



SUMMATIVE OUTCOME EVALUATION REPORT

Building Africa's Capacity
to Train for Africa

DECEMBER 2019



Our Motivation

“Transforming agriculture in Africa requires innovative scientific research, educational and training approaches. The education sector needs to be more connected to the new challenges facing rural communities and needs to build capacity of young people to be part of the transformation of the agricultural sector”. Reinforced by the Science Agenda for Agriculture in Africa



Our Vision

Vibrant transformative universities to catalyse sustainable inclusive agricultural development to feed and create prosperity for Africa

Our Mission

To strengthen the capacities of Universities to foster innovations responsive to the demands of smallholder farmers and value chains through the training of high quality researchers, the output of impact-oriented research, and the maintenance of collaborative working relations among researchers, farmers, market actors, national agricultural research and advocacy institutions, and governments



**INSPIRING THE NEXT
GENERATION OF
SCIENTISTS FOR AFRICA**

ACKNOWLEDGMENTS

Chronicling the achievements of the RUFORUM Network since the devolution of FORUM to the present day-RUFORUM by the Rockefeller Foundation was an exercise that provided key yardsticks for the Vision 2030. We would like to thank Dr. Clesensio Tizikara; Dr. Florence Nakayiwa; and Dr. Melody Mentz-Coetzee for dedicating time to chronicle the achievements of RUFORUM since inception in 2004 when the concept that African Universities have the capacity to drive the research that would expand agricultural output in the Continent.

The Vice-Chancellors of the then 10 universities¹ that formed the RUFORUM network are forever in our gratitude. They assumed ownership, thereby assuming financial responsibility too, without hesitancy and steered RUFORUM through its early years. Following the support from the Rockefeller Foundation, several other development partners including the Bill and Melinda Gates Foundation (Phase I & II), German Academic Exchange Service (DAAD); Carnegie Corporation of New York, the International Development Research Centre (IDRC), the European Union through the Intra ACP/Africa academic mobility programmes and recently, the Bill and Melinda Gates Foundation (Phase III) and Mastercard Foundation stepped in as RUFORUM's core funders, consistently providing support and the global perspective of higher education.

It has enabled us to increase in scope and transform into a powerful voice and champion for higher education, science, technology and innovation in Africa.



RUFORUM is a network of several stakeholders collaborating to advance science, technology and innovation on the African Continent. They are the staff and Principal Investigators (PIs) at Member Universities, the students who are undertaking research for their bachelors, masters, doctorates and Post-doctorates, and the smallholder farmers with whom they collaborate.

We are extremely delighted of our graduates—those who head several higher education institutions and departments in national and international research institutes. With the continuing support from partners towards expanding the footprint of the RUFORUM Network across Africa, we look forward to achieving even greater milestones in the future.

Professor Adipala Ekwamu
Executive Secretary, RUFORUM

ACRONYMS & ABBREVIATIONS

AHESTI	Agricultural Higher Education, Science, Technology and Innovation
AHEW	Africa Higher Education Week
AU	African Union
CAADP	Comprehensive Africa Agricultural Development Programme
FAPA	Field Attachment Programme Awards
GRG	Graduate Research Grant
GTA	Graduate Teaching Assistant (ship)
Ha	Hectare
HAE	Higher Agricultural Education
ICT	Information, Communication Technologies
Kg	Kilogram
LUANAR	Lilongwe University of Agriculture and Natural Resources
MSc	Master of Science
NGO	Non-Governmental Organisation
PhD	Doctor of Philosophy
R4D	Research for Development
RTP	Regional Training Programme
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
STISA	Science, Technology and Innovation Strategy for Africa
SUFACE	Strengthening University Farming Community Engagement
TVET	Technical and Vocational Education and Training

KEY MESSAGES

RUFORUM as a network and its programme structure and design have been and are still highly relevant at global, regional and country levels. The RUFORUM approach and having a regional network that mentors and promotes transformation is important and justifies continued and increased support from national governments, the African Union and Development Partners. RUFORUM has ensured continued alignment to the Pan-African high-level agendas and response to member demands.

RUFORUM is a functional networking system that is built on strong transnational collaborative approaches that utilizes Africa's diversity, range of existing capacities and expertise, while leveraging international cooperation. The diversity in institutional capacities, cultures and policy environments, and the extent to which individual and collective capacities have been transferred or institutionalized in the member universities varies considerably. The member universities and the countries to which they belong and/or operate from are at different development levels, with differentiated capacities and needs - financial, human capital, infrastructure, scientific and technological.

