

The RUFORUM Journey



*If you are thinking a year ahead – sow a seed.
If you are thinking 10 years ahead – plant a tree.
If you are thinking 100 years ahead – educate the people.
– Kuan Tzu*

The Ruforum Journey

Published by Regional Universities Forum for
Capacity Building in Agriculture (RUFORUM)

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First published 2022

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Layout & cover design: Feroza Sarlie Motara

Printing: Jetline Print

Foreword

Earlier this year, I made a trip to fulfil a dream.

I travelled to the Evangelical University in Africa (UEA) in the eastern part of the Democratic Republic of Congo (DRC) to attend the launch of a new PhD programme in Agroecology and Climate Sciences offered jointly by four RUFORUM¹ member universities. The other three are the Catholic University of Bukavu (UCB), the Official University of Bukavu (UOB) and the Catholic University of Graben (UCG). It will be our first doctoral training offering on the country's home soil, focusing on the region's natural ecosystems and the challenges of climate change.



My trip to the DRC represented, for me, both the culmination of the RUFORUM journey thus far, and a new phase now taking shape.

The three-hour boat journey from Goma across Lake Kivu to reach the town of Bukavu gave me the opportunity to reflect on what this milestone of doctoral training in the DRC means for our unique African organisation.

My reflections on RUFORUM's journey began with writing my memoir, *Unfinished Journey*, in 2019. Now at the end of my tenure, I have joined in dialogues with friends and colleagues across the RUFORUM family to reflect and gather diverse perspectives on the past, present, and future of our network. At the RUFORUM Triennial meeting held in Cotonou, Benin in December 2021, we gathered to explore some of the key ideas and values that have shaped our journey, as well as the challenges and opportunities that lie ahead. This book is a result of those reflections and perspectives

The Democratic Republic of Congo's (DRC) new doctoral training programme harnesses the rich intelligence of relationships, capacities and processes that RUFORUM has built over time through its unique approach – as healthy, living soil that provides a rich environment for new seeds to grow.

RUFORUM, serving as a facilitator of the regional dialogues to inform the 2021 United Nations Food Systems Summit (UNFSS) agenda, gathered important insights about the human capacity needs and potential of the DRC. As the Congolese universities worked together to shape their new offering, those insights were available to inform the programme's design. Thus, we were able to draw upon and utilise our broader network's knowledge of the context, needs and capacities in the DRC – as well as on the full breadth of RUFORUM's experience with capacity building in many other fragile and post-conflict societies.

¹ *Regional Universities Forum for Capacity Building in Agriculture*

We harnessed the intelligence of our network to contribute towards new generations of Congolese and other African scientists gaining the quality education and relevant skills they need to become change agents for their societies.

In the Congo, I was gratified to meet young postdoctoral graduates who had trained elsewhere through our network. Now they were back on Congolese soil, ready and committed to helping build the country's future.

As I have been reflecting lately, life is always an unfinished journey. My Aunty Ada Adongo, who is more than 100 years old, reminds me: *'In your lifetime you run your mile, but you do not finish; you hand over the baton to others to continue the race.'*

It gives me a sense of hope and optimism knowing that there are thousands of RUFORUM graduates picking up the baton, in the Congo and across the continent, working to create a brighter future. The road ahead will be difficult. Africa is poised to become the world's new food basket, but needs the skills, knowledge, and capacities to protect its own resources and ensure that growth is inclusive and sustainable. Time is of the essence. Millions of young people enter the job market each year. Most of them are underprepared and lack prospects. Society is still holding back young women, in particular, from reaching their potential. And yet, the continent – and the world – needs every hand on deck, prepared to face the challenges ahead. Africa desperately needs inclusive growth, and the agricultural sector has the potential to provide it. Just as desperately, we need transformation of our economic models to ensure that no one is left behind. We equally need to avoid ecological collapse and climate catastrophe.

The scene in the DRC illustrates what is at stake – rich in forests, land and minerals, the Congo is one of the few countries left with the potential to feed the world. However, its natural wealth has been systematically looted, while its traumatised people remain among the poorest in the world. This happened, in part, because the country lacked the human capital to harness its natural resources productively, for the benefit of its population.

Considering RUFORUM's future, I am reminded of a message I heard recently in a TED Talk from the Costa Rican climate leader and diplomat, Christiana Figueres². She is known for leading the global negotiations to bring about the United Nations' historic Paris Agreement on climate change in December 2015, to maximise the chances of avoiding catastrophic levels of global warming.

Figueres coined the term 'stubborn optimism' to describe the attitude and energy that is needed to confront deeply challenging situations and bring about desired changes. She describes stubborn optimism as 'the mindset that is necessary to transform the reality we are given into the reality we want'. As she explains, optimism is the 'necessary input'. She says:

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'Optimism means envisioning our desired future and actively pulling it closer. Optimism opens the field of possibility. It drives your desire to contribute. It makes you actively jump out of bed in the morning, because you feel challenged and hopeful at the same time.'

But optimism alone is not enough. Stubbornness is also required. This is the mental toughness: the 'gritty, determined, relentless' part of staying on a committed path and not giving up, even when it is hard to keep going.

² Christiana Figueres. The case for stubborn optimism on climate change. https://www.ted.com/talks/christiana_figueres_the_case_for_stubborn_optimism_on_climate?language=en

When I look at RUFORUM's journey, I see the qualities of stubborn optimism in our network's past. I think the qualities of stubborn optimism must be embedded in RUFORUM's DNA – these are the qualities needed now, more than ever, to drive our network forward as we face a challenging and uncertain future.

To launch this new PhD programme is to plant new seeds of hope, for Congo and beyond. It reminds me that early in RUFORUM's history, one of our first moves as an independent organisation was to launch regional PhD programmes. Doctoral training in Africa was unheard of at the time, and many people tried to discourage us from attempting it. But fast-forward to today, and it has been implemented so widely and successfully across our network that one easily forgets how impossible it seemed a mere 18 years ago.

Reading the pages ahead, I hope you will be inspired to achieve even greater dreams, and to run your absolute best mile as we all continue our journeys towards building the Africa We Want.

Prof. Adipala Ekwamu

Abbreviations

ACE	African Centres of Excellence
ACP	Africa-Caribbean-Pacific
AHESTI	Agenda for Agricultural Higher Education, Science, Technology and Innovation
ANAFE	African Network for Agriculture, Agroforestry & Natural Resources Education
ARC	Agricultural Research Corporation (of Sudan)
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AUC	African Union Commission
BMGF	Bill and Melinda Gates Foundation
C10	Committee of Ten Heads of State and Government
CAADP	Comprehensive Africa Agricultural Development Programme
CARP	Community Action Research Project
CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
CGIAR	Consultative Group on International Agricultural Research
CORAF	West and Central African Council for Agricultural Research and Development
CTA	Technical Centre for Agricultural and Rural Cooperation
DfID	Department for International Development
DRC	Democratic Republic of Congo
EU	European Union
FAAP	Framework for African Agricultural Productivity
FARA	Forum for Agricultural Research in Africa
FAO	Food and Agriculture Organization
GRG	Graduate research grant
GTA	Graduate Training Assistance
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDRC	International Development Research Centre
IDP	Internally Displaced People
ILRI	International Livestock Research Institute
ISABU	Institute of Agricultural Science of Burundi
IUCN	International Union for the Conservation of Nature
LUANAR	Lilongwe University of Agriculture and Natural Resources
MaCCRI	Makerere University Regional Centre for Crop Improvement
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MOOC	Massive Open Online Course
NaCRRRI	National Crops Resources Research Institute - Uganda
NARS	National Agricultural Research System
NARI	National Agricultural Research Institute
NARO	National Agricultural Research Organisation
NEPAD	New Partnership for Africa's Development
PI	Principal Investigator
P'KWI	Popular Knowledge Women's Initiative
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SCARDA	Strengthening Capacity for Agricultural Research and Development
SDGs	Sustainable Development Goals
STISA	Science Technology and Innovation Strategy for Africa

TAGDev	Transforming African Agricultural Universities to meaningfully contribute to Africa's growth and development
UCB	Catholic University of Bukavu
UCG	Catholic University of Graben
UEA	Evangelical University in Africa
UN	United Nations
UNFSS	United Nations Food Systems Summit
UOB	Official University of Bukavu
UPDF	Uganda Peoples Defence Forces
USAID	United States Agency for International Development

Introduction: a journey towards inclusion



*Walk alone and you will go fast.
Walk together and you will go far.*
– African proverb

RUFORUM is a network of African universities focused on human capacity building and institutional strengthening in agriculture and food systems. It is a large network that grew from a small seed – and it has travelled further than anyone could have foreseen.

In the decade before RUFORUM was officially formed in 2004, a handful of committed scientists had been walking a new road together. They were striving to find new ways of training and mentoring postgraduate students, engaging in collaborative research with communities, and sharing their ideas and experiences with one another – all within the resource-constrained contexts of their universities. They needed a spark to kindle the fire they had ignited, and help it grow.

The RUFORUM story is a story of universities struggling to adapt and become fit to serve the needs of their changing societies. From this essential mission, a formidable pan-African organisation has grown. Today, RUFORUM's footprint extends to 40 African countries. It has become a singular voice for the contributions of African universities towards sustainable development. The network regularly convenes Heads of State, government ministers, university leaders and United Nations' agencies in global dialogues. Such convenings engage students directly in discussions with Heads of State in Zoom seminars to inform the shape of future food systems policies. As former RUFORUM Board Chair, Prof. George Kanyama-Phiri reflects:



George Kanyama-Phiri

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'RUFORUM members do not forget where they have come from or where they are going. Some like me have been there from the beginning. This long history and all the relationships have given me the momentum to move forward. That spirit of camaraderie has made all the difference.'

Few could have imagined the myriad ways in which RUFORUM has evolved and grown. The network gathers diverse people with diverse knowledge from across the continent and the world together to collaborate on cutting-edge, interdisciplinary research in food systems. It collaborates with rural communities in the co-production of knowledge that is in sync with policy agendas. It innovates and scales out novel approaches to student learning, and grooms young researchers to be innovators, changemakers and builders of society.

Globally recognised as a thought leader, RUFORUM's models of regional postgraduate training and research have created pockets of strength which attracted World Bank investment and helped spark the flagship centres of excellence initiative. From its tiny Secretariat, located on Makerere University campus in Uganda, the network mobilises hundreds of partnerships, involving hundreds of millions of dollars, to lift the capabilities of African institutions through collaborative, multidisciplinary research. These efforts engage universities directly in the key issues of our time: sustainable livelihoods, inclusive development, food and nutrition security, climate change adaptation, science, technology and innovation, and the Fourth Industrial Revolution.

Dr Mary Shawa, the former Principal Secretary of the Ministry of Nutrition and HIV/AIDS in Malawi, who chairs RUFORUM's Finance and Administration Committee, observes: *'We have sown a seed which has grown into a very big baobab tree, with a lot of branches, leaves, and roots.'*



Mary Shawa

How did this happen? And more importantly, why does it matter?

This book is a companion volume to *Unfinished Journey*, the memoir published by RUFORUM's Executive Secretary, Professor Adipala Ekwamu. While that book shared the perspective of a pivotal leader in the organisation, there remains another story to be told from the diverse perspectives of the wider network. That story is told in this book.

As will be explored in these pages, the RUFORUM journey has been a collective journey of struggle, adaptation, and evolution. It has unfolded across different countries, regions, institutions, and individual lives. Fittingly, this volume weaves together the many different voices of students, researchers, university leaders and many others who have been part of the journey.

Above all, the RUFORUM journey has been a journey towards inclusivity. The network's efforts have enabled universities to dismantle their ivory towers and open themselves to communities. University voices have been brought into wider policy and development processes. Young women have been supported to overcome societal barriers and become top scientists. RUFORUM has partnered university researchers with local agricultural training colleges (TVETs) to bring new practical and entrepreneurial strengths to the sector. All these efforts have focused on bringing people together and harnessing the brainpower



and capacities of the universities for inclusive and sustainable development.

Today, RUFORUM's diverse family includes more than 157 member institutions spread across all the regions of Africa. In meetings, one is just as likely to hear Swahili, French, Arabic or Portuguese as English being spoken in the corridors.

The Triennial gathering held in December 2021 in Cotonou, Benin, reflected the vibrancy, energy and spirit of togetherness that continues to define RUFORUM today. It was a momentous occasion, full of joy and emotion as colleagues who had not had the opportunity to meet in person were reunited. It was the first complete, in-person gathering of the RUFORUM family since the disruptions brought on

by the COVID-19 pandemic two years before. It was also a challenging moment. The conference took place just when the new Omicron variant of the COVID-19 virus had been detected – and it took all the organisation's resources of dedication, courage, and agility to respond to the moment and ensure its success. Addressing the plenary in Benin, former Mauritian President Dr Ameenah Gurib-Fakim said:

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'We meet at a consequential time in Africa's evolution. Across the spectrum of societal leadership – public, business, academia, civil society – we need to recognise the crucial importance of science, technology and innovation and commit ourselves to excellence in science and technology for sustainable development. We are literally in a race against time.'

In Benin, many attendees were asked to share what RUFORUM meant to them. Each of their answers pointed, in diverse ways, to core RUFORUM aspirations and values. Foremost among these is the belief in education as the golden key to unlock development and enable Africa to feed itself and the world. Likewise, the belief in the power of a network to serve as a fulcrum for development, leveraging the intelligence of a continent to generate wealth in society, build resilience for the future and leave no one behind. As Kay Muir-Leresche the first Chair of the RUFORUM Technical Committee observes:



Dr Ameenah Gurib-Fakim



Umezuruike Linus Opara

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'I really believe that RUFORUM is still committed to its earliest principles. All of its projects reinforce the principles of integrating universities into society and making their students much more relevant, focusing on smallholder farmers and promoting sustainability and inclusivity. Their work has taken different forms and gone through the fashion changes over the years, but the principles at the heart of it are no different from what they were at the beginning.'

Yet as Distinguished Professor Umezuruike Linus Opara, Stellenbosch University's South African Research Chair of post-harvest technology, noted, there is still work to be done to meet the challenges ahead:

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'RUFORUM has demonstrated investments in human capacity development, in training our young people into research, building new platforms for knowledge extension both old and young on different parts of the continent, assisting our governments to formulate policies. Having said all of that – I think now is the time for us to take stock and start asking ourselves the hard questions: how have we fared with our own commitments? I would call this a time of action.'

Walking new paths

RUFORUM's journey has emerged incrementally, step by step. Importantly, as a self-created organisation, owned collectively by its member universities, RUFORUM has enjoyed great latitude to innovate, experiment and chart its own path forward in a tough and resource-constrained environment.

Along the way, it has attracted diverse partners with its unique value proposition. Its independence has also posed deep challenges, and at times it has been extremely difficult to chart a pathway forward.

*Traveller, there is no road. You make
the path as you walk.'*
– Antonio Machado (Spanish poet)

One of the larger forces shaping RUFORUM's unfolding path has been an ongoing debate about the role of universities in society. This debate has resonance for agriculture – which has long been the backbone of African society and remains so today. While most other parts of the world industrialised and transitioned to more diversified economies, Africa remains solidly agrarian. More than 60 per cent of Sub-Saharan Africa's population still depends on the sector for its livelihood.

In the past, most African universities were far removed from the concerns of ordinary small-scale farmers. This was partly by design. Many of Africa's earliest universities were colonial creations, intended to train a tiny elite of civil servants to fill bureaucratic roles in government. Colonialism 'played a great role in shaping the educational philosophy, organisation and structure of African universities'³. To the extent that these elite, traditional institutions engaged with communities at all, it was in the mode of 'delivering their expertise' from on high, as opposed to listening and collaborating with farmers in their fields.

Since African nations gained independence, beginning with Ghana in 1957, many questions have shaped the contours of higher education: what is the purpose of a university? What is the value proposition? How does the university support society, and how does society support the university? Are universities a private or a public good? Who has access to them? Who benefits from them, and how worthwhile is it to invest in them?

³ Alemu (2014); Mackatiani et. al. (2016), in Mutuku, et al. Transformative outreach in tertiary agricultural education in Africa, in *Transforming Tertiary Agricultural Education in Africa* (Kraybill, Lynam and Adipala, eds.) 2021. p. 157.

In the early days of independence, African universities were the pride of their nations. As political and economic turmoil gripped many countries on the continent during the 1970s and into the 1990s, however, the universities suffered increasing isolation and stagnation.

A neoliberal world order impelled by ideologies of economic growth and market competition, spelled further disaster. The World Bank, with its lending influence, prescribed 'structural adjustment', aimed to maximise economic growth, and contain spending. The prevailing thinking of the time saw universities as more of a private than a public good, and thus directed cash-strapped governments to invest in primary education at the expense of higher learning⁴.

In these times of scarcity, universities' delivery of their traditional mandates of training, research and outreach to society steadily weakened. In theory, universities were recognised as having an important developmental role to play, but their capacities to perform that role were hollowed out over decades of underfunding and neglect. Lacking the resources to engage directly with communities, or even to do research, the universities grew more deeply entrenched in ivory tower mode, while their graduates increasingly lacked real world skills and relevance.

Today African universities are still living with the consequences of structural adjustment, as they continue to be shaped by forces of globalisation and privatisation. Yet, persuasive and mounting evidence from around the world indicates the essential role in development that universities can play, provided they are supported with conducive policies and investments.

South Korea, for example, is now reaping the benefits of decades of investment in higher education. At independence in the 1960s, Brazil, Ghana and South Korea were all on roughly equal developmental footing⁵. Starting from an exceptionally low base, with just one national university at the time, the South Korean government radically expanded access to higher education, and later focused on improving its quality and its linkages with industry. These investments produced a highly skilled workforce which propelled South Korea to become one of the world's most technologically advanced societies, and the world's 12th largest economy⁶.

In one aspect, RUFORUM's journey so far has been about making the case for African tertiary education as a public good. Through piloting dozens of groundbreaking programmes and interventions, the network has

⁴ <https://www.scidev.net/global/features/higher-education-africa-who-pays/>

⁵ Clay. (2016) in Literature Study on the Korean Model and Contribution of Universities to National Economic Development. (2021). RUFORUM.

⁶ Literature Study on the Korean Model and Contribution of Universities to National Economic Development (2021). RUFORUM.



facilitated the creation of many 'islands of success' across the continent. It has also focused on embedding and scaling these new models. Such interventions have served as powerful levers for transformation on a small scale, but without broader support and collaboration, they are insufficient. The universities' full potential remains untapped.

A sea change is now needed. Contemporary African universities are confronting a powerful set of challenges and imperatives: They must demonstrate their relevance to society and bolster their capacities to train young people in essential skills; they must strengthen their own capacities for innovation and thought leadership; and they must harness the power of networking to deepen their impact and effectiveness in a globalised world. Seeds have been sown – but Africa has yet to harness the true power of its tertiary education sector, to make the most of a narrow window of opportunity to develop economically and avert social and environmental catastrophe.

Gender, youth, climate, and planetary boundaries

The universities have a pivotal role to play in every urgent issue facing Africa and the world. The face of the continent is changing profoundly due to intense population pressures and dramatic climate-related upheavals. The stakes could not be higher.

'Gender equality is more than a goal in itself, it is a precondition for meeting the challenge of reducing poverty, promoting sustainable development and building good governance.' – Kofi Annan, former United Nations Secretary-General

Sub-Saharan Africa has the world's youngest and fastest-growing population, and the world's highest rate of exclusion from education. Nearly 60 per cent of young people aged 15 to 17 do not attend school⁷. Yet it is still the case that after wide adoption of compulsory primary and secondary schooling across the continent, increasing numbers of learners have been seeking tertiary education. Liberalisation in the education sector has also introduced wider uptake of primary and secondary education, further increasing the numbers of young people in the pipeline for higher education. Meanwhile, under-development in agriculture limits the sector's potential to provide employment for young people. These factors highlight the urgent need for reskilling and upskilling young people so they can meet the emerging demands of local and global economies.

The African population has grown five-fold since Ghana's independence. It is set to nearly double to two billion people by 2050, when it is expected that two out of every five children born will be African⁸. Already, the capacities of education systems, from primary schools to universities, are stretched to breaking point. Seventy-five per cent of the workforce is in vulnerable employment, while as many as 90 per cent of young people lack basic secondary-level skills, aside from the skills they require to create the necessary jobs and industries to propel Africa forward⁹.

Currently, most of Africa's jobs are in the informal sector, and many people end up farming by default rather than by choice. Yet agricultural growth, assisted by knowledge and technologies from the universities, has unmatched potential to lift people out of poverty. The agrifood sector, if transformed through applications of appropriate knowledge, could fuel job creation and inclusive growth. A stable one per cent increase in agricultural yields could end poverty for two million people¹⁰.

⁷ <http://uis.unesco.org/en/topic/education-africa>

⁸ <https://www.weforum.org/agenda/2020/01/the-children-s-continent/>

⁹ Mastercard Foundation, <https://mastercardfdn.org/research/secondary-education-in-africa/>; GIZ Akzente. (August 2021). 'Learning for the Future'. <https://akzente.giz.de/en/artikel/essay-education>

¹⁰ Patrick Okori, (May 2021), addressing the Vice Chancellors online dialogue in preparation for the UN Food Systems Summit

Africa's young and energetic population, if supported with quality education and job prospects, will be positioned to leverage agrifood system opportunities to overcome challenges and power the continent to a vibrant future. As Reeta Roy, the President and CEO of the Mastercard Foundation, a key RUFORUM supporter observes, universities have a key role to play in unlocking both food systems innovation, and the untapped potential of young people:

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*'We can harness the ingenuity, the energy, the resourcefulness of young people and create a much more equitable and inclusive society. RUFORUM has been at the forefront of the charge to help transform African economies.'*¹¹

With schools and universities already bursting at the seams and demand for education that will only grow, rapid innovation is essential for harnessing the population tidal wave productively. The university sector has already grown exponentially to meet burgeoning demand – however, expansion amidst resource scarcity has strained and often eroded the quality of instruction.

What is needed now, as different voices will highlight in the following pages, is a new vision for African higher education – bolstered by the power of a network.

The food system itself is reeling from world events which have unleashed shock upon shock – the COVID-19 pandemic, climate chaos, financial speculation, and war. The United Nations Secretary General Antonio Guterres warns of 'the spectre of a global food shortage' that could define our foreseeable future.¹² All this comes as the food system itself is changing rapidly on the back of urbanisation and population growth. Partly due to weak capacities in its own food production systems, Africa depends increasingly on food imports – spending \$43 billion in 2019 – A mere 20 per cent of which is represented by intra-African trade.¹³ As of mid-2022, the COVID-19 pandemic had exposed stark vulnerabilities and deep weaknesses in societies across the continent, while global instabilities, including crippling droughts, flooding and heat waves damaging harvests in China, India and elsewhere, along with war in Ukraine, had set food prices spiralling. Even as schools reopen after closing their doors during the pandemic, many young people have not returned. Worsening poverty has forced thousands of girls into early marriages, foreclosing on their prospects for a self-determined future. Dr Mary Shawa highlights the network's leadership in harnessing education to unlock women's potential to drive development:

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'In the normal education system, girls who become pregnant drop out. In the RUFORUM system, if you are pregnant, you are nurtured. We have gone to great effort to support mothers to continue with their studies, and to prepare accommodation for students with young families. We know these are major issues that frequently prevent women from continuing with their studies.'

As former Liberian president Ellen Johnson Sirleaf wrote: *'investing in girls' education is not only a moral imperative, it is a smart investment.'*¹⁴ Without it, Africa simply cannot harness the energies of its growing young population productively. As the Ugandan climate activist Vanessa Nakate has noted in *Time* magazine,

¹¹ Remarks delivered at the RUFORUM biennial meeting in Cape Town, South Africa, 2016

¹² <https://www.economist.com/leaders/2022/05/19/the-coming-food-catastrophe>

¹³ <https://www.brookings.edu/blog/africa-in-focus/2020/12/14/unpacking-the-misconceptions-about-africas-food-imports/#:~:text=The%20proportion%20of%20African%20countries%E2%80%99%20food%20imports%20originating,third%20of%20this%20intra-African%20food%20trade%20%28Figure%201%29.>

¹⁴ <https://reliefweb.int/report/world/girls-education-and-womens-equality-how-get-more-out-worlds-most-promising-investment>

educated girls grow up to be empowered women who shape their societies for the better. *They are not forced into early marriage, and they tend to have smaller, healthier families, reducing emissions well into the future,*' she writes.¹⁵

Building the Africa We Want

RUFORUM's efforts over the years have been guided and shaped by the African Union's Agenda 2063, which focuses on the vision of building the 'Africa We Want'. This strategic framework, developed collaboratively by African governments, outlines a vision for dynamic and inclusive development on the continent in which both the universities and the agricultural sector play an essential part.

In something of a conundrum, RUFORUM and its member universities sit at the apex of the educational pyramid. While the network cannot directly address the broader numbers challenge, its role as a thought leader, innovator and catalyst is essential. In response to the scope of the challenges it contends with, RUFORUM has also needed to transform itself to focus more on reaching underprivileged young people and developing entrepreneurship in the universities. The importance of this developmental role will only increase, as noted by Kraybill et al:

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*'As African economies become incrementally more knowledge-based, lifelong learning is the new reality, and societies are assuming many characteristics of a learning organisation, which requires universities to engage directly with them.'*¹⁶

Equally pressing are the challenges of feeding Africa's growing population within planetary boundaries. The International Panel on Climate Change report released in February 2022 highlighted a rapidly narrowing window of opportunity to respond to climate change and create a liveable future. African farmers have been struggling for more than a decade with increasing floods, droughts, crop pest and disease outbreaks and unstable weather patterns brought about by climate change.

The Stockholm Resilience Centre's planetary boundaries research identifies nine key planetary systems thresholds that maintain planetary stability, providing a 'safe operating space' for humanity. Using the planetary boundaries concept, researchers have synthesised earth systems science to determine the impact of human activities on the biosphere. According to updated research released in 2022, six of the nine planetary boundaries have now been transgressed: climate change, biosphere integrity, biogeochemical cycles, land system change, novel entities (including human-made chemicals such as inorganic fertilisers and plastics) and freshwater change¹⁷. Agriculture is both heavily implicated in and affected by these boundaries, highlighting the intense challenges of feeding the world's growing population within environmental limits.

Nowhere on Earth will this challenge be more formidable than in Africa. The World Bank forecasts that the effects of climate change will raise food insecurity in Africa to the extent that by 2080, half the world's undernourished people will be concentrated there.¹⁸

¹⁵ <https://time.com/5953417/vanessa-nakate-educate-girls-climate/>

¹⁶ Mutuku, et al. Transformative outreach in tertiary agricultural education in Africa, in *Transforming Tertiary Agricultural Education in Africa* (Kraybill, Lynam and Adipala, eds.), 2021, p. 159

¹⁷ <https://www.pik-potsdam.de/en/news/latest-news/planetary-boundaries-update-freshwater-boundary-exceeds-safe-limits>

¹⁸ <https://www.cimmyt.org/news/farmers-at-center-of-sustainable-agriculture-in-kenya/>

The power of a network such as RUFORUM will be a key resource for dealing with such deep, complex, and interconnected planetary challenges. The universities' roles as seed beds of innovation need to be harnessed. Yet it is no longer enough that universities deliver effectively at the local and national scale. Such societal and planetary challenges require integrated thinking and relationship building across the network scale. As shall be revealed, RUFORUM has developed models of cooperation and harnessing of limited resources for wider impact. As key challenges only become more complex in the future this approach offers an effective way to work together and chart new pathways.

Why is it important to tell the story?

Stories play a powerful role in shaping systems. The purpose of this book is to make RUFORUM's journey visible, drawing on perspectives from different people who have been part of the journey. The goal is to create a narrative that reflects the rich diversity of perspectives and weaves them into a coherent story. The aim is to provide a tool to help deepen and widen understanding of where RUFORUM has come from, where it is headed in the future, and the potential impacts the network can have on the development challenges facing Africa.

As the writer Ben Okri has remarked, stories are a fundamental technology that humans use to make sense of the world. While we use science to understand how the world works and develop innovations to change the world (for the better, we hope), we use stories to make meaning from the data revealed by doing science. Thus, storytelling and science go hand and hand. Okri observes:

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*'We are always asking data to tell us something, to reveal something. What we ask for data to reveal to us is a story, some kind of narrative to give shape or form to some kind of question or enigma.'*¹⁹

Stories are also essential for understanding complex systems. As narrative specialist Ella Saltmarshe writes: *'Stories make, prop up and bring down systems. Stories shape how we understand the world, our place in it, and our ability to change it.'*²⁰

Looking at RUFORUM now, it is easy to forget how much the network and the world have changed in the past 20 years. RUFORUM has both contributed to and benefitted from wider changes in higher education and in society, such as stronger postgraduate training initiatives and greater equality for women. If today it appears no great feat that African universities are churning out PhD graduates, and women are taking up roles as Vice-Chancellors and leading scientists, that is only because concerted efforts were made, across the network and in other institutions and in society, to make these visions a reality. Through making such processes of change visible by telling the stories, we glimpse how RUFORUM both contributed to and was affected by these changes.

Stories are also essential for learning. There is always the temptation to tell the story as a pristine fairy tale, with perfect characters who live happily ever after. But that is never the reality. Life is inherently messy, and so are complex organisations. We learn far more from studying the mess and being curious about it than we do from pretending it is not there.

¹⁹ From remarks delivered at STRATA 2014 <https://benokri.co.uk/events/ben-okri-storytelling-science-strata-europe-2014/>

²⁰ Saltmarshe, E. (2018). Using Story to Change Systems. *Stanford Social Innovation Review*. https://ssir.org/articles/entry/using_story_to_change_systems

This book highlights the diverse voices of the RUFORUM network. It integrates their distinct perspectives into a holistic story that reflects on the past, present, and future of the network's engagements and impacts across the diverse and ever-changing landscapes of African higher education. Drawing upon RUFORUM's rich history and legacy, the book demonstrates how the network has both contributed to and been influenced by the trajectories of higher education, research, research for development, agriculture and food security, capacity building and policy.

This story is told in four parts:

Part I: Seeds (1993–2007)

This part chronicles the network's birth and transition to become an independent, university-owned collaborative. It documents the journey towards finding unique expression as an African-led institution, within the daunting challenges and constraints across the higher education landscape. It focuses on the early evolution and processes of developing a unique vision, value proposition and strategy, and building the organisational structures and relationships to enable RUFORUM to become the influential network that it is today.

Part II: Roots and Shoots (2007–2015)

This part focuses on the growth processes as the network expanded from the ten initial member universities and began building relationships with new institutions in South Africa, West Africa, and Sudan. Key to RUFORUM's evolution was the introduction of PhD level training in African universities, and the network's approach to developing regional pockets of specialisation. During this period, RUFORUM succeeded in establishing itself as an effective and impactful network offering a groundbreaking vision of community-engaged multi- and interdisciplinary research and capacity building for African universities.

Part III: The Mycelial Network (2015–present)

This part documents RUFORUM's growth as a pan-African organisation and voice for higher education and agriculture on the continent. We describe how RUFORUM has concentrated its policymaking efforts, strengthened its partnership and convening power, and continued to build on its legacy of innovation, developing a powerful and transformative new vision for universities to catalyse innovation, entrepreneurship, multi-sector collaboration and agro-industrialisation to drive sustainable and inclusive growth.

Part IV: Epilogue: a letter to the future

This part contains Prof. Adipala Ekwamu's special message to the future. What seeds has RUFORUM planted, and how have they come to fruition? How must the network reposition itself to move forward with Africa and contribute further to the increasingly complex challenges of the continent and the world? How does the network continue its journey toward a more inclusive Society?

PART I: Seeds (1993–2007)



'A seed neither fears light nor darkness, but uses both to grow.'
– Matshona Dhliwayo

The seeds of RUFORUM were planted at a crucial moment for both agriculture and higher education in Africa. It was the late 1980s, a time when neither African universities nor agriculture were considered a priority, by governments or within the prevailing global development discourses. Many African universities and research institutions were languishing in isolation, hollowed out by political and economic strife in their societies, as well as structural adjustment policies.

Long gone was the post-independence honeymoon, during which flagship African institutions such as Makerere University in Uganda were seen as prized bastions of development for the nation. Instead, governments had followed the 'structural adjustment' doctrine of the World Bank and IMF and neglected higher education. Universities had entered a period of steep decline from which it would take decades to emerge.

A vision for change

It was into this difficult environment that Prof. Agnes Mwang'ombe, a plant pathologist with a fresh doctorate in hand from the University of London in the United Kingdom, returned in the 1980s to a teaching position at the University of Nairobi in Kenya. While abroad, Agnes had made the most of her university's vibrant research culture and infrastructure – from the networks through which one found grants, to the well-stocked laboratories. Returning to Nairobi, she was eager to continue building her scientific career, while contributing her much-needed skills and expertise towards strengthening food security and crop disease management in her country. However, the situation she returned to was deeply frustrating. While she had gained new skills and a new perspective in London, at home nothing had changed.

Her country desperately needed her skills. But she was quickly overwhelmed by the heavy teaching load and disheartened by the sparsely equipped libraries and laboratories. It was a struggle just to make ends meet and achieve the basics, let alone raise research funds, she recalls.

She was not alone. Other young, ambitious scientists were also returning from acquiring foreign PhDs to institutions in Kenya, Malawi, Uganda, and Zimbabwe. They were finding that they could not implement their training, because their institutions were weak from perennial under-investment. As Prof. Adipala Ekwamu wrote in his autobiography, experiencing the stark contrasts between the environments of Makerere University and Ohio State University, where he obtained his PhD, was what prompted him to mount a determined struggle for changes to his home institution in Uganda:

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*'My life in the USA provided me with an important new perspective. Perhaps part of my life's journey would be to change the way certain things were done back home at Makerere. At Ohio State University, I was part of a vibrant academic culture that pushed people to publish and perform, nurturing younger researchers in the process. I found myself taking part in this life – attending the convenings of vibrant professional academic networks and societies, meeting people and being exposed to their ideas and ways of thinking – which in turn enriched my own.'*²¹

And:

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*'Returning to Makerere brought many challenges too. Gone were the abundant resources, the focused sense of purpose and the productive academic culture that had supported me during my time at Ohio State University. Ironically, while I was training abroad, I had only thought of coming home; but now I was home, it was difficult to figure out exactly how and where to dig in and work towards building the country that I loved so much.'*²²

Reflecting further on his experience in the USA, he recently added:

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'My time in the US set a very strong seed in me. I saw faculty concerned with building science leaders. I saw people who didn't want to keep their students for ages, but wanted their students to finish on time and move on. That brought me to reflect on what was happening in my home university in Makerere. Things were to the contrary. Our postgraduate training, in particular, was not well set to provide quality and motivation.'

Adipala was fortunate to find like-minded colleagues at Makerere who shared his passion for reform at the university. Together with Dr Maurice Ogenga Latigo and Dr Mateete Bekunda, he created new initiatives inspired by his time in the USA: the African Crop Science Society and its related publication, the *African Crop Science Journal*, were intended to gather senior scientists and students alike around a common platform to enrich their discipline and publish their work.

²¹ *Unfinished Journey*, p. 84

²² *Unfinished Journey*, p. 87

The three colleagues also undertook to introduce a more collegial and quality-oriented approach to master's level training in the Faculty of Agriculture, where all too often unmotivated supervisors let their students languish for years before graduating.

While these efforts were underway at Makerere, other scientists in nearby countries were busy with their own overtures towards quality teaching and research. These initiatives laid the foundations for stronger academic cultures to develop – foundations that continue to be built upon in the present day.

The missing link

In 1980, Malcolm Blackie, a professor of agricultural economics and development, joined the University of Zimbabwe to set up a new Faculty of Agriculture. At the time, a newly independent Zimbabwe was served by a strong government agricultural research system; however, it was geared entirely towards the large-scale commercial sector. The majority population of smallholder farmers were ignored, and the universities sidelined. Government officials were unenthusiastic about having students on their agricultural research stations. *'Their message was, "You guys can do the academic stuff, we do the real stuff,"'* Malcolm recalls.

Developing the new faculty, Blackie grew convinced that postgraduate training was key to breaking out of the ivory tower and building a programme of quality and relevance. His vision was to get students out into the field and working with communities, engaging in hands-on research that would not only build wider relationships amongst academics, farmers, and the local government, but would nurture a vibrant publishing culture in the faculty. He wrote:

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*'Teaching programmes need to be supported and enhanced by the research in which senior academics are involved. Graduate students bring new ideas, and revised theories into the comfortable world of academic life.'*²³

Malcolm had the good fortune of being mentored by one of the foremost experts on agricultural development in Africa, Prof. Carl Eicher. In the year that Malcolm joined the agricultural faculty, it had welcomed a mere six new students, even though entry standards were low. Within three years, quality improved and even with higher admissions standards the faculty welcomed in 100 new undergraduates, demonstrating the demand for university training in agriculture. Getting support for postgraduate training was tough in those days, but slowly it began to trickle in from the International Development Research Centre (IDRC), the Ford Foundation and a few other funders. Within a short space of time, Malcolm could see a marked improvement in quality in the new faculty.

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'The support meant that within about another four years, we actually had a nice little graduate school going. The whole atmosphere of the faculty had changed,' he recalls. *'The conventional wisdom back then was that you send postgraduate students overseas to get their degrees. What typically happened was they came back to an empty laboratory. It was very difficult for them to actually use their training.'*

²³ Blackie, M. & Muir-Leresche, K. (2012). Establishing innovative Higher Education programmes in support of agricultural rural transformation in Africa: the case of FORUM and RUFORUM. <https://www.ruforum.org/sites/default/files/Malcolm%20Blackie%20&%20Kay%20Muir-Leresche.pdf>

In 1987, Malcolm was recruited by the Rockefeller Foundation to help establish a new programme of agricultural support for southern Africa. The Foundation had been a key driver of the Green Revolution which was sweeping across parts of Asia and Latin America, introducing new high-yield hybrid varieties of maize and wheat to bolster food security in those regions. The Foundation anticipated a looming food crisis in Africa and understood that the challenges of training scientists and building strong institutions were key to food security. Furthermore, it was recognised that the capacities of people and institutions needed to be developed hand-in-hand, the one both depending upon and supporting the other.²⁴ Universities and research institutions alike had been hollowed out by underinvestment and structural adjustment. Public expenditure in the agricultural sector in African countries was on average about half that of spending on other continents, including much of Asia, where the Green Revolution was flourishing.²⁵ Africa was rapidly losing a generation of scientists to brain drain, particularly as African PhD holders tended to stay abroad in greener pastures after obtaining their doctorates.

FORUM gains traction

Bolstered by his experience at the University of Zimbabwe, Malcolm proposed that the Foundation focus its efforts on master's-level training, as a leverage point for building both the next generation of scientists, and the research capacities of universities – and connecting those research efforts to real needs in communities through participatory research with farmers.

In a meeting, Malcolm met Dr Joyce L. Moock, an Associate Vice-President at the Foundation, who similarly saw master's level training as 'one of the key movers in agricultural development'²⁶. Such a focus would not transform the universities in and of itself, but as Malcolm's experience had shown, in terms of value for money it was a strong lever to boost the quality and relevance of agricultural training. Upgrading the universities was beyond the Foundation's means, but developing quality master's programmes was a realistic objective.²⁷

Joyce Moock commissioned Malcolm Blackie and Dr John Lynam, who headed the Rockefeller Foundation's food security division in Kenya, to review the agricultural programmes of nine universities in five countries of southern and eastern Africa where the foundation worked. The review found that almost all departments and faculties lacked the facilities to attract quality students.²⁸ Fieldwork was limited, and research was often disconnected from farmers' realities. As Malcolm wrote:

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*'The constraints were exactly those that I had faced at the University of Zimbabwe. Funds for graduate students were difficult to find, and professors were doing the best with the limited resources they had. I had been lucky in Zimbabwe that there was the "honeymoon" of independence. As the caravan of development agencies moved on to new priorities, the agriculture faculties in the older independent African States lost favour. The training of African staff had been done. And faculties were being swamped by undergraduates as governments promised widespread access to university education without expanding facilities.'*²⁹

²⁴ *Unfinished Journey*, p. 90

²⁵ Waswa, M., Okori, P., Mweetwa, A., Adipala, E. (2020). Genesis, Evolution and Strategic Thrusts of RUFORUM. *African Journal of Rural Development* 5(1): 39-62.

²⁶ Blackie, M. & Muir-Leresche, K., 2012

²⁷ *Dirty Hands, Fine Minds*, p. 7

²⁸ Blackie, M. & Muir-Leresche, K., 2012

²⁹ Blackie, M. & Muir-Leresche, K., 2012

In short, the findings of the review made a compelling case for investing in postgraduate training opportunities to build human capital in agricultural systems. But first the groundwork had to be laid. As a first step, Malcolm was able to offer researchers in these universities \$10,000 'no-strings-attached' grants to explore new research possibilities with local communities and develop proposals. The only criteria for these proposals were that smallholder farmers had to be involved, and the project had to be of interest to communities outside the university. As Malcolm recalls: *'The truth was, everybody used that \$10,000 well, and we got some very good proposals. This was a very different concept, but it just took off like wildfire.'*

On this basis, in 1992 the Rockefeller Foundation established the Forum for Agricultural Resource Husbandry, known thereafter as FORUM. FORUM was created to align university research to the needs of smallholder farmers through competitive grants for master's students to conduct community participatory research. It would operate in the five countries where the Foundation already had programmes: Kenya, Malawi, Mozambique, Uganda, and Zimbabwe³⁰.

'Mama Africa'

FORUM was more than a groundbreaking grant programme; it became a close-knit family – thanks in large part to a woman affectionately known as 'Mama Africa'. Dr Bharati Patel served as programme officer across most of FORUM's 12-year lifespan. A Zambian plant pathologist, she had been one of only 70 university graduates at the time of her country's independence in 1964 and was deeply committed to nurturing homegrown African scientists. She had headed the research department in Zambia's Ministry of Agriculture during the 1980s, and then joined the governing board of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India. From there, she was recruited by the Rockefeller Foundation to oversee FORUM in 1993.

Bharati's name quickly became intertwined with that of FORUM, which was housed at Bunda College in Malawi. Her warm, outspoken character and feisty sense of humour were matched by a relentless drive for excellence. She brought an unshakeable focus on quality and rigour to FORUM, and she is still widely remembered for pushing the Principal Investigators (PIs) and their students hard to meet the highest standards and publish in quality journals. The students were her passion: she took pains to ensure they finished their degrees in good time and had opportunities to present their work. Any PI who neglected their students or let standards slip could expect a ferocious tongue lashing. Under her tenure, the completion time for a master's degree among the FORUM universities fell from up to seven years to an average of 2.7 years.³¹

Competitive grants were FORUM's mainstay. These were awards in the range of \$80,000 to \$100,000 given to a PI, supervising at least two master's students in community-based participatory research over a two- to three-year period. For the first time, such grants made it possible for academics and students to go to the field and build working relationships with farmers, the lifeblood of African society. The grants provided vehicles and other equipment essential for reaching isolated fields and villages and obtaining useful results. Bharati hired several consultants to provide support in developing quality proposals, carrying out the work and publishing and presenting it. She made sure that researchers developed solid proposal writing skills and put them to effective use. Bharati reflected: *'I wanted to raise the bar but not make it so high that no one could jump over it. It was hard at first. No one wanted to apply for a grant and not get it.'*³²

³⁰ Ten universities were included in FORUM: Egerton University, Jomo Kenyatta University of Agriculture and Technology, Kenyatta University, Moi University, and the University of Nairobi (Kenya); Bunda Agricultural College (Malawi); Eduardo Mondlane University (Mozambique); Makerere University (Uganda); Africa University and the University of Zimbabwe (Zimbabwe).

³¹ *Dirty Hands, Fine Minds*, p. 13

³² *Dirty Hands, Fine Minds*, p. 10

Rather than turn down flawed proposals, Bharati and other agriculture and development experts she commissioned helped researchers work through various iterations until they met expectations of quality. After FORUM's launch, it took 18 months before the first grant was successfully awarded, but once researchers grasped the requirements of this novel approach, the programme took off.

With a few notable exceptions, the lion's share of grants (68 per cent) focused on crop production. In Zimbabwe, under Prof. Sheunesu Mpeperekwi, students and researchers connected with smallholder farmers to develop soybean production. In Uganda, Prof. Adipala Ekwamu and his students worked on cowpea production with communities recovering from conflict. In Malawi, Prof. George Kanyama-Phiri was working on soil and nutrient management, and in Kenya Prof. Nancy Karanja worked on soil fertility issues. For such promising researchers, the opportunity to serve as a PI and supervise students was a lifeline. The programmes provided students the resources to do proper research, as well as professional and collegial support. The stipends provided to the PIs through the grants freed them to focus on producing quality research with their students instead of seeking consultancies to supplement their meagre incomes.

Another FORUM pioneer, Prof. Vincent Saka, Head of the Department of Crop Science at Bunda College of Agriculture, which was then part of the University of Malawi, recalls:

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'Many of the researchers who received those grants are still with the university today and might otherwise have dropped out. We didn't have money for research or the skills to get research grants outside of FORUM. Getting those grants really strengthened our capabilities and our confidence as researchers.'

Bharati could be tough on researchers and students alike. She wanted results, and pushed herself as well as others to deliver them, but she did so with a twinkle in her eye and a spirit of camaraderie and fun. On one field visit, as she had recalled in *Dirty Hands, Fine Minds*:

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'The Zimbabweans got me in and out of the Land Rover 100 times to see if I could take it. That was in the Zambezi Valley, where it was darned hot. I visited as many field trials as I could, and I told them I could drink them under the table!'³³

Every other year, Bharati convened all the FORUM PIs and students to exchange ideas and share their work. These vibrant gatherings became essential to FORUM culture, not least because, like the African Crop Science Society and its counterpart publication, the *African Crop Science Journal*, they provided a rare and precious platform for African academics to meet each other, discover one another's work and build relationships. International meetings were hardly ever held on the African continent. Countries were politically isolated from one another. Zimbabwe had been cut off from the rest of Africa by sanctions before independence, while Malawi, too, had recently endured a period of political isolation, and Mozambique was separated by a language barrier as well as its own post-conflict challenges. Travel connections across borders were poorly serviced. Email and the internet had yet to penetrate most places. Phone and fax lines were sporadic and expensive to use. Virtually all the communication between different academics and institutions happened through the slow-moving postal service.

³³ *Dirty Hands, Fine Minds*, p. 11

The intellectual growth and camaraderie fostered through FORUM was phenomenal. If opportunities for academic staff to attend international conferences were rare, they were unheard of for students. The students were often tasked with organising FORUM meetings. These events sharpened their critical thinking and debating skills. Bharati urged students to argue with their supervisors, and as they were constantly tested and pushed to do better, both by Bharati and their supervisors, the students stretched themselves and developed impressive skills.

Prof. Jeninah Karungi Tumutegyereize, a FORUM student who had worked on cowpea research with Adipala, recalls her mettle being tested through intensive rounds of draft revisions and conference preparations:

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'If Prof. gave you back a paper draft without comments, it was his way of telling you it was rubbish. Once you saw red pen marks everywhere on the page, you knew your work was starting to make sense,' she recalls. 'We were all young students. We worked very hard but we never suffered because we were not alone. We had a very good foundation, and that has helped us all up to today. We had excellent training in scientific writing. Not many students received the kind of mentorship that we received. It laid the foundations for who I have become today.'

FORUM's greatest strength was its students – and the culture of passionate, well-rounded, and well-prepared students that was fostered through the intense work and exposure to international gatherings remains a hallmark of RUFORUM to this day.

Participatory research with farmers

Within a few years, the researchers' collaborations with communities had already produced demonstrable results. At the University of Zimbabwe, for example, Prof. Sheunesu Mpeperekwi was working on soybean production with smallholders. His passion for soybean sprang from his earlier studies in the United States, where he had heard soybean described as the world's most efficient biological system for producing protein. Thinking of the widespread malnutrition and protein deficiency back home, he was eager to see if small-scale soybean production could help.

When he returned to Zimbabwe in 1988, he was told by his colleagues that soybean production was too complicated and could only be viable at a commercial scale. Undeterred, on a sabbatical with some Rockefeller Foundation funding, he spent several months travelling around southern Africa, collecting samples of the nitrogen-fixing soil bacteria rhizobium, and by chance encountered a group of smallholder farmers in Zambia who were in fact producing soybeans.

It struck him that if small-scale farmers planted soybean, a nitrogen-fixing crop, that was inoculated with rhizobium, a nitrogen-fixing bacterium, they might get better maize yields without having to introduce chemical fertilisers to the soil – and they would reap a protein-rich soybean crop as a bonus. The hypothesis was that this system would improve soil health and therefore yields of farmers' staple crop, maize. However, nobody knew if the rhizobium bacteria could even survive in farmers' acidified and severely depleted soils.

With a FORUM grant, Sheunesu could enlist two master's students in studying the agronomical issues of soybean inoculation in the farmers' exhausted fields, and in promoting the technologies of soybean production and rhizobium inoculation with smallholders. They found that when farmers did rotate their

maize and soybean crops, their yields improved. But the farmers also needed a market for the soya they had produced.

The solution, as Sheunesu put it, was to *'mobilise people along the value chain'*.³⁴ Working with a variety of students over three FORUM (and later RUFORUM) grant cycles, the researchers built relationships with government extension workers and convinced the country's largest soap and oil manufacturer to buy from the small producers. They worked with farmers' unions to bulk farmers' produce into commercial volumes. Through the project, farmers developed their own value-added products from soybean, putting food on the table and money in their pockets. It was a small yet powerful example of what universities and communities could achieve by working together. As Bharati Patel recalled from a field visit in 2000:

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*The harvest was so big they had to buy a lorry to take the crop to market. We went the whole hog in the project, even concocting recipes with soybean flour. All the farmers wanted trials in their fields. When the whole village turns out to thank you and when the shops are emptied with the money made from the harvest, then you know you're getting somewhere.*³⁵

Wherever FORUM researchers and students worked with farmers, similar processes took shape and gained momentum. In his autobiography, Adipala described working with three farming communities in the cowpea-growing, semi-dryland areas of eastern Uganda, emerging from civil conflict. Testing new varieties of cowpeas in the fields with farmers, the researchers were also learning to step out of their traditional roles of 'delivering knowledge', and into new roles as collaborators and learners.

As Adipala describes in his memoirs, he and his team formed close relationships with one inspirational group of women from Bukedea in the Kumi district. The group was led by an extraordinary woman named Norah Ebukalin, along with her husband, the Reverend Sam Ebukalin. This original group of 12 women initiated by Norah had named themselves P'KWI, which stands for Popular Knowledge Women's Initiative. Having endured years of a brutal insurgency which had disrupted farming in this semi-arid area, traditionally known for cowpea and groundnut production, Norah and her neighbours were already working hard to organise themselves and rebuild their lives.

As another group member, Rosaline Ajore had recalled: *'We would work in my garden today, tomorrow in yours. Everybody was desperate, but how do you help everybody at once? The best way to help ourselves was through the group.'*³⁶



Norah Ebukalin (second from right) with P'KWI members

³⁴ RUFORUM, University of Zimbabwe Storyline, 2012

³⁵ *Dirty Hands, Fine Minds*, p. 11

³⁶ RUFORUM Bukedea Storyline, 2012

As Norah had later recalled it, one day as the women were sitting beneath the mango tree outside her house, a vehicle pulled up and out jumped a scientist to introduce himself and propose collaboration. This was Adipala. Putting their trust in Adipala and his team, the women decided as a group to embrace innovation and collaboration with the scientists as a survival strategy – and they have never looked back.

In the beginning, the research with scientists to adapt new varieties of groundnuts and cowpeas was about building food security and ensuring survival. In the process, the women had learned that by organising themselves, working together, pooling their resources, and continuously learning and adapting their knowledge, they could continue improving their lives far beyond what they had initially envisioned.

For the farmers and the scientists alike, the collaboration furnished transformative lessons deeply affecting their approach to both farming and research. It planted the seed of RUFORUM's approach to working with farmers and communities. Working with the farmers, Adipala and his team learned to value farmers' own indigenous knowledge and to work with a collaborative and responsive rather than an instructive mindset. The farmers, meanwhile, learned to use knowledge to empower themselves. Once they had gained food security, they continued to organise themselves to share knowledge and expand their collective enterprises. By the year 2019, they had grown to become a collective of more than 2,500 households, embracing technologies such as radio to share learnings and developing industries including a modern and profitable organic sunflower oil processing factory³⁷.

As Norah had reflected, the success of P'KWI was evident in that the community was retaining its young people. The youth were seeing a future in Bukedea, and wanted to be part of it, instead of migrating to the cities in search of scarce jobs.³⁸ She said: *'Our minds have been transformed. We want to remain a place for transformation, not only for P'KWI but for our young people and the community.'*³⁹

As a master's student, Jeninah Karungi was there at the beginning. She remembers learning to ride a bicycle and travelling the dusty roads from village to village, spending long days with the farmers in their fields as she studied various methods of protecting the crops from pest damage. In the process, she made friends with the hard-working and determined farmers – especially the women – and learned from them. *'It's the women who ensure food security'*, she observes. *'All over the country, they are the ones who take responsibility for making sure their children have food to eat.'* As is chronicled in *Unfinished Journey*, the farmers were tough. Students could not merely observe and collect data but had to dig in and get their hands dirty. Jeninah recalls the drive and determination of the farmers to move forward and improve their lives. They had expert knowledge of their flat, arid terrain with its sandy and semi-arid soils, and grew millet and sorghum, cowpeas and groundnuts, and later sunflower as a commercial crop. She recalls how they diversified their crop plantings and stocked their granaries to ensure their families would be well fed even in drought years – and how they enthusiastically yet selectively embraced modern technologies once they were convinced that these would help them achieve their aims.

Among Jeninah and her fellow students, this combination of intense fieldwork and rigorous scientific training, publishing and presenting has shaped successful and prolific careers, and a cadre of dedicated scientists who continue to contribute to science and development in myriad ways. Jeninah recalls:

³⁷ *Unfinished Journey*, p. 93-95

³⁸ *Unfinished Journey*, p. 95

³⁹ *Unfinished Journey*, p. 96

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There is a very big difference now between me and my counterparts. Many finished their PhD without any publications. By the time I finished, I had been a PI on two grants. It's all because of what we learnt when we completed our research. We learned how to write a winning proposal; that was embedded in the training. When I did my master's, I had my firstborn child. When I defended my master's thesis I think I was carrying the second one.'

After that, she completed a sandwich PhD programme sponsored by the Swedish International Development Agency (SIDA). Thanks to her strong publication record she then pursued a fast track to become an associate professor in crop science, pest management and entomology, where she continues to mentor new generations of young scientists, including those from post-conflict countries. Today, she remembers the mentorship of Adipala in particular. She observes:

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'He started the whole culture of research in our faculty. He has a talent of knowing how to write a proposal and get funding. Once he got funding, he knew how to involve people, and how to create multidisciplinary teams so that everybody moves together. This approach always produced outputs for the donors to see. Then the students working with him learned to get their own grants and do the same. He started the culture, but even now it is thriving. Most of my own career growth can be attributed to the way he trained us.'

FORUM graduates continue to occupy key positions in the universities and research systems of their countries – and beyond. In Malawi, for example, FORUM graduate Prince Kapondamgaga served previously as the president's chief of staff, after leading the country's national Farmers' Union for many years. Others are now Vice-Chancellors and senior officials in research institutions, NGOs, and the private sector. Several FORUM graduates continue to maintain relationships with RUFORUM in the present, for example mentoring students and leading innovative research programmes whose seeds were sown through the initiatives of the network.

Over its 12 years in operation, FORUM became increasingly impactful. By the end of 2003, the programme had awarded 314 grants worth more than \$14,5 million.⁴⁰ Some 220 journal publications had been garnered.⁴¹ Prominent behind this achievement was a formidable cadre of nearly 250 new passionate, energetic, and highly skilled young scientists ready to take up their positions in the universities, research institutions and NGOs in all five countries.⁴² Students, researchers, and institutions alike had been energised. FORUM support had played a significant role in rehabilitating agricultural faculties, raising teaching standards and improving curricula and pedagogy.⁴³ It also showed the importance of mentoring and supervision.⁴⁴ There was mounting evidence that the universities had it in themselves to build their own capacity, contribute high quality research and produce high quality students and publications through participatory action research with communities. The universities were taking the first steps towards positioning themselves more as developmental partners than as ivory towers. The groundwork had been laid for universities to make robust contributions towards agricultural research, science, innovation, and development.

⁴⁰ RUFORUM genesis paper, Waswa, M., Okori, P., Mweetwa, A., Adipala, E. (2020). Genesis, Evolution and Strategic Thrusts of RUFORUM. *African Journal of Rural Development* 5(1): 39-62.

⁴¹ Blackie, M. & Muir-Leresche, K., 2012

⁴² Blackie, M. & Muir-Leresche, K., 2012

⁴³ RUFORUM genesis paper, Waswa et al., 2020

⁴⁴ RUFORUM genesis paper, Waswa et al., 2020

Researchers were getting to know one another, getting into the field to do research, sharing their findings, and training African scientists who would stay in the system, equipped to have an impact there. Through FORUM and through Bharati's vision, the seeds were planted for a student-centred approach to training, and for an academic culture of excellence, focused on relevance, results and impact.

From FORