an impressive list of outputs from the work supported to date. This work is complemented by strong capacity in applied agronomy, crop protection, and integrated pest management. There are excellent collaborations in place with national, regional, and international organisations.

The neighbouring Institute of Environmental Management also has excellent molecular biology facilities and is providing support for DNA sequencing and other comparable work at the university.

Statistics and biometrics

The department of crop science has a good depth in biometrics and has published a text on the subject. It has a modern computer laboratory with space for about 40 students, together with the necessary software.

Agricultural Economics

The Department is another of the initial ‘launch’ departments for the Collaborative MSc Programme in Agricultural and Applied Economics described under the University of Nairobi. The department has a strong programme and is well supported by computer access.

Food Science and Technology

The department has a new fully equipped building recently completed with Norwegian support. Unfortunately it was not possible to interact with members of this department during the field assignment but it was evident that this is potentially a very

considerable resource. JKUAT in Kenya has helped with staff training and for curriculum development.

Biodiversity

The associated department of forestry has a strong interest in developing capacity in biodiversity issues through a focused programme on utilisation of indigenous fruits and other foods. Both the crop science and the forestry departments have valuable links to international biodiversity groups and are recognised as leading departments in their fields in the region.

Outreach

Besides the conventional outreach activities associated with its research programmes, MU is host to two major regional journals of international quality (in crop science and in social science) as well as having its own high quality publishing house.

Developing an action plan for RUFORUM

Building on experience

Rockefeller Foundation set up its field programmes in southern and eastern Africa in 1988 with the appointment of field staff to Foundation offices in Lilongwe and Nairobi. As implementation of Foundation programmes got underway, it quickly became apparent that there were significant shortages of appropriately trained development specialists (particularly at the MSc level) and that the universities of the region had useful (but underexploited) research and training skills. University professors had heavy teaching and administrative responsibilities which made field research almost impossible to undertake meaningfully. Most university research was, therefore, confined to on-station laboratories and field stations, and there was little direct interaction with farmers.

Furthermore, most graduate training opportunities relied on overseas universities and the limited number of scholarships available to national universities rarely provided more than student tuition and living costs. In the absence of research grants, it was difficult to involve students in on farm studies.

In the light of this, the Foundation set up a competitive grant scheme for faculties of agriculture in the countries in which it had programmes – Kenya, Malawi, Uganda, and Zimbabwe⁸. The objective was to provide fully funded (tuition, research, and living costs) scholarships to MSc students studying in faculties of agriculture in the target countries. The focus of the grants were to be on improving the productivity of the main national food staple (typically maize) which was the overall thrust⁹ of the Foundation's Agricultural Sciences (now Food Security) Programme at the time.

Initially, uptake of the grants was painfully slow. The review process through which the grants were put was challenging and, in addition, what was now called The Forum for Agricultural Resource Husbandry required that each grant have a credible outside partner (based in an institution or organisation that was not affiliated to the university). This was to help establish demand for the research and also possibly to help in the development of uptake pathways. University researchers were not familiar with the competitive grant system and many struggled to meet the needed criteria. However, from the outset, the Forum had a policy of nurturing all potentially promising initiatives and provided help and advice both in the initial development of proposals and in the revision of those which the review process indicated needed additional work. Modest, quickly disbursed, preparation grants were made available to help university researchers develop their ideas in consultation with target farmers, potential partners, and other interested individuals and institutions. Foundation staff, as well as existing Forum grantees, advised new grantees on the process of developing proposals which met the needed criteria. This helped build both a sense of ownership

⁸ Mozambique became a focus country later.

⁹ Available funds did not permit a comprehensive programme covering the range of potential grantees at candidate universities and the Foundation policy was to focus its grants to support its overall programme objectives.

of the programme and also a balance between those faculties who had the capacity to develop quality proposals, and those who further down the learning curve.

Lessons from the ‘old’ Forum

Achievements of the ‘old’ Forum: the response of the universities, once researchers understood the new “rules of the game”, exceeded all expectations. The quality of proposals rapidly improved and some departments succeeded in attracting in substantial numbers of graduate students. *The commitment of both staff and students to achieving research objectives and outputs was high. The quality of the work reported was of international standard* (as indicated by publications and conference proceedings), and overall the students were supervised well. After nine years of operations, the FORUM compiled and published a Working Document of 111 citations and abstracts from refereed scientific journals that had resulted from its grants¹⁰. Graduating students were well received by employers and many have gone on to further advanced training.

Through participating in the Forum, university professors could build up the capacity of their departments. Each grant brought with it the opportunity to acquire new equipment and other resources that enhanced the department’s capacity to do future research. Thus *each successful graduating student left a significant ‘footprint’* in the department which served to build capacity in physical as well as human terms.

The original Forum was developed in the recognition that universities needed to become active partners in the creation of new opportunities for poor smallholders in the region. It provided opportunities for individual faculty members to respond to the challenges of creating change by:

- Empowering academic staff to work on needed solutions to smallholders’ problems
- Better preparing MSc graduates for tasks within the rural development community
- Greatly improving access of both staff and students to the body of scientific literature, as well as enhancing the capacity of participating departments through the acquisition of needed research equipment and supplies.

Under the inspired leadership of Dr. Bharati Patel, who joined the Foundation to manage the Forum once it became established, innovations such as report writing courses, internal Forum meetings for mutual review of progress, and other quality enhancing efforts were introduced. This also served to create *a strong sense of ownership amongst all Forum participants* – from Foundation staff, to students, and to farmers and other collaborators.

Shortcomings of the ‘old’ Forum: the Forum was a “single donor” programme, limited in its resources, and only supporting research within narrow geographic and thematic boundaries. Although crops, soils, and social science departments found

¹⁰ FORUM Working Document No. 4 “The FORUM on Agricultural Resource Husbandry: Bibliography and Abstracts” by M.N. Omare et al. 2001.

plenty of opportunities for developing grants, few other departments were able effectively to participate. So, while several departments within a faculty were revitalised through Forum grants, *the effect on the faculty overall was limited.*

While the outside partnership component of the Forum was valuable in bringing the universities into the mainstream of the development process (see the preceding review of competencies), it was *less successful in creating the needed uptake pathways.* Both staff and students feel that the outputs of their research did not adequately reach their target communities and that the Forum needed to devote more resources to ensuring that uptake pathways could be created and sustained.

Overview: the Forum succeeded well in changing the way research was conducted in participating departments:

- Both staff and students learned to work directly with farmers.
- The status and training of MSc Students were improved.
- Universities became better recognised as effective collaborators.
- Forum universities were now better engaged as active participants in key national policy initiatives.

Five key lessons come from reviewing the overall performance of the ‘old’ Forum that are integral to its future evolution:

- The value of a *strong emphasis on quality and relevance* of research.
- A focus upon the *needs of the rural poor.*
- The *sense of ownership* among grantees and students.
- *Building a ‘footprint’ in participating departments* (in terms of new equipment and other resources) from conducting research so as to facilitate the future development of a research ‘stable’ of active, productive, and focused researchers.
- The importance of *formalising outreach activities* through creating a second ‘footprint’ of available and adopted improve livelihoods amongst the rural poor. .

Recommendation 2:

The experience from the ‘old’ Forum in terms of emphasising quality, focusing on the needs of the rural poor, building ownership and ensuring all grants leave an adequate ‘footprints’ (at both the university and the community level), and developing an uptake pathway strategy should be explicitly incorporated into RUFORUM.

From the 'old' Forum to RUFORUM

Scaling out success

University research mission has changed. Universities are no longer upstream research institutes of the NARS; rather they need explicitly to become integrated into the national and regional R&D communities. Funding for universities and research does not usually come as unrestricted funds - most support is now linked to specific programmes and defined tasks and work plans. Furthermore, development agendas have also altered - agriculture now shares high priority with other development objectives (for example; HIV/AIDS, good governance, trade liberalisation). But universities have been slow to recognise both the opportunities and the threats in these shifts in emphases. Consequently, they often are only now in the process of repositioning themselves. RUFORUM can be a powerful tool for the universities to use as they respond to this new environment.

RUFORUM aims to scale out the successes of the 'old' Forum through:

- *deepening ownership* by placing management of the RUFORUM with member universities,
- *broadening its agenda* to assist the rural poor beyond food security intervention, and,
- *increasing participation* by more departments in more universities

RUFORUM is, therefore, not merely an expanded 'old' Forum. It is an interactive and diversified mechanism to assist universities adjust to their changing and more appropriate roles within African society. Fundamental to success is a *well focused, prioritised, and efficiently implemented research and outreach agenda*. RUFORUM will have to work with participating universities and their partners to implement swiftly and effectively a new research and outreach paradigm which includes:

- **The universities mainstreamed within the NARS:** farmers want answers to problems and an efficient and effective process for reaching those answers. Universities and their partners will need to become *development* as well as *research* agencies.
- **Substantial farmer involvement in research:** the universities can provide significant leadership and expertise in capitalising on opportunities to expand, improve, and institutionalise the start already made in using participatory methods, and in prioritising outreach and scaling up issues.
- **Innovation to be welcomed:** new ideas, new people, and partnerships with new institutions are explicitly encouraged by RUFORUM. This includes thorough use of the scientific literature, web-based sources or the private sector, field visits in and out of the country, and especially networking between kindred interests.

- **A research agenda which moves beyond technology:** the problems faced by farmers are not simply those of low productivity, but of access to markets for inputs and outputs, and of constraints (such as HIV/AIDS and gender inequalities) which cannot be addressed through technological change alone.

The constraint on this transformation is not just management – it is leadership and vision. It is to the task of developing such qualities that this RUFORUM is devoted. Three key elements underlie the strategy:

- *a research and outreach funding mechanism* owned by the participating universities,
- *a complementary human resource development strategy*, continuing to be based around MSc training, but importantly building other opportunities such as postdoctoral fellowships and PhD scholarships, and,
- *building physical capacity* (and restoring and enhancing existing capacities at participating institutions).

The key driver that RUFORUM has for creating change is its research and outreach funding mechanisms. The concept of ‘supply driven’ research is a myth. Researchers do not have resources of their own to undertake studies; they seek and obtain funding from outside bodies and have to meet the criteria set by those bodies. The poor impact of so much of the past research effort is as much a reflection of the inadequacies of the review and evaluation processes of funding agencies as of the failures of development workers and researchers.

RUFORUM will use the experience of the ‘old’ Forum to lead change in the way research is undertaken – **‘business unusual’**. The evidence from the ‘old’ Forum shows unequivocally, that with sympathetic and influential funding and other support, the university research community will quickly respond to signals. At the core of the ‘business unusual’ strategy, therefore, is a substantial and influential source of funding for research and outreach activities that works under radically different rules from those of the past.

The focus is on quality and impact. The emphasis is on inclusion and openness – making the best use of talent and resources for the benefit of improving the livelihoods of poor rural communities. RUFORUM aims to create the basis for agricultural research and outreach systems that address quickly and effectively the needs of these communities and open new opportunities to them. This agenda, which forms the core of the programme, requires a fundamental change in research management and in the quality and focus of the research outputs. These need to be facilitated through enhanced networking and coordination among the NARS organisations, with sector stakeholders, and with international organisations. This is achieved through a clear policy of research and outreach funds being linked clearly and effectively to the quality of outputs – **“funds follow quality”**.

Importantly, implementation of RUFORUM will require the mobilisation of a much wider range of partners to contribute to the task of delivering the broader and deeper agricultural research and outreach agenda envisaged. RUFORUM grants will support

researchers who see themselves as participating directly in development and building the partnerships and networks that enable them to fulfil the expanded 'business unusual' mandate.

Implementing the dream: from donor to partner

RUFORUM has inherited a programme which was owned by a donor, and which was backed by the resources of that donor. While Rockefeller Foundation, quite rightly and necessarily, continue to support RUFORUM, the resources from that source simply will not meet the demands imposed by the broader and deeper agenda which RUFORUM needs to implement. As an immediate priority, therefore, RUFORUM needs to present itself both to the participating universities and to potential sources of financial support as a clearly different body from the 'old' Forum.

Recommendation 3:

RUFORUM explicitly positions itself as a facilitating mechanism for the universities collectively to design strategic initiatives that address rural poverty. It will incorporate the successful components of the 'old' Forum in its own programme, and will expand its efforts to enhance those parts of the 'old' Forum which were neglected or omitted from that programme.

To achieve this, RUFORUM needs to raise additional resources. RUFORUM does not do this *on behalf of* participating universities, it does this *with* participating universities. RUFORUM works with these universities to put together strategic interventions at national, regional, and subregional levels and to facilitate the funding of these plans through skilful mobilisation of outside funds. The success of RUFORUM depends on its ability to bring in these funds. The well tested quality control, efficient disbursement, and monitoring and evaluation mechanisms of RUFORUM are used to provide individual or team grants to those universities which participated in the original strategic planning effort. Funding of the RUFORUM secretariat comes from the overhead fee it charges to undertake this task. These concepts are developed further in subsequent sections.

Programme development

The 'old' Forum had MSc training as a core objective. It is difficult to see what advantage RUFORUM could gain by moving away from this approach. The quality focus remains essential - graduate training under RUFORUM should be done better, not cheaper, than other options. This route allows for participating departments to build up their resources as each new student leaves a clear 'footprint' in terms of resources, data, and analysis. This is an essential requirement as faculties expand their PhD programmes if these are to routinely and evidently meet the needed standards.

All universities, in the developed as well as the developing world, face the problem of 'static' (stagnant) expertise in teaching and research¹¹. The new blood injected by graduate students provides an excellent way of stimulating new ideas, enthusiasm, and different ways of doing business within a department. RUFORUM, as it develops

¹¹ One (anonymous) dean interviewed during the consultation commented that he expected no more than 20% of his academic staff to be productively engaged in quality, focused research and teaching.

its programmes, should explicitly consider further training options as integral parts of its most promising initiatives. It needs also to encourage the best departments to come up with longer term proposals that build long-term relationships with established outreach programmes. This ensures that RUFORUM projects also leave a further (and essential) clear footprint in terms of enhanced options amongst target communities.

Recommendation 4:

RUFORUM should encourage the development of research ‘stables’ within the leading departments, for example by helping fund post-doctorate fellowships, as well as helping build strong and lasting connections to outreach programmes, rather than working with individual farmers on a project-by-project basis.

The task facing the RUFORUM management in meeting these challenges is considerable but not impossible. A start has already been made on the key elements needed through the various consultations and workshops that preceded this study.

The immediate task now is to develop key strategic themes which can form the basis of a fund raising effort around which RUFORUM can attract the needed financial support from appropriate donors. In the first instance, the RUFORUM secretariat could use the strategic themes that came out of consultative stakeholders’ meetings in the participating countries. Examples follow below. These are not exhaustive but give a sense of the major areas in which the secretariat can start to move the programme forward. ***The output from implementation of these strategic themes will be high quality demand-driven research and outreach activities implemented to facilitate the widespread uptake of interventions and technologies that increase sustainable production, utilisation of, and access, to food as well as natural resources management in eastern and southern Africa.***

Recommendation 5:

The RUFORUM secretariat, in close consultation with senior participating RUFORUM scientists and other informed parties, develop key strategic themes into focused development proposals based on those formulated by the consultative stakeholders’ meetings. Further themes will be developed as RUFORUM continues its programme – either by revisiting the consultative process regularly (say, every second year or so) or else by a more formal priority setting exercise.

Strategic Theme: Increasing the Diversity and Roles of Legumes within Smallholder Farming Systems

Background: the major cropping enterprises and food production systems among small-scale farmers across East and Southern Africa are cereal-based, particularly maize but also sorghum, millets and cooking banana. In general, these cropping systems are in decline due to degrading soils and uncontrolled pests and disease. Yet at the same time, improvements in cereal cropping offer promise to small-scale farmers because cereals and bananas are readily marketed. Usually, cereal-based cropping systems are intercropped with legumes but the choice and performance of these legumes is poor. A key to improving cereal-based systems is increasing the role and productivity of intercropped legumes because of their multiple benefits including

soil protection, biological nitrogen-fixation, drought tolerance, greater nutritional value and higher market prices. Under-utilised legumes in East and Southern Africa include groundnut, pigeon pea, green gram, soyabean and lablab, in large part because legumes originate from outside Africa and have not been systematically adapted within small-scale farming systems.

Overall Objective: to assist small-scale farmers improve their welfare and livelihoods through increased reliance upon food legumes within cereal-based cropping systems in diverse agro-ecosystems of East and Southern Africa.

Specific Objectives:

- To identify, screen, improve and disseminate food legume germplasm suitable for adoption by small-scale farmers.
- To integrate the use of legumes into the soil fertility management practices of small-scale farmers through participatory, adaptive on-farm research.
- To better understand and promote food legumes and their products in improved human nutrition and within local and urban markets.
- To improve the capacities of university-based agricultural researchers to more effectively collaborate with farmers and their organisations, rural development specialists, agricultural extension officers, national planners and the private sector.

These grants will involve adaptive, on-farm research in legume germplasm, improvement and seed systems; integrated soil fertility and pest management; symbiotic biological nitrogen fixation; pulse quality control and marketing; and value-added legume processing and human nutrition. Much of the initial gains from this approach will result from the transfer of recently developed legume varieties and technologies from one grantee, university and country to another. Important legume germplasm includes promiscuously-nodulated soyabean (Zimbabwe), rosette-resistant groundnut (Kenya) and dwarf, determinate pigeonpea (Malawi). New legume technologies include MBILI and relay intercropping (Kenya and Uganda), short-term improved fallows (Malawi and Zimbabwe) and legume protein bio-fortification (Kenya and Uganda). Graduate training and collaboration beyond the university will be necessary components of every project. Collaboration between grantees and universities will be emphasised, with promising findings from one research project readily tested by another for their application under different agro-ecological and socio-economic conditions. These findings will be shared over the RUFORUM internet site and through periodic meeting of grantees, students and collaborators.

Outputs and Impacts: improved legumes will become better available and integrated into small-scale farming systems in semi-arid and sub-humid agro-ecosystems of East and Southern Africa accompanied by the technologies necessary to consume, process and market them. This process will also develop technologies and information tools for further use by rural development specialists and agricultural extension agents that will amplify the beneficial impacts of the activity.

Target Budget: If universities in both East and Southern Africa receive five \$60,000 two-year grants covering the range of legume disciplines each and RUFORUM administers and backstops these grants for 20% overhead then \$720,000 is required to support the strategic theme every two years.

Strategic Theme: Understanding Farmer Organisations and Expanding their Capacities for Service Provision

Background: farmer empowerment through the development of effective community based organisations is a central component of major development initiatives throughout the region. The underlying rationale is that groups of neighbouring farmers share common obstacles and opportunities and it is reasonable that they organise for collective action. The community-based organizations that arise commonly devote their efforts to accessing information, learning new technologies and pooling resources to acquire inputs or to market surpluses. Most farmers, however, lack experience in forming self-help groups, particularly with the steps necessary to formalise and manage their new organisations. Furthermore, much of the difficulties in scaling-up important new agricultural technologies, purchasing and distributing discount inputs and improving market access and prices result from the lack of farmer umbrella organisations to undertake such tasks. There is much that remains to be understood as to how empowering farmer organisations be fostered and enhanced.

Overall Objective: to identify a strategy that allows for smallholder farmers associations in East and Southern Africa to provide a fuller range of services to their members including distribution of recent and relevant extension information and improved access to key farm inputs and produce markets.

Specific Objectives:

- To identify, test and popularise mechanisms that allow farmer associations to form and then operate in a self-sufficient manner based upon revenues from dues and brokerage fees and to assess the benefits to farmers joining those organisations.
- To crystallise recent research findings and pioneering technologies into useful tools and products for smallholder farmers and to better orient university scientists and students toward the needs of farmers associations, the capacities of their officers and the skills of their members.

Approach: project teams will conduct a participatory monitoring and evaluation exercise to identify entry points for backstopping farmer associations. The team will also organize a training course for the officers of these associations that includes group dynamics, transparency, civics, leadership, financial management, and sales and marketing. A graduate student will be assigned to each of these farmer associations and develop a thesis around that affiliation.

Outputs and Impacts: if 10 groups have 300 members, and each member increases their cereal surpluses by 1 tonne each year and improves their sales price to \$200 per tonne, then US\$600,000 of cereal will be traded each year through the project. These

sort of sales volumes can revitalize rural economies. A considerable multiplier effect would be achieved if, for instance, the knowledge and interest in farmer organisations stimulates the formation of 10 additional groups by each university,

Target Budget: if each of 10 RUFORUM Universities develop an inter-departmental initiative to foster a farmers' umbrella or marketing association over three years for \$75,000 each and RUFORUM administers and backstops these grants for 20% overhead then \$900,000 is required to support the strategic theme every three years.

Strategic Theme: Striga Eradication in Africa: Integrating Cutting-Edge Technology, Intellectual Property and Smallholder Practice

Background: striga (*Striga hermonthica*¹²) is a parasitic weed that attacks several cereal grains, particularly maize and sorghum, and other native and exotic grasses throughout Africa, and elsewhere in the tropics and warm temperate regions. Yields of maize are reduced from 20% to 80% depending upon the intensity of striga infestation and the tolerance of the maize. For example, striga infestation in Kenya occurs in 200,000 ha and results in crop losses estimated at \$15 million per year. Farmers responded to striga by hand weeding and, less often, burning affected fields but the efficacy of these practices remain questionable considering the large numbers of seed (≈ 5000) that a single, mature plant produces and returns to the soil. These seed remain dormant in the soil for up to 15 years. Weeding and routine field sanitation procedures, even when combined with improved soil fertility management, appear insufficient to eradicate striga once it has become established within a farmer's field. A revolutionary technology is becoming available to fight striga that is based upon inherited imazapyr-resistance (I-R) by maize. When I-R maize seed is coated with the herbicide, striga attempting to parasitise the resulting plant are destroyed. Farmers could restore lost yields and actively suppress and reduce striga seed banks in soil if this technology were available to them. However, expertise in biotechnology and diagnostic assays that are required to assist in the registration of this technology need to be developed. RUFORUM can play a vital role in developing capacities in this area and accelerating the delivery of this critical tool in the war against striga.

Overall Objective: to confine, reduce and eliminate striga infestation in East and Southern Africa, thereby improving maize yields, food security and wellbeing among rural poor.

Specific Objectives:

- To improve the capacities of East and Southern African nations to register and utilize herbicide resistance as a means to overcome striga infestation in small-scale farming systems
- To provide necessary technical backstopping in the assessment of imazapyr-resistance and its longer-term residual effects
- To strengthen the capacities of national public universities in the areas of plant biotechnology and soil biochemistry and to exercise that capacity in

¹² A related and equally damaging species, *Striga asiatica*, is more common in southern Africa.

collaboration with national regulatory bodies, regional planners and the private sector.

Approach: several technical, regulatory and logistic hurdles must be overcome before herbicide resistance technologies may be utilised to combat striga. First, the trait for herbicide-resistance must be incorporated into locally adapted maize varieties. Next, the herbicide must be approved for experimental use and the effectiveness of the technology to control striga documented. Then, the herbicide-resistant maize varieties and herbicide technology must be approved by regulatory bodies and licensing agreements completed. Finally, seed companies must obtain parent material and produce, treat and distribute sufficient herbicide-treated seed that the technology becomes widely available to farmers. Meanwhile, longer-term environmental and public health concerns must also be addressed. RUFORUM can greatly facilitate the process. Crop breeders can obtain herbicide materials and incorporate the trait into superior lines. Crop physiologists can develop diagnostic assays to insure that the trait is stabilised and not transferred to other target weeds. Soil biochemists can study the diffusion and persistence of the herbicide under different soil conditions. Agronomists can study the efficacy of the technology under a range of crop managements and environmental conditions. Weed scientists can quantify the dynamics of striga seed populations, economists calculate profitability and sociologists document farmer perceptions, etc. Universities are well positioned to provide these services. This strategic theme would provide RUFORUM to participate in the larger AATF-CIMMYT-BASF strategy to introduce imazapyr-resistant maize to African farmers as an essential tool in the control of striga.

Outputs and Impacts: for the first time, farmers will be able to overcome the devastating effects of striga, a parasitic weed that causes massive food insecurity and human suffering.

Target budget: AATF plans to introduce imazapyr-resistance over the next few years in Kenya, Uganda, Malawi, Mozambique and Zimbabwe. If a university within each of five RUFORUM countries is provided a three-year \$150,000 grant to develop capacities in striga management and provide the technical backstopping described above, and the RUFORUM administers and coordinates these grants for 20% overhead then \$900,000 is required to support the strategic theme over three years.

Strategic Theme: Re-vitalising African traditional crops and fruits, and exploring their roles in contemporary diets

Background: most of the food crops grown by East and Southern Africa's small-scale farmers did not originate from Africa. For example, maize, beans, groundnuts, sweet potato and cassava are all exotics from Tropical America and have largely displaced the sorghum, millets, cowpea and jams produced by yesteryear's traditional farmers. Marginalising African crops has resulted in collapsed traditional seed systems, reduced farm biodiversity, poorer diets, decreased food security, and declining cultural tradition. Ironically, demand for traditional foods by urban consumers is increasing because indigenous small grains, pulses, fruits and leafy green vegetables are both tasty and nutritious - but often these foods are not readily available. In addition, in times of food scarcity, these traditional crops and fruits play a valuable role in supporting household food security. This role could be significantly

enhanced if improved varieties and production, harvesting, and storage techniques could be made available to the rural poor. A component of the African Renaissance is the revitalisation of traditional foods and their re-emergence within contemporary cuisine as a means of stimulating markets for these crops.

Overall Objective: to identify, conserve, improve and promote African traditional crops and fruits as a means of improving their seed systems and markets, making the crops more attractive to small-scale farmers.

Specific Objectives:

- To better understand which traditional foods are becoming marginalised and explore avenues for their revitalisation.
- Explore opportunities for processing traditional foods in ways that make them more attractive and easily prepared by urban consumers, thereby strengthening their demand and markets.

Approach: research groups will embark upon a series of investigations designed to identify which traditional crops and fruits are becoming marginalised, how much diversity occurs within them, their productive and genetic potentials, post-harvest requirements and their processing and marketing potentials. These efforts will involve plant taxonomists, ethno-botanists, crop breeders, crop scientists, food scientists, agricultural engineers, human nutritionists and economists and should be conducted in conjunction with farmer associations and commercial establishments.

Outputs and Impacts: improved seed systems and stronger markets for at least 20 traditional crops and fruits will become available to small-scale farmers. Farm biodiversity and household food security will be enhanced. Universities will strengthen their capacities to work with farmers and the private sector in areas that promote environmental conservation and public wellbeing.

Target Budget: if 10 RU FORUM universities each embark upon interdisciplinary studies of traditional crops for \$90,000 each over three years and the RU FORUM administers and coordinates these grants for 20% overhead then \$1,080,000 is required over three years.

Strategic theme: the sustainable management and conservation of fragile rangeland and cultivated drylands through focused research and community based interventions to enhance the quality of life of the rural poor

Background. The vast majority of farms in East and Southern Africa rely upon seasonal rainfall and are unlikely to benefit from irrigation within the foreseeable future. The risks of drought are very real throughout semi-arid Southern Africa, where a poor rains result in national food shortages, but also in eastern Kenya and northern Uganda as these marginal rainfall areas become increasingly cultivated. Furthermore, the encroachment of agriculture into traditional grazing areas leads to conflict and to the reduction of production options to traditional livestock owners.

Farmers respond to the risks of drought by cultivating faster maturing, drought tolerant crops and by preparing their fields in a manner that reduces runoff during peak rainfall, usually through forming contour furrows during seedbed preparation. Water harvesting is a recent concept that stresses the capture and protection of incoming precipitation. Rather than merely slowing runoff, water harvesting techniques redirects the moisture into the soil through short-term ponding and deeper penetration into soil. Water harvesting also embraces surface mulching to reduce the loss of soil water to the atmosphere. Examples of water harvesting include the construction of tie ridges and mound ridges to resist runoff, shaping fields into a series of shallow pans to assist ponding, strip-ripping the soil to assist water penetration, hillside terracing to eliminate slopes and surface and stubble mulching as combined approaches to organic matter recycling and runoff control. The practices are not widely practiced or vary greatly between communities and often the farmers most in need of these techniques remain unaware of their options. Even farmers in sub-humid areas stand to benefit from improved water harvesting field practices as a precaution to early drought. Universities in East and Southern Africa are well positioned to compile the range of water harvesting available to and practiced by farmers, to improve upon these practices and then promote the ones offering greatest returns to small-scale farmers.

In addition, a focus on improving both water and livestock management will facilitate the needed institution building and capacity building at community level. Improved sustainability of rangeland resources through new improved livestock management options is desperately needed. As, through population growth, families are forced to move from higher potential areas, they need to learn how to develop productive and sustainable livelihood systems in the drier and more difficult areas in which they find themselves. There is increasing evidence of community problems as the needs of traditional livestock producers and those of the incoming farmers conflict.

Overall Objective: to assist farmers to better understand and practice water harvesting as a means of reducing crop losses resulting from periodic drought, and to assist livestock producers in the sustainable utilisation of soil and water resources.

Specific Objectives:

- To identify, compile and characterise the range of water harvesting technologies that are suitable for use by farming communities in East and Southern Africa.
- To compare different practices in farmers fields and then refine and combine the most promising water harvesting technologies in a manner that improves crop moisture relations and reduces their labour requirements.
- To develop site-specific guidelines and information tools on suitable water harvesting techniques for use by farmers, extension agents and development specialists.
- To improve resource management, especially water and livestock management, by developing new techniques together with related institution and capacity building at the community level.

- To increase livestock productivity through community based interventions and training for improved disease management, fodder use, nutrition interventions, and grazing management.

Approach: drought-prone smallholder farming areas and their existing farmer associations active within a range of agro-ecological zones throughout East and Southern Africa will be identified. The water and livestock management techniques being practiced will be characterised and collated. At the same time, a review of water and livestock management technologies being promoted elsewhere, particularly the efforts of international centres active in arid and semi-arid environments (eg ICRISAT, ILRI, REDPA¹³) will be undertaken. A protocol to characterise livestock practices and priority problem areas, water capture, soil moisture distribution, water uptake by crops and the resulting yields will be developed and followed by different teams of investigators and students participating in this RUFORUM activity. A small set of “core” technologies (treatments) will be identified and compared to locally practiced or promising alternatives. The results will be compiled and analysed by local teams and then forwarded for further interpretation at the network level. Each team and their partner farmers will conduct several farmer field days as a means to raise awareness and stimulate discussion of different practices.

Outputs and Impacts: a network for information sharing and research on improved water management will be established, and the existing livestock based networks enhanced. The efficiencies and labour requirements of alternative water harvesting practices will be documented and described in a series of site-specific water management guidelines that are formalised into extension manuals. A conceptual and structural framework for the exchange of technological information and local knowledge will be established between traditional livestock owners, agriculturalists, and participating institutions. Extension manuals are distributed through extension systems and rural development agencies and during farmer field days built around the successful field experiments. Graduate students trained in improved water and livestock management technologies will enter the agricultural research and development workforce.

Target Budget. If eight RU FORUM universities each form a national water management team and embark upon on-farm studies of water harvesting and livestock management technologies for \$100,000 each over three years and the RU FORUM administers and coordinates these grants for 20% overhead then \$960,000 is required over three years.

Crosscutting themes

In all the above themes, there are several crosscutting issues which need to be properly incorporated as the themes are developed into programmes. These are critical

¹³ Regional Dryland Programme in Eastern Africa which is a collaborative network involving the Pastoral Information Network Programme based at the University of Nairobi, the Dryland Husbandry Project based in Ethiopia, and the Research Programme for Environmental Policy and Society based at Linköping University, Sweden.

areas which are common to most of the proposed endeavours and which have implications beyond the normal focus of many agricultural programmes.

Adding value: a major emphasis in almost all national development strategies has to help the poor ‘add value’ to the commodities which they have for sale. Value can be added in a number of ways. The product may be transformed into an item which can then be sold at a higher price. This is what is typically meant by ‘adding value’ and will usually involve some kind of processing. But it is not the only source of added value (or even the most appropriate) in many circumstances. See, for example, the food processing methodology adopted by Egerton University. The producer may recover a higher proportion of the sale price through participating in an improved market system. Or losses may be reduced, allowing the farmer to gain greater food security, or higher incomes, from each harvest. It is important that RUFORUM, in its development of strategic themes, recognises that there are several streams of potential added value.

HIV/AIDS: the HIV/AIDS pandemic adds a particular challenge to agricultural development in the region. It impacts on agriculture in many ways. Food security falls as adults fall ill. Some, who were sending remittances to rural households, return home sick and unable to work. Even when they can receive suitable treatment, their nutrition needs are difficult to meet in poor households and the drugs may prove ineffective. Without adults to work the land, productivity falls, and investment in the new essential technologies to break out of poverty slips beyond reach. Family members seek work on other’s farms, leaving their own untended until later in the season – and with consequently lower yields. Funerals and hospital visits mean less time working with crops and animals. RUFORUM will need to build on the start made by Kenyatta University in linking public health and agriculture as an essential crosscutting issue to run through all strategic themes.

Strategic theme implementation

Principles of developing RUFORUM Strategic Initiatives include:

- **Balance:** RUFORUM projects need to balance programme activities around graduate training, relevant research and community outreach. As importantly, the emphasis on creating change in farmer livelihoods should not result in the promotion of incompletely tested recommendations to farmers. The quality of the research and the consequent options and recommendations need constantly to be assured through careful, critical review.
- **Cost effectiveness:** budgets need to include well justified, but adequate, funds for training, research and outreach. RUFORUM does not aim at supporting *cheaper* research and training than other options, but implementing them to a *higher standard*. This again reinforces the quality focus of RUFORUM.
- **Interactive:** team members in different universities and institutes need to interact regularly and effectively. While meetings and workshops are a necessary part of creating the needed networks that will be the foundation

of RUFORUM, much greater use needs to be made of electronic networking and communications.

Recommendation 6:

RUFORUM must increasingly rely upon electronic communications and E-conferencing for programme development activities. The RUFORUM website can assist by posting information on the development and progress of various programmes and acknowledging outstanding contributions to them.

The process of developing a strategic initiative will go through several phases. These are outlined in the following paragraphs – which provide a guideline rather than a totally prescriptive set of steps. Most strategic initiatives will go through most of these steps, but there will be cases where groups already have done much of the initial work and, where this is the case, it should be built upon.

Inception: the RUFORUM secretariat issues a ‘call’ for a *Thematic Concept Note*. The call will be based around the information provided from the stakeholder consultations outlined in the preceding sections. In particular, where there is known expertise in the strategic theme area, potential interested parties will be contacted and encouraged to develop strong, team-based proposals.

Once the secretariat receives suitable responses to the call, it will work with either individual teams or encourage merged teams to produce an overall concept document. Regional and international expertise, using staff of the IARCs, overseas universities, and international and regional institutes, should be solicited both by the secretariat and the concept note development teams. Potential donors should be involved and informed throughout the process so that their concerns and priorities can be addressed, without distorting the overall thrust of local and international expertise.

Once there is a serious indication of possible support from a potential donor¹⁴, the concept development team should be tasked to develop the note into a fully costed and justified programme proposal. This proposal will incorporate a number of possible individual projects which can be funded through the overall programme. At this stage it may be necessary to call a small workshop to work together intensively (possibly together with donor representatives) to fashion the detailed proposal.

Implementation: the programme is then funded by one or more donors. The RUFORUM secretariat manages the resources on behalf of the donor. Members of RUFORUM then put together project proposals (involving graduate students and other training activities) which RUFORUM puts through its proven review process. Once the projects meet the required criteria, funds are released to individual projects for undertaking the agreed workplans. Grantees will then recruit students and initiate research.

Monitoring and evaluation: the RUFORUM secretariat will monitor the various research projects based on its established procedures (which should be continually

¹⁴ This should not be seen as an essential prerequisite. There may well be instances where the concept development team needs to build donor support for a radically new approach. Such innovative efforts should not be discouraged.

reviewed and updated in the light of ongoing experience). It will require the normal periodic reports from grantees and assemble these into appropriate format for reporting to the donors involved.

The obvious question at this point is that, if the universities are indeed raising their own funds, what is the advantage of then putting these funds through RUFORUM and paying an overhead for the privilege? Many departments and faculties already have good ongoing relationships with donors. RUFORUM is specifically intended neither to downgrade these, nor to become an unnecessary 'middleman' in the process. However, RUFORUM brings the following important strengths to university research funding applications:

- Access to a wider potential range of donors since these are able to invest in specific goals across a range of institutions (RUFORUM should target existing donor strategic areas such as the USAID-funded CRSP programmes)
- The thematic programme approach lends itself to the potential of supporting more institutions at higher levels of funding
- RUFORUM has established and well proven quality control mechanisms which can be applied across the diverse range of collaborators, thus enhancing the chance of overall success
- Ownership and leadership is strongly developed at several levels. Farmers, directly involved in proposal and project development not only benefit from the work but contribute to it; students gain experience and confidence from 'hands on' field work; academic staff are able to enhance their teaching programmes with 'real world' examples, while developing their departmental capacity to undertake research; universities become actively engaged as development partners with both donors and rural communities.

Utilising the Forum track record

The Forum, through its participating scientists and graduates, has an impressive track record. This needs to be exploited fully as RUFORUM enters the business of raising its own funds through the efforts of its own members. It is these efforts which will ensure the sustainability of the programme and which will also build true ownership by participating institutions and scientists. The approach allows the RUFORUM secretariat to develop a coherent programme in partnership with the best of African science, and avoids the disastrous quality diluting effect of proposed 'equity' strategies in which funds are shared on a formula, rather than a quality, basis between the RUFORUM institutions.

Recommendation 7:

The RUFORUM secretariat raise a nominal subscription from all participating universities but the bulk of its operations should be funded through overhead derived from managing collaborative grants. The secretariat should also update and make available on the website and through other means its portfolio of successes to promote the track record of the programme.

This approach will require that overhead funds are used with a high degree of efficiency. This will involve making maximum use of electronic communication, together with imaginative development of the RUFORUM website¹⁵. But the enhanced networking implied can be expected to be directly beneficial to RUFORUM objectives. While research from the natural and social sciences has the potential to address the pervasive poverty of Africa, this potential has not been successfully incorporated into development strategies. With strong leadership especially from the research community itself and supportive guiding policies, this dismal picture can be altered at modest cost with substantial benefits to the livelihoods of poor farmers as research outputs are incorporated into development projects, programmes and policies. This is achieved through skilful networking of the best available talent (nationally and internationally) in a focused, problem orientated mode to integrate high quality technology into the development process – which is exactly what is proposed through the thematic approach recommended in this report. The following paragraphs indicate key items that need to be highlighted as part of RUFORUM's track record.

Research for development: earlier Forum projects (for example, both the MBILI legume production system and the use of rock phosphate at Moi University, the soyabean development project at the University of Zimbabwe, and both the cowpea integrated pest management effort and the water hyacinth management project at Makerere University¹⁶) have had significant impacts in creating change. ***The lesson is that well verified science, introduced with strong and consistent leadership from the research community, can make a real contribution to development and the reduction of poverty.***

Policy linkages and networks: A common problem throughout Sub-Saharan Africa is the poor linkages among farmers, NGOs, extension services, policy makers, and the private sector. RUFORUM has the capacity to create multi-agency, multi-disciplinary teams that worked systematically and with strong local leadership to develop solutions to pressing national and regional problems. It provides a model through which a coordinated, cost effective, and efficient technology transfer process can evolve, using the best of national and international expertise in a focused, problem solving effort. The best of local knowledge and expertise, both at farmer and researcher/policy maker level, can be used to develop a practical example of how to link research, extension and national policy to improve living standards for rural people reliant on agriculture.

The lesson is that science for development requires effective networking amongst several key parties. This is entirely possible but needs facilitation and encouragement.

Explicit consideration of scale: as RUFORUM has matured from the 'old' Forum, existing grantees and others have noted the need to build in stronger long term

¹⁵ See, for example, <http://www.id21.org/>, http://www.odi.org.uk/Africa_Portal/, <http://www.sarpn.org.za/>, <http://www.africancrops.net/>, and <http://topics.developmentgateway.org/foodsecurity/>

¹⁶ This list is not exhaustive, but illustrative. The authors of this report were shown many admirable other examples during the field visits.

collaborations to ensure the widespread uptake of ‘best bet’ options. Experience from the best of the ‘old’ Forum has shown that it is entirely possible, with thoughtful integration of policy and research, to make a rapid impact on poverty. But researchers need to reach beyond the boundaries of their own disciplines and to start to engage directly with the poor. Much has been achieved in this direction but much more is needed. In particular, from the outset, researchers need to understand the dimensions of poverty. *The lesson is that researchers also need to be innovative and active in developing partnerships and networks that can carry the best of their outputs quickly and efficiently into the hands of the poor.*

Nurturing through crises

The case of Zimbabwe provides another example of the value of RUFORUM as a support institution. The nurturing grant to the University of Zimbabwe for the training of some 13 MSc students has served to help keep the graduate training programmes operational. This can be complemented, as funds allow, through providing scholarships to Zimbabweans to study at other RUFORUM universities in East African and Malawi. The best of the Zimbabwe outreach activities can also be built into regional and subregional programmes, together with funds for keeping key facilities operational.

RUFORUM needs to highlight and develop its ‘in house’ expertise to help universities remain viable institutions through periods of difficulty (such as national economic distress). This strategy can also be refined and developed to help participating universities adapt to change and to expand their role within the NARS (*as illustrated with the Bunda College development – see recommendation 1*).

Concluding remarks

RUFORUM is a very different programme from the ‘old’ Forum. In the old Forum, grantees responded to established regional programme goals. In RUFORUM, its members develop their own goals and the secretariat coordinates the resulting opportunities for funding. RUFORUM is not a donor – rather it works with its members to raise funds for high quality research thrusts along thematic lines. Membership of RUFORUM is, therefore, open to all departments who can offer solutions to the pressing problems of rural poverty, within the constraints of the agreed thematic options. As new themes emerge, these can be validated through participatory discussions amongst RUFORUM participants and informed outsiders and developed as needed. This expands further the opportunities for interdisciplinary research and outreach.

Graduate training will remain at the core of RUFORUM. The establishment of post-doctorate opportunities in leading RUFORUM institutes may be seen as a useful, if not necessary, bridge to PhD training (deep footprints). RUFORUM activities, however, will also necessarily involve training of, and learning to work with, communities as essential component of moving research swiftly and efficiently from the laboratory to farmers’ fields on a broad scale.

A major focus of RUFORUM will be electronic networking – to develop thematic thrusts, to put together programmes to address the defined problem areas in these

thrusts, and to promote the best outcomes consequent on the programme implementation. These networks will be used to enhance quality, to introduce new ideas, and to bring to scale the best of the new opportunities which are developed.

Finally, through the networking opportunities created by RUFORUM, universities in countries where political or economic conditions are unfavourable can be kept operating at the highest possible standard. These institutions will be ready for action once the situation returns to normality and will quickly be able to play their role in national recovery exercises.

Enhancement of training programmes

Graduate training

The team was asked to look for possible centres of specialisation to mount regional PhD and MSc programmes, and to recommending 2-3 centres for piloting these programme. As noted in a previous section, RUFORUM not simply a research activity, but one which includes a complementary human resource development strategy, based around MSc training, but importantly building other opportunities such as postdoctoral fellowships and PhD scholarships.

Also, as recommended previously, the research strategy is built around active networking which serves, not only to bring to top expertise into the process, but also is a powerful tool in the building capacity amongst partners who will, inevitably, be at different stages of development. The graduate training efforts should follow this same principle, where networks of specialisation (rather than centres of excellence) are developed. Within these networks, those with the best skills and facilities should become centres of leadership with the objective of enhancing capacity and quality throughout the network.

Recommendation 8:

RUFORUM should promote and facilitate networks of specialisation rather than centres of excellence. Within such networks, centres of leadership (possibly the initiators of ‘research stables’) should be designated to enhance capacity and quality throughout the network.

A Network of Specialisation among RUFORUM members may be viewed as having leaders, facilitators and needy members. Leaders are the universities that have greatest expertise and most up to date facilities in a certain area of instruction or research. Facilitators are universities with specialized, but incomplete capacities within that area. Needy members are those who acknowledge their weakness in that area and seek to collaborate within the network in order to broaden their services and capacities. By pooling their efforts through networking, RUFORUM members will have greater abilities to achieve their strategic goals in terms of training and impact-oriented research. Several potential networks suggest themselves from the review of competencies undertaken. Within these key network areas, as a priority, graduate training courses should be quickly enhanced:

- **Biotechnology:** Eduardo Mondlane, JKUAT, Nairobi, and Makerere, jointly led by Kenyatta and Makerere.
- **Food Science and Nutrition:** JKUAT, Makerere, and Egerton. Each has a rather distinct focus but possibly the community bias of the (rather small) Egerton group is best suited to provide leadership within the objectives of RUFORUM. At least one southern African partner should be developed with some urgency, probably based around the Egerton approach.
- **Agricultural Economics:** Zimbabwe, Bunda, Nairobi, Egerton, and Makerere, with Makerere and Bunda jointly taking the lead.

- **Natural resources and soils:** Nairobi, Moi, Bunda and Makerere. This is a very strong group and it is difficult to recommend an overall centre of leadership – each university has different strengths and together they provide a very comprehensive and powerful potential programme. Again, increased capacity is urgently needed in southern Africa.
 - *Range Management and Dry land farming* (University of Nairobi)
 - *Natural Resource Management* (Makerere with Moi)
- **Crop improvement:** Makerere and Egerton¹⁷, with needed capacity building in southern Africa.
- **Biometry:** (inclusive of social sciences and biostatistics) - Kenyatta and JKUAT, and possibly Nairobi).

Then there are a number of cases in which expertise currently is very limited and where the lead institute will, at least in the first instance, be operating alone.

Examples include:

- **Aquaculture:** Bunda
- **Animal Science:** Bunda
- **E-learning:** Kenyatta
- **Public Health:** Kenyatta
- **Horticulture:** JKUAT
- **Agricultural Engineering:** JKUAT

RUFORUM will also take advantage of the comparative advantage Moi and Africa University have on outreach (and also new initiative being extended by Zimbabwe and Bunda) Africa University's comparative strength in Agribusiness and the facilities being built for e-learning will be exploited.

Collaborative graduate training development

Networks of Specialisation are recommended as a strategy for RUFORUM members to promote complementarity and synergy. National public universities in East and Southern Africa have developed from differing starting points and invested their limited resources in ways which suit their particular circumstances. No university anywhere operates at the cutting edge in all disciplines of science. Through greater collaboration among universities, students, staff, and (most importantly) farmers can access the range of knowledge and facilities held within the ambit of all RUFORUM members.

¹⁷ Kenyatta's efforts in this direction are covered under biotechnology. Moi University is doing some useful work in green bean improvement.

The Agricultural Economics model

A model to consider is the regional Collaborative MSc Programme in Agricultural and Applied Economics¹⁸. This aims to equip professionals with knowledge and skills essential for transforming the currently underdeveloped agro-food sectors and rural economies of Eastern, Central and Southern Africa to perform well in an environmentally sustainable fashion. It is an entirely inclusive programme and is based around 16 departments in the region. An Agricultural Economics Education Board (AEEB), currently comprising representatives of the 16 collaborating departments, approves programme content. A Programme Executive Committee guides the AEEB.

The programme of study comprises five semesters over 20 to 24 months. Applications are entertained from graduates in any field and professionals in mid-career, provided they satisfy prerequisites considered necessary to succeed in a rigorous programme of study and research. Missing prerequisites are acquired prior to entry through courses offered separately or jointly by the collaborating departments and other reputable institutions within and outside the region. The first two semesters of 15 weeks each focus on core subjects. The third semester, to be held in a shared facility¹⁹ in the region, offers the student an expanded selection of elective subjects. Over the fourth and fifth semesters, students do their research and write up the results.

However, as noted in the preceding review of competencies, not all of the first five 'launch' departments are fully equipped to handle the demands of this very challenging exercise. RUFORUM should take care to ensure that, as it scales up its efforts in graduate education, that participating departments indeed have the equipment and staff necessary to mount courses of the requisite quality.

RUFORUM graduate training

Figure 1 illustrates the general model recommended for RUFORUM. In this model, several different universities may pool their different strengths (for example; in curriculum, outreach, facilities) to put together a course which reaches both the needy and the less needy universities. The outputs are graduates well versed in the chosen discipline and increased capacity at the less well-endowed universities. This last is then further enhanced by the stronger universities bringing in the weaker into the overall thematic research networks so as to enable them to build their field skills and reputations²⁰.

¹⁸ <http://www.agricultureconomics.net/>

¹⁹ Currently the University of Pretoria

²⁰ The cases of biometrics and aquaculture serve as examples only because many other thematic networks may be required. For example, the capacities in plant biotechnology vary considerably between universities. Some universities have expertise in plant tissue culture, others in DNA hybridization and others in molecular transformation. Some members have positive national positions toward genetically modified crops and others are more cautious. Some members have stronger facilities and a paucity of staff, while others have interested staff without laboratories. Clearly, capacity for networking exists in plant biotechnology and in other fields such as agribusiness and food science.

Disciplines with severe skills gaps: there is a definite need to develop a network to improve capacities at biometrics (see Figure 2). There is a critical shortage of professional biometricians and expertise at most, but not all, RUFORUM universities.

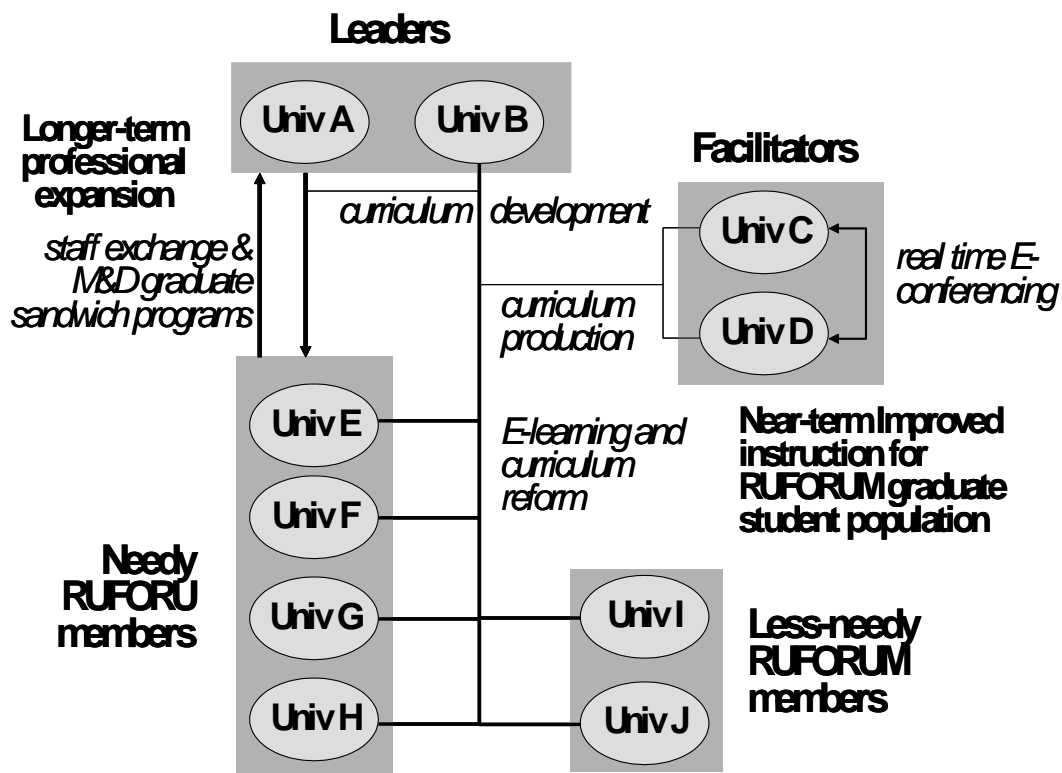


Figure 1. Generalised structure for a RUFORUM Network of Specialisation.

The weaker universities require both near-term improvement in their quality of graduate-level biometrics instruction, and longer-term expansion in the number of trained biometricians within their faculty. Three universities that are strong in biometrics serve as leaders, developing curriculum and hosting graduate students. The ‘reach’ of this effort can be extended by using a further two universities that host state-of-the-art “E-learning” facilities. These last contribute to the network by producing and distributing improved course materials and conducting electronic conferences. Needy RUFORUM members receive these course materials and integrate them into their biometrics instruction. In this way, improved biometrics instruction can quickly impact upon the general graduate student populations within the RUFORUM. Over the longer-term, staff exchange and graduate “sandwich” programs between leading and needy universities will result in substantial increase in the number of trained biometricians within the RUFORUM.

Accessing high quality facilities: another situation requiring networking occurs when one RUFORUM member hosts state-of-the-art facilities. For example, Bunda College of Agriculture in Malawi has developed excellent facilities in aquaculture – which most other RUFORUM members lack. The general model of leaders and facilitators assisting recipient members again applies (Figure 3). Bunda College’s strength in aquaculture is complimented by the expertise in fisheries held by other universities and the assistance of two universities to develop and disseminate course materials. Students and researchers in animal science and fisheries are then provided opportunity to participate in collaborative research with Bunda College and to use the

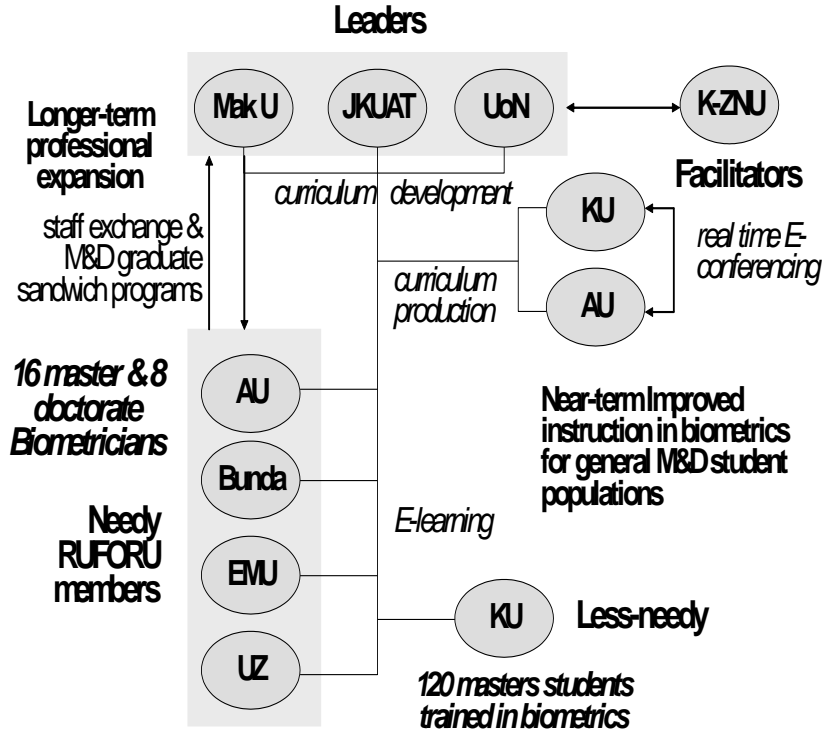


Figure 2: Structure and operations of a RUFORUM network designed to improve training and increase capacities in biometrics among its members.

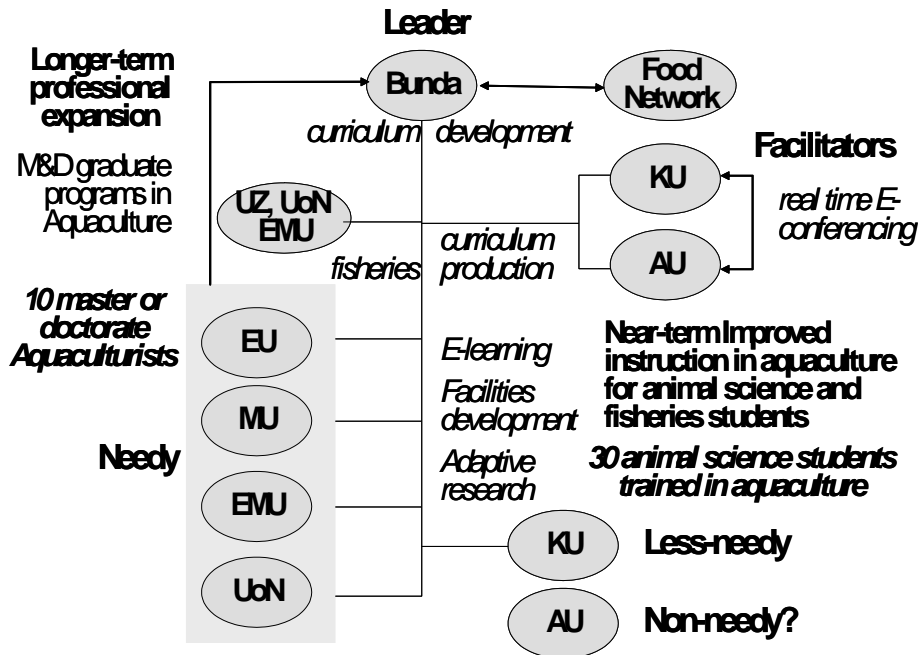


Figure 3. Structure and operations of a RUFORUM network designed to capitalise upon the outstanding facilities in aquacultural science at Bunda College in Malawi.

facilities as required. The universities with less interest in aquaculture need not participate within the network.

A somewhat comparable situation pertains to biotechnology. Kenyatta University has a clear advantage in biotechnology facilities at the time of writing – but several of the other RUFORUM universities are either at the advanced stage of introducing biotechnology into their programmes or are planning to do in the near future. Pulling together in a collaborative framework based on centres of leadership, provides an efficient and equitable mechanism for this new technology to be incorporated into the overall efforts of RUFORUM. Unnecessary competition is eliminated, and best practices are reinforced.

Overall enhancement of graduate courses: the ‘old’ Forum started the process of improving the overall quality of graduate courses offered at participating universities. This effort needs to be prioritised and linked explicitly to the new RUFORUM centres of leadership and facilitated through the associated networks of specialisation. This will ensure that courses are up to date, and that experience and best practice from throughout the RUFORUM networks are incorporated into graduate learning experiences.

Recommendation 9:

RUFORUM should adopt an explicit programme of graduate training enhancement. This will involve three levels of activity (1) building capacity in areas of general weakness (such as biometry), (2) increasing the reach and impact of existing state-of-the-art facilities at RUFORUM universities (for example, biotechnology and aquaculture), and (3) routinely and regularly raising the quality of existing graduate courses. These objectives will be achieved through the use of RUFORUM supported centres of leadership and networks of specialisation to create effective networking and distance learning exercises for both staff and students.

A concept paper for action

Network establishment

The immediate priority for RUFORUM must be to develop its network activities. It is through these that resources will flow into participating universities and develop the momentum for change which the 'old Forum' has shown to be possible. Five strategic themes are proposed:

- Increasing the Diversity and Roles of Legumes within Smallholder Farming Systems
- Understanding Farmer Organisations and Expanding their Capacities for Service Provision
- Striga Eradication in Africa: Integrating Cutting-Edge Technology, Intellectual Property and Smallholder Practice
- Re-vitalising African traditional crops and fruits, and exploring their roles in contemporary diets
- The sustainable management and conservation of fragile rangeland and cultivated drylands through focused research and community based interventions to enhance the quality of life of the rural poor.

The secretariat should invite expressions of interest from lead scientists in the region to moderate an e-forum in each of these key areas.

The objective of each e-forum will be to develop a budgeted programme of action (based on RUFORUM principles of building capacity, focusing on quality and impact, and reaching the poor) for the strategic theme in question.

The plan of action will include improved graduate courses, and graduate training opportunities. Provision will be made for MSc students, as well as, where appropriate, PhD and postdoctoral posts.

Outreach is fundamental to all themes. The emphasis in all programmes must be in creating change on the ground, so that active linkages to outreach partners, the private sector, and to farmer-based organisations is expected. The thematic programme is a *development, not just a research effort* and moderators will need to show that they are able to work effectively in this wider context.

The e-forum may, through consultation with its members and other concerned parties, focus on a programme in the first instance that is national, subregional, or regional. In some cases, it may be better to create linked national programmes – which may be easier to fund – than move immediately to a subregional or regional programme.

Each e-forum moderator will have the responsibility of:

- **guiding e-forum discussions and building consensus** amongst the members on both programme and budget,
- **creating an inclusive debate** in which the best and most appropriate data and information is used to develop the proposed programme, and,
- **involving potential funding agencies** in the discussion throughout programme development.

The moderator will be given a fixed time in which to finish the assignment (three months should be sufficient to come up with a high quality proposal). Assuming the moderator spends, on average, three days a week on programme development and accepts a fee of \$500/day, each moderator would receive \$18000. Total programme development costs would be \$90000. It might be useful to have a small final workshop. However, this effort is to be an example of a new, cost-effective way of doing business amongst the universities and it may be better to have some modest travel and per diem allowances to provide opportunities for the most active e-forum participants to meet occasionally in a less formal framework than a workshop. Ten members, with a \$500 airfare and \$200 per diem for four days, would add \$13000 per strategic theme. The overall budget for theme development would then be \$155000.

Network moderation and development

The terms of reference for the network moderator²¹ include:

- building a network of informed specialists within the strategic theme to include the major priority specialisations,
- developing a budgeted overall programme to support the strategic theme (including both research and graduate training opportunities and courses, as well as ‘nurturing’ exercises to widen network reach to weaker or less well endowed institutions),
- opening and maintaining a discussion with concerned donors and ensuring that their constraints and objectives are adequately dealt with, and,
- submitting a final proposal to the concerned donors through the RUFORUM secretariat.

The moderator would be paid 50% of the fee on acceptance of the commission, 25% on submission of a proposal satisfactory to the RUFORUM secretariat, and the remaining balance upon successful funding of the initiative. The draft proposal would go through the normal rigorous scientific review that RUFORUM uses for its regular grants. Reviewers should include regional and international experts with strong policy experience and with a track record of successful policy implementation.

²¹ It may be sensible, in some instances, to have more than a single moderator. In which case, the fee will be split between the moderators.

The secretariat will need to maintain an overview at all times on theme development in order to provide guidance and assistance as needed. It may choose to do this using its own staff, or contract separately for this to be done. But, as the process will be unfamiliar to all concerned, it will be important to keep the momentum and focus going. All moderators will need to be established scientists in their area of expertise, have an excellent knowledge of universities, and be fully familiar with the theme being developed (but also able to take a 'balanced' perspective on overall theme needs as opposed to promoting a single line of action). The external additional overview will be needed to help make sure that established interests are not perceived as 'taking over'. This last will be a very real danger, given the somewhat poor collaborative track record amongst many universities, and also the limited internet access that several universities have. In many cases, it can be anticipated that the perception will be misplaced – but it is important that even the perception of unfairness needs to be explicitly countered from the outset.

Appendix I

Terms of reference

The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) is an initiative by 10 universities in East and Southern Africa. It evolved from a programme of the Rockefeller Foundation's Food Security Programme called Forum on Agricultural Resource Husbandry (FORUM). The evolution of FORUM into an organisation registered in the region, followed strong recommendations of an external evaluation, to devolve management and operation of FORUM to an African institution. The 10 universities that form RUFORUM are; Africa University (Zimbabwe), Eduardo Mondlane (Mozambique), Egerton University (Kenya); Jomo Kenyatta University of Agriculture and Technology (Kenya); Kenyatta University (Kenya); Makerere University (Uganda), Moi University (Kenya); University of Malawi (Malawi); University of Nairobi (Kenya); and, University of Zimbabwe (Zimbabwe). The organisation plans to expand to other universities within each country and region.

The new organisation is faced with a number of challenges including identifying a niche among a multitude of actors, strengthening and promoting the role of universities in research, training and outreach, improving image and enhancing roles of universities in development agenda and policies, developing partnerships for university-based training, research and outreach, enhancing quality of university products (graduates and processes), broadening the organisation's funding base and how to integrate universities in the broader NARS. Also fundamental is the need to ensure ownership and broad stakeholder engagement at all levels of RUFORUM operations. Thus, being a new member organisation, RUFORUM undertook a wide ranging stakeholders' consultation and has produced a draft 10 year strategic plan to guide its operation. The plan however needs to be operationalised by identifying key programmes, their aims, objectives, outputs, outcomes/impact and indicators for assessing progress. Further, it requires identification of competencies/gaps in the different universities and examining modalities of some of the recommendations of the strategic plan process.

RUFORUM therefore wishes to contract two consultants to facilitate the transformation of the strategic plan to an action plan (operational plan) and help to implement some of the already identified activities. The assignment involves helping to market RUFORUM and identifying opportunities for expanding the funding base, undertaking an assessment of the competencies/gaps/opportunities in the RUFORUM participating universities and countries and advising on how some of these could be improved and harnessed to provide regional public goods, and link universities better to the broader NARS and development issues, and identify possible units/areas of specialization to provide regional training and research facilities. RUFORUM has in the past focused on M.Sc training but now also proposes to pilot regional- based PhD training in a few regional centres (2-3), and if need be regional based Masters programs for example in Biometry. The National and regional stakeholder workshops also recommended payment of membership fee and expansion of membership but modalities were not defined. There was also a strong desire to strengthen student/staff exchange and promote solidarity among the participating

universities. Additionally it was recommended that universities who host regional training programmes should charge local fees to all RUFORUM member universities.

On the basis of the above RUFORUM is contracting two consultants to examine the above issues. The TORs are detailed below.

A Team Leader to provide the overall leadership for the process. Specifically, He/She will be responsible for, among others,

- Market RUFORUM and solicit for additional financial resources; identifying potential funding sources and contacts
- Transform the strategic plan into an action (operational plan), more specifically identify programmes for operating the strategic goals, including suggesting budgets and required competencies at the Secretariat level
- Assess opportunities for integrating universities in the broader NARS and development issues in the different countries
- Assess competencies/gaps/opportunities in the RUFORUM participating universities in Kenya (5) and Uganda (1) and possible centres of specialization to mount regional Ph.D and M.Sc. programs, and recommending 2-3 centres for piloting the regional training programs
- Assess modalities for membership fees and expansion
- Ensure quality of the process and product

The consultant will be expected to deliver the following:

- A concept proposal on how the team will undertake the process
- Report of the fund raising drive including a list of potential funding sources and contact
- An operational plan for RUFORUM
- A report of the findings on the competencies/gaps/opportunity study, integration of universities in the broader NARS and national development, membership expansion and fees, and recommendations arising from the assignment.

The consultant will be paid as specified in the contract and in conformity to Uganda financial laws.

Support Consultant: the lead consultant will be assisted by a second consultant who will be responsible for undertaking the assignment in Malawi, Mozambique and Zimbabwe. Specifically, He/She will be responsible for:

assessing competencies/gaps/opportunities in the RUFORUM participating universities in Malawi (1), Mozambique (1) and Zimbabwe (2) and identifying possible centres of specialization to mount regional Ph.D and M.Sc. programs, and recommending 1-3 centres for piloting the regional Masters and Ph.D training programs

- assessing opportunities for integrating universities in the broader NARS and development issues in the three countries
- Assessing demand and opportunity for mounting a regional Biometrics M.Sc Degree program and the modalities
- assessing opportunities for integrating universities in the broader NARS and development issues in the three countries
- assessing opportunities for transforming Bunda College of Agriculture into a full fledged university

Deliverables

The consultant will prepare a report in consultation with the Team Leader on the specific TOR He/She is responsible for.

The consultant will be paid as specified in the contract and in conformity to Uganda financial laws.

Appendix 2

Itinerary

PROGRAMME FOR MALCOLM BLACKIE'S VISIT TO KENYA AND UGANDA UNIVERSITIES

Sunday 17 July 2005	Arrival in Kenya, Nairobi
Monday 18 – Tuesday 19 July 2005	Visit to Jomo Kenyatta University of Agriculture and Technology
Wednesday 20 July 2005	Morning: Jomo Kenyatta University of Agriculture and Technology Afternoon: Kenyatta University
Thursday 21 July 2005	Continue with work at Kenyatta University
Friday 22 July 2005	Visit Nairobi University
Saturday 23 July 2005	Continue with work at Nairobi University
Sunday 24 July 2005	Travel to Egerton University
Monday 25 July 2005	Start work at Egerton University
Tuesday 26 July 2005	Morning: Egerton University Afternoon: Travel to Moi University
Wednesday 27 July 2005	Start work at Moi University
Thursday 28 July 2005	Continue with Work at Moi University till about 10.00 am then Leave for Uganda
Friday 29 July 2005	Visit Makerere University
Saturday 30 July 2005	Continue with work at Makerere University
Sunday 31 July 2005	Work with Paul Woomer on the write up
Monday 1 August 2005	Continue work on the write-up together with Paul Woomer
Tuesday 2 August 2005	Complete writing
Wednesday 3 August	Presentation of draft report to General Assembly and Board
Thursday 15 August 2005	Submission of Final Report

PL Woomeer: Itinerary

10 July	Sunday	Depart Nairobi 0820 hr on KQ 424, arrive Lilongwe at 1220 hr, travel overland to Bunda College, stay at Social Forestry Guest House. Meet with Principal (G. K-P)
11 July	Monday	Meet with Dean and Department heads. Deliver guest lecture, meet with past and present grantees to discuss RU FORUM Strategic Plan.
12 July	Tuesday	Assess laboratory, field and biometric capacities (am), meet faculty on RU FORUM proposal process (pm).
13 July	Wednesday	Travel to Lilongwe airport, depart Lilongwe.
14 July	Thursday	Travel to UZ, meet Dean and Department heads. Deliver guest lecture, meet with past and present grantees to discuss RU FORUM Strategic Plan.
15 July	Friday	Assess laboratory, field and biometric capacities (am), with faculty on RU FORUM proposal process (pm).
16 July	Saturday	Free day
17 July	Sunday	Free day
18 July	Monday	Travel overland to Africa University Meet with Dean and Department heads. Deliver guest lecture, meet with past and present grantees to discuss RU FORUM Strategic Plan.
19 July	Tuesday	Assess laboratory, field and biometric capacities (am), meet faculty on RU FORUM proposal process (pm).
20 July	Wednesday	Travel overland to Harare airport, depart Harare at 1450 on BA 6268. Arrive Johannesburg 1630 hr, in transit, depart for Maputo 1910 hr on TM 306, arrive Maputo airport at 2010 hr.
21 July	Thursday	Travel to Eduardo Mondlane University, meet Dean and Department heads. Deliver guest lecture, meet with past and present grantees to discuss RU FORUM Strategic Plan.
22 July	Friday	Assess laboratory, field and biometric capacities (am). t Meet with prospective grantees to discuss proposals (pm).
23 July	Saturday	Depart Maputo for Nairobi.