RUFORUM has successfully mobilised resources and provided grants to member universities, albeit on a competitive basis resulting in an even distribution of activity and associated benefit to members. Initially RUFORUM attracted only a few development partners. Positioning itself as a facilitating mechanism for the universities and working with its members to design strategic initiatives attracted a more diverse array of funders, and in particular national governments committing to investing and borrowing to support higher education and research. Moving forwards, RUFORUM is likely to be more successful in

raising more funds not by “doing it on behalf” of participating universities, but “doing it with” participating universities. The network should also consolidate and secure commitments from government sources to fund RUFORUM to ensure sustainability.

The flexibility of RUFORUM's main funders, specifically their willingness to change plans, scale up efforts and fund discreet activities as needs arose was central to enabling RUFORUM implement its activities in a way that was adaptive and responsive to the local context. The long term commitment of development partners and long duration of support allowed strong trusting relationships to form, which allowed ongoing and collaborative engagements about evolving and emerging capacity needs and for success to be built upon.

RUFORUM has an efficient and effective governance and management structure. The Secretariat has always been on track on disbursement and budget utilisation within the time frame with activities being carried out in several participating member universities and countries. About 75 percent of the RUFORUM funds are allocated to grants to member universities and 25 percent to advocacy, partnerships and networking, and overall coordination of activities. The current governance arrangements enhance ownership and should be maintained, but be fully financed by members.

RUFORUM has increased awareness and capacities of national, regional, continental and global stakeholders in higher agricultural education through successive and successful events organized in various countries, and a strong focus on multi-institution transboundary activities.

KEY MESSAGES

Stakeholders reached included policy makers, technical staff of government departments and agencies, research institutions, development partners, farmers and other agricultural value chain actors. Discussions and effort has shifted from universities merely producing graduates and research outputs to productivity and the applicability and relevance of these products, thus bringing a more holistic perspective to higher agricultural education, training and learning. RUFORUM effort to integrate universities with communities through student-centred extension services is a positive step in meeting the demand for knowledge and capacity development at the individual farmer and community levels. These efforts should be consolidated and scaled up.

RUFORUM's commitment to a partner-led networking approach helped build strong members' ownership of the processes and its programmes (curriculum, training programmes, community action research projects), and created the space for partners to play a formative role in deciding the priorities for support and take a lead role in implementation, in line with their growing capacities. Having competitively selected implementing partners for areas where they had relatively well-developed expertise, facilities and comparative strengths, together with twinning and staff exchange/mobility arrangements, created opportunities where the few first generation universities in relation to the number of years since their establishment took leadership and were able to provide newly established members with high quality, highly technical, and oftentimes difficult to find, skills and expertise.

The networking opportunities created by RUFORUM have helped member universities in fragile States, where political or economic conditions were unfavourable, to keep

operating at the highest possible standard, build their depleted staff capacities and re-establish their systems. This is a best practice regionality principle that should be maintained. RUFORUM should carefully balance between equitable sharing of work as a capacity building tool and the sharing of benefits delivered by a few of the more capable members (centres of excellence/leadership) on behalf of the entire network.

Networking has been beneficial in fostering research collaboration, mobility exchange and curriculum improvement. Inter- and intra-institutional collaborations have been of imperative importance, especially for the development of the younger universities - consolidating their academic environment and accessing better trained faculty to improve the quality of their teaching and learning. Staff and student exchanges facilitated the learning of new teaching and research tools, increased the breadth of their knowledge, and learning different approaches to solving Africa's problems. Mentoring programmes aided students and early-career staff to connect with peers, colleagues and other academic and professional contacts that provided insights and opportunities in career paths. The biennial conference and African Higher Education Weeks (AHEW) have demonstrated the convening power of RUFORUM and the capacity to bring together key actors to address common higher agricultural education goals and challenges.

Graduate training, built on a strong synergy between the production (research) and dissemination (teaching and outreach) of knowledge, has been and will remain at the core of RUFORUM. The establishment of Post-doctoral fellowships and field attachment opportunities have been useful in helping young

researchers raise their professional profiles and broaden their access to opportunities. Linking training and learning to working with communities has been instrumental in: (i) moving university generated knowledge and research outputs swiftly and efficiently from the laboratory to farmers' fields on a broad scale; (ii) facilitating the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity; (iii) enriching scholarship, research, and creative activity; (iv) enhancing curriculum, teaching and learning; and, (v) enabling the training of well-educated and engaged graduates eager and prepared to address critical societal issues and contribute to the public good.

The RUFORUM regional training programmes focus on more than just information transfer but also support to soft skills and networking, and imparting of multi-dimensional qualities, which makes graduates from RUFORUM supported programmes more suited to employment requirements. Many jobs today, and many more in the near future, require a combination of technological know-how, problem-solving and critical thinking, as well as soft skills and practical experience. The days of staying in one job, or with one company, for decades are waning. The new generation of graduates has different aspirations, viewing their employment ideals and options in self-employment, especially with the dwindling conventional public and private sector job opportunities.

RUFORUM has an ever widening alumni membership. The network should tap into the larger alumni network to facilitate ongoing programmes, through mentorship and active graduate level and community engagement programmes. RUFORUM needs to make a clear-eyed determination about who in its network it wants to prioritize, for example, current members

and partners, potential members and partners, influential and powerful members and partners, and "friends who are real connectors", and then figuring how best to allocate attention. RUFORUM needs a good crop of ambassadors to sell its brand and attract support and investment both within the countries it is operating in and globally.

Sustainability of RUFORUM depends on membership, government and development partners finance. Apart from seeking to transform into a continental organ largely supported and funded by African governments for its Secretariat operations, RUFORUM should look at options where it can provide fee-based services to increase income, and seek potential sources of passive income (for example through leveraging partial royalties from intellectual property). Many of its younger/smaller member universities and the communities engaging with them, for example, have limited knowledge about intellectual property rights and/or do not have the resources to effectively patent their inventions and RUFORUM could take collective responsibility on behalf of the members and derive income from royalties accrued.

EXECUTIVE SUMMARY

The purpose of the 2018 summative outcome evaluation was to help RUFORUM improve its decision-making, the implementation of its Vision 2030, and programming initiatives for capacity development and institutional strengthening of its member universities. The evaluation provides evidence and proof of concept for the benefits of collaboration to the member universities, the national governments, and the regional and continental development agendas, in the areas of higher education, agriculture and science, technology and innovation in broad terms. It provides accountability for development partners' support and aid spending on RUFORUM and generates learning on why and how RUFORUM initiatives have been successful (or not). The overall approach of the evaluation was grounded in a general theory of change for capacity development and the results frameworks of RUFORUM interventions supported by various partners.

The analytical framework that was used in the evaluation to assess the RUFORUM outcomes has two dimensions: first, it uses the logic of a results chain to unpack the different changes that were expected to occur as a result of RUFORUM intervention; second, it distinguishes between three different levels at which capacity change can occur: individual (knowledge, technical skills, motivation), organisational (policies, processes, systems, structures, incentives, resources, practices) and the enabling environment (policy, legal, social and economic context and other factors external to the organisation). The results chain distinguishes between three types of change: changes in the capacity of individual beneficiaries, RUFORUM member universities and partners; changes in the performance of RUFORUM as a network, and the contribution of RUFORUM to longer term development results at national, regional and continental levels.

RUFORUM programmes and projects have broadly consisted of five interrelated intervention areas albeit with a varying degree of focus: (a)

developing and/or supporting regional academic programmes; (b) integrating research as a tool for quality graduate training; (c) institutional support to member universities; (d) enhancing capacity of universities to engage with industry and community; and (e) programme management and coordination of partnership and networking activities. The programme structure was premised on the innovativeness of the universities in three basic areas that constitute higher education - teaching, research and service to the community and local economy. The design was majorly composed of Masters and Doctoral regional training programmes; competitively selected agricultural science & technology related research and innovation activities that could be addressed in collaborative partnerships; and institutional strengthening. The synergy between the production (research) and dissemination (teaching and outreach) of knowledge formed the backbone of the characteristics and strengths of the programmes. The Secretariat, through effective governance structures and continental advocacy, acted as the knowledge and coordination hub to support this.

This summary reviews the achievements of RUFORUM, and presents key messages about the degree to which RUFORUM has had an effect in “strengthening the capacity of African universities to deliver relevant and impact orientated research and training - producing skilled and proactive graduates, and demand driven research outputs and innovation in response to national, regional and continental agricultural development priorities”. It assesses whether RUFORUM has been effective in meeting its objectives; how well its programmes have worked; the extent to which the programmes have been implemented as designed; whether the programmes were accessible and acceptable to the target beneficiaries; and the accrued benefits to universities and communities as a direct or indirect result of RUFORUM interventions on agriculture as a scientific discipline.

RELEVANCE OF RUFORUM OBJECTIVES

The theory of change underlying the RUFORUM programme was that competitively awarded graduate research grants, scholarships for Master's and Doctoral training and direct support to create new or upgrade and reform existing training programmes could result in graduates with the appropriate skills set as well as more relevant research. Furthermore, it was assumed that institutional strengthening grants (ISG) and community action research grants (CARP), given to university researchers to work more closely with industry and communities, would bring the two groups together to: solve areas of mutual interest; enhance training and mutual learning; allow industry and communities to utilize research and graduates to enhance agricultural productivity; and, increase overall productivity, performance and visibility of universities within the country, regionally and globally. The outcomes of RUFORUM would be traceable through changes in the people and the organisations that its programmes would come into contact with, and the changes in the environment in which RUFORUM operated. The programme objectives, component interventions, and outcome measures were generally logically linked.

Science, technology and innovation are priority for the African continent and national governments as they aspire to build knowledge-based economies and accelerate inclusive growth. RUFORUM derived and/or aligned its strategic objectives and agenda largely from/to the continent-wide policy frameworks as they evolved, specifically: Agenda 2063-the Africa we want; the Comprehensive African Agricultural Development Programme (CAADP); the Science, Technology and Innovation Strategy for Africa (STISA), 2014-2024; Continental Education Strategy for Africa (CESA), 2016-2025; the Africa Agricultural Education and Skills Improvement Framework (AESIF), 2015-2025; the Continental Technical and Vocational Education and Training (TVET) Strategy; and the Science Agenda for Agriculture in Africa (S3A).

RUFORUM took into consideration the policy frameworks of Development Partners on revitalising higher education and agriculture in Africa, and the long-term vision/development paths and strategies of the AU member states. The long-term frameworks of most African countries envisage sustainable development and socio-economic transformation through strengthening competitiveness for sustainable wealth creation, employment and inclusive growth. Investment in higher education to increase skills and knowledge of the labour force, and in research & development and increasing innovation capacity to enhance entrepreneurship and agricultural value chains are key pillars in many of these.

RUFORUM was about universities doing things differently. Getting money to invest in scholarships and training programmes would not be sufficient to address Africa's challenges. Producing graduates that can function in the "new" world where knowledge is easily available requires imparting the skills to apply and create and use it in new ways. Universities needed to change the way they work, and focus on providing experiential learning to students. Community based participatory research integrated university teaching and research, linked universities to industry through agribusiness and entrepreneurship schemes, and linked universities to communities through outreach and student-centred extension and advisory services. These were RUFORUM-led initiatives designed to transform the role of universities in changing Africa's agricultural ecosystem. This is what was unique about the RUFORUM approach and why having a regional network that mentors and promotes transformation is important.

RELEVANCE OF RUFORUM OBJECTIVES

Hence, the RUFORUM suite of interventions remains highly relevant in supporting Africa's development objectives through institutional initiatives, training graduates, and enhancing quality of higher agricultural education. RUFORUM pursued seven strategic objectives that strongly focussed on building an Africa-owned network of universities to collectively marshal and strategically allocate resources to strengthen capacity of the

member universities to: i) produce more and better qualified graduates, men and women, relevant to identified human capacity and skills gaps; ii) produce more and better knowledge and research outputs relevant to identified priority areas; and iii) develop capacity to access existing stores of global and locally generated knowledge and adapt it to local use.

EFFICIENCY: IMPLEMENTATION AND OUTPUTS

Academic and research collaboration and networking. The RUFORUM network expanded in a controlled phased manner from 10 member universities in 5 countries in Eastern and Southern Africa in 2004 to 105 universities in 37 countries spanning the entire African continent by 2018. This brings together more than 30,000 faculty and non-academic experts; and, a large body of students - the future agricultural service providers and leaders. Collaboration with other education and research institutions of the North helped raise the standards of member universities through exposure to teaching, research, services and management methods. International cooperation, experience and exposure enabled young researchers and educationists to expand their work, publish it in recognised professional journals, and present it at professional meetings. At the student level, institutional collaboration allowed for an exchange of students that benefited both from the faculty exposure as well as academic culture and environment. Subscribing to partnership approaches spurred better relations with industry, local businesses, and local communities. Close ties with communities made universities more responsive to their needs, such as identifying their most-needed areas of education, developing relevant curricula and pedagogy that directly benefit communities, as well as providing research solutions for local concerns.

Marshal and strategically allocate resources for transformative impact. Advocacy, networking and exposure of the importance of investment in HAE have resulted in much higher profile for universities and greater recognition of their role in all aspects of national development. The RUFORUM networking arrangement and partnerships have been very beneficial and influential in attracting grant funding to the member universities from other sources such as industries, foundations, and international organisations. The number of projects implemented directly under the RUFORUM umbrella grew from one in 2004 to 91 in 2018, with a total funding of US\$ 200.7 million supported by multiple donors.

RUFORUM member universities have committed to support improved faculty qualifications and skills within the network under the Graduate Teaching Assistant fellowships scheme. The estimated value of the GTA is US\$ 13.7 million - with the fees waived by the receiving host university, travel and stipends funded by the sending university and RUFORUM committing to solicit external funding to help support the research component. RUFORUM assisted members to write grant proposals through writeshops, as well as other facilitation, raising US\$ 17.6 million in the form of funded collaborative projects and US\$ 66 million for 11 Centres of Excellence.

Better qualified graduates have been produced through the RUFORUM Network. RUFORUM supported the design and participatory development of more than twenty (20) curricula; and the establishment of 7 PhD and 3 MSc regional training programmes at six lead universities. A total of 2,386 graduates have been trained (1,883 MSc and 503 PhD) through the regional training programmes (420 PhD and 495 MSc), and the grants mechanisms (83 PhD and 1,388 MSc). An additional 99 PhD (out of 325 pledged) have been successfully placed and reported for studies. Training at regional institutions generated capacity for the lower levels in the agriculture training value chain. Undergraduate and Master programmes at the lead universities, over and above RUFORUM support, benefited from the new technologies, benchmarks and academic development associated with the regional training programmes.

High quality relevant research outputs have been generated from RUFORUM-supported research. RUFORUM maintains a competitive grants

programme that includes graduate research grants (GRGs), the Community Action Research Programme (CARP), and the Field Attachment Programme Awards (FAPA) and post-doctoral grants. A total of 468 grants worth US\$ 26.6 million were awarded for research and dissemination of technologies and innovations on crops (184 grants, US\$ 13 million), livestock and fisheries (65 grants, US\$ 4 million) and institutional strengthening (64 grants, US\$ 3 million) and other cross cutting and emerging research and outreach areas. Key advances have been made in the areas of crop improvement and pest/disease control with focus on cereals, roots and tubers and grain legumes across the African region. RUFORUM had a specific focus on small holders targeting rural innovations and framing systems, value chains and agribusiness as well as food, nutrition and postharvest handling. The scientific outputs are largely in the form of publications in peer reviewed journals, theses in university repositories, crop varieties, and productivity-enhancing practices and recommendations.

EFFECTIVENESS: ACHIEVEMENT OF OBJECTIVES AT THE OUTCOME LEVEL

15. Economic and financial efficiency-high quality graduates have been trained at a relatively low cost. An input/output based analysis revealed that the investment cost of training for a 2-year MSc course through RUFORUM was US\$ 25,150 as compared to US\$ 90,800 in North America, US\$ 83,840 in Australia, and US\$ 54,218 in Europe, largely due to higher tuition and fees charged by the universities. Doctoral-level training lasts 4 academic years in USA/Canada, Australia and Europe at a cost of US\$ 242,680, US\$ 181,680 and US\$ 147,088 respectively, and 3 academic years through RUFORUM at a cost of US\$ 59,400. This implies that it costs approximately 4, 3 and 2.5 times more to train in USA/Canada, Australia and

Europe respectively, than using the RUFORUM arrangement. Africa and the development partners providing the scholarship grants saved US\$ 258 million by not training all the 1,883 MSc and 734 PhD (503 through RTPs/Grants and 231 Graduate Teaching Assistantships) graduates in North America, US\$ 200 million in the case of Australia and US\$ 119 million for Europe.

RUFORUM has produced Graduates more relevant for solving Africa's problems and labour market needs. Apart from much lower costs compared to international study, training in the local environment and through their research during their training, students find solutions that are applicable in the local context and thus contribute to improving livelihoods of rural communities. Furthermore, these graduates are retained on the continent on course completion to transfer this knowledge and their innovations to society. RUFORUM graduates have gone into academia, research and development sectors, produced relevant knowledge products, and have become change makers in their various specific fields of expertise and in national development. RUFORUM training has greatly contributed to rebuilding of staff numbers, skills and competencies for teaching and research at member universities; National Agricultural Research Institutes; Government Ministries, Departments and Agencies; and Non-State Actors. The 2014 tracer study indicates that about 39% of RUFORUM graduates were employed within the university system, while the agricultural research institutes took up 27% and the civil society and industry employed 10% each.

The effectiveness and productivity of individual graduates ultimately helps elevate the universities and other organisations they join as staff to higher thresholds of performance. Enhanced experiential training led to greater innovation and amplification of knowledge, and task performance: (i) MSc graduates have excelled in international-calibre PhD programmes; (ii) PhD graduates have become Heads of Departments, Deans and Principals in various universities and Heads of national and regional agricultural research programmes; (iii) graduates who are teaching in universities are positively influencing research and learning approaches in use; (iv) those in research institutes are contributing to improved quality of research; and, (v) employees in government ministries, departments and agencies have a say in shaping the policy environment. 17. Knowledge, skills, wage

premiums and better job prospects for graduates. RUFORUM training involves experts working with learners to transfer to them knowledge, skills and attitudes to improve their effectiveness. General responses from alumni reveal that performance, innovation, tacit knowledge, adaptive expertise, confidence and self-management skills of graduates increased due to the training received. Because of the focus on more than just information transfer and the support to soft skills and networking, the multi-dimensional qualities of graduates from RUFORUM training programmes means they not only get employed in highly competitive job sectors that also offer better remuneration, but also generally move rapidly through the promotion ladders in their career paths. Results from a 2014 tracer study indicate that 75% of RUFORUM graduates found employment within 6 months of completing their studies, 73% were on permanent or long-term contracts, and 56% occupied positions of influence at regional, national or local government levels.

RUFORUM has boosted the performance of African Universities. The performance of universities was boosted through increased numbers of staff with higher qualifications and better pedagogical and research skills. However, with the proliferation of new universities, this increase in numbers is starting to get eroded. Increased exposure of students to more and better prepared academic staff ultimately increases the academic, research and field potential of graduates. For universities hosting the regional training programmes, their effectiveness and reputation increased, in addition to other dimensions related to these two aspects that also got largely amplified. This further increased their prospects and ability to attract more students to the training programmes.

RUFORUM has enhanced parity among women and men in sharing the benefits of HAE and research. Guidelines for student recruitment, award of grants, and scholarships give special focus to support for female students. The RUFORUM policy on gender targeted increasing women enrolment

in MSc and PhD programmes and participation in agricultural research to 40% by 2015. At the initiation of RUFORUM in 2004, only 20% of the MSc students trained with FORUM support were female, while those trained at PhD level were 12%. The overall female students' recruitment under the MSc regional training programmes increased to 25% by 2009 and 33% by 2018. The corresponding figures for the PhD programmes were 29% by 2009 and 33% by 2018. The proportion of female students fully supported by RUFORUM for PhD training more than quadrupled from 12% in 2004 to 45% by 2018; the ratios for MSc increased from 20% to 45% in the same period.

RESEARCH OUTPUT AND IMPACT

Investment in research and dissemination of crop-related technologies and innovations. RUFORUM invested 11% of US\$ the 85.1 million mobilised by the Secretariat into graduate research and post-doctoral grants and 7% into community action research and field attachments. Overall, crops research accounted for 36.6% of the funds invested in research and institutional strengthening and 33% of the grants awarded. The RUFORUM footprint is greater in the traditional staple crops with cereals, roots and tubers and grain legumes receiving the highest number of grants and resources invested in research and dissemination of crop-related technologies and innovations. In the animal sector, fisheries and aquaculture, cattle and poultry were the main areas of research effort.

RUFORUM-supported research processes have enhance collaboration amongst multi-disciplinary teams. Grant requirements for intra- and inter-institutional collaboration as well as inter- and multi-disciplinary research processes have brought together specialists of different skills to work together and bring their scientific abilities to achieve answers to significant questions. This not only accelerates the progress of university

research, but also enhances the quality of the work as well as extending the repertoire of the partners.

RUFORUM-brokered partnerships among researchers have ensured that their knowledge, skills and techniques are available more broadly to mutually benefit the participants and the network. The more the researchers collaborate, the greater the chances for success and problem solving, the prospects for acquiring and sharing knowledge and experience, and also in making equipment, facilities, and laboratories available to other researchers even if they belonged to another institution. Participatory research has increased adoption rates of new methods or technologies by farmers and communities involved in the design and execution of the research programmes due to the increased sense of ownership over the processes and products, as well as the reassurance that the outcomes are intended to suit the community needs and preferences

RUFORUM-supported research has resulted into technology generation, adoption and use. Research initiated through graduate training has engineered development of elite varieties of drought tolerant indigenous crops and contributed to approaches for sustainable use of natural resources for enhanced livelihoods in the region. Adoption of new crop varieties and commodity production practices from the research has contributed to improving livelihoods of smallholder farmers. The spread and impact of RUFORUM technologies is documented in several project reports and RUFORUM documentaries including "Bringing Science to Communities" (<https://repository.ruforum.org/system/tmf/Voices%20from%20the%20Field%20%28Web%29.pdf?file=1&type=node&id=37289&force=>) that showcases the on-ground impact of research and scientific work of RUFORUM-sponsored graduates.

RUFORUM estimates that the assortment of technologies generated have reached over one million beneficiaries through extension, seed systems and supportive policies. Adoption of new crop varieties and commodity production practices from the research has contributed to improving livelihoods of smallholder farmers and solving real community problems. Examples of some of the successful technologies from RUFORUM-supported research include:

Response to environmental and climate change challenges has been enabled under RUFORUM supported research. RUFORUM supported research focusses primarily on food and environment security and encapsulates a number of innovative research projects that address natural

resource management, sustainable agriculture issues, changes to climate and environment, and food and water shortages. For example, the interventions by the Soil and Water Management programme are putting emphasis on indigenous drought tolerant crops coupled with enhancing soil fertility through promoting use of nitrogen fixing leguminous crops, appropriate crop rotation, intercropping, optimized fertilizer rates and use of planting pits to improve water use efficiency. Thus, the initiatives are responding to emerging environmental challenges especially climate change and declining soil fertility and will result in technological innovations with immense potential to boost agricultural productivity and promote food security in the region.

PARTNERSHIPS, NETWORKING AND ADVOCACY

RUFORUM run a spirited advocacy campaign with a clear value proposition – educating the next generation of African scientists, and combining the power of online activities with the potential of offline activities to reach out and advocate for increased investment in higher agricultural education. RUFORUM engaged its members and supporters, grew its network of advocates, and targeted the right people and organisations that could help it in its efforts. The grand prize of this sustained advocacy was the establishment by the African Union in 2016 of the Committee of Ten Heads of State and Government championing Education, Science and Technology in Africa. The Committee was instituted after noting that education, science, technology and innovation remain the primary instruments that will enable Africa to effectively implement its long-term vision of a transformative Agenda 2063.

RUFORUM networking events provided great opportunity to students and faculty for networking with other industry and academic professionals, in addition to providing invaluable insights into their

chosen fields. More than 450 networking events have been convened, including 16 Annual General Assemblies and 6 biennial events over the last 15 years. The biennial conference and Africa Higher Education Week (AHEW) is RUFORUM's most comprehensive meeting for its diverse stakeholders in both agriculture and higher education sectors. Initially dedicated to graduate students and their supervisors, grantees in RUFORUM member universities, and alumni, it was a platform for peer review, quality control, mentorship, networking, and shared learning.

The African Higher Education Week (AHEW) has transitioned from being primarily a scientific event focused on mentorship of graduate students to an academia-policy-development interaction platform providing space for niching shared perspectives and visions for development with the active participation of universities. It has demonstrated the convening power of RUFORUM and the capacity to bring together key actors to address common HAE goals. Participation in the biennial conferences has increased from 285 participants from 22 countries

in 2007 to 850 participants from 73 countries in 2016. The 6th meeting held in Nairobi, 22-26 October 2018 attracted over 1,800 participants from 38 countries, and representing a diverse array of affiliations extending to high profile policy makers from government, regional agencies and development partners. RUFORUM has enabled the establishment of channels among member universities that allow effective communication, stable partnerships, and networking between academics.

The RUFORUM electronic online- and internet-based communication tools and knowledge

repositories broadened cooperation opportunities available to both faculty and students. Volumes of information can be accessed, transmitted and discussed at the same time using the various online portals. In particular, the online data portals on agricultural higher education capacities in Africa offer free user-friendly data on teaching staff and student populations in agricultural higher education in African countries. Access to this detail of data will help decision makers identify gaps, plan, formulate policy, and set priorities and benchmarks for higher agricultural training, as well as measure progress toward goals.

CONCLUSION

The evaluation identified a number of factors that help explain RUFORUM's success. It also identified other factors that pose a risk to RUFORUM performance.

The ultimate success and value addition of RUFORUM has been (will continue to be) based on how its studies and assessments, capacity development initiatives, graduate research outputs, and knowledge management activities have translated into:

- (i) uptake and/or integration of tools and products into the teaching and research processes;
- (ii) public and private sector investment and entrepreneurship, and,
- (iii) improved public sector management of the Africa's education ecosystem.

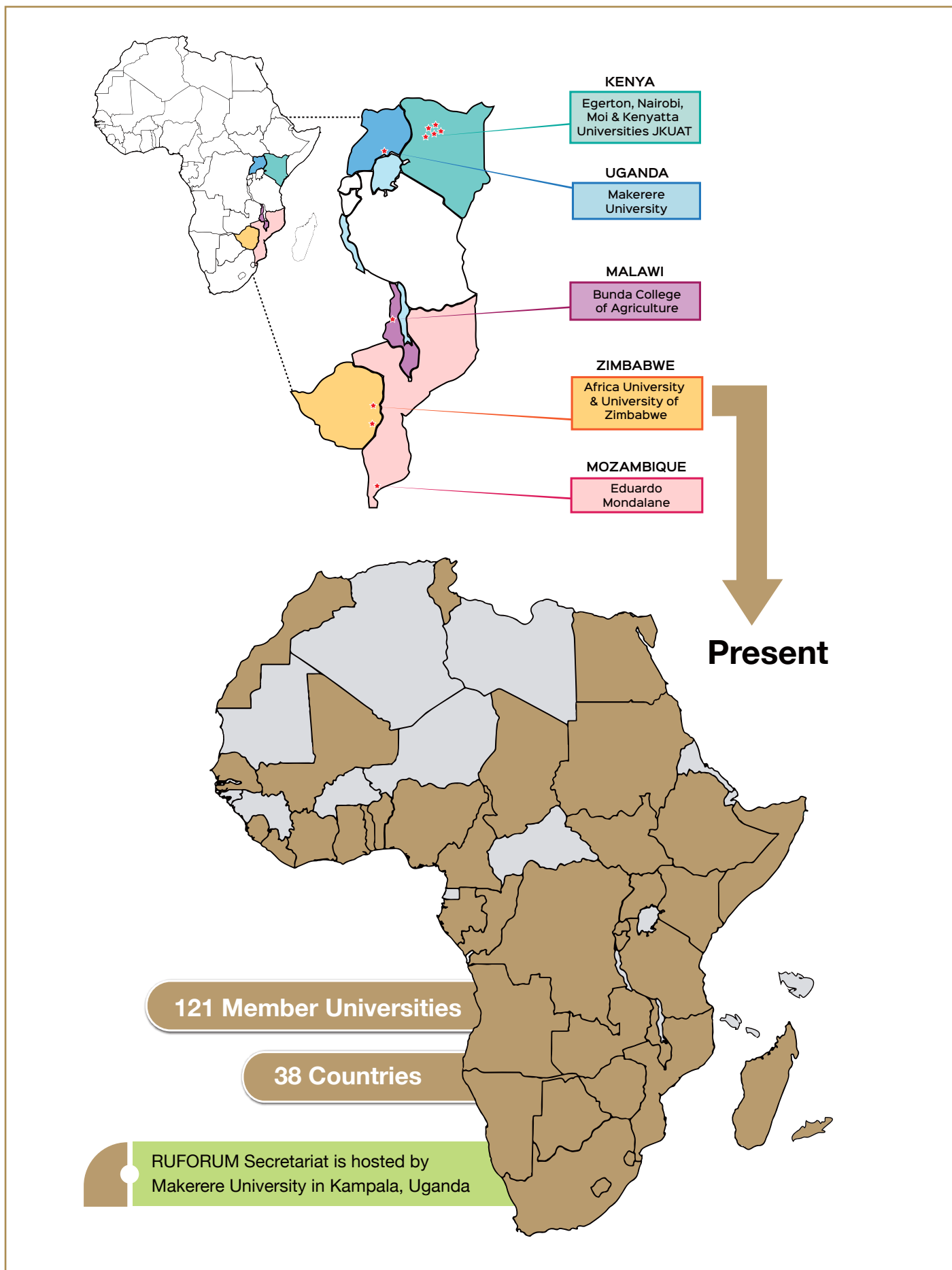
RUFORUM has been generally effective in terms of simultaneously carrying out activities in several countries and its progress towards achievement of stated results. The challenge, however, has been how to decide which ideas should become priorities for action in the face of many demands and requests for cooperation.



**INSPIRING THE NEXT
GENERATION OF
SCIENTISTS FOR AFRICA**

Expansion has been in Scope, Countries and within Countries

Phased Expansion 2004 - 2019





Plot 151/155 Garden Hill, Makerere University Main Campus
P.O. Box 16811 Kampala, Uganda
Tel: +256 417 713300 (Office) • Fax: +256 414 534153
Email: secretariat@ruforum.org
Website: www.ruforum.org, <http://respository.ruforum.org>

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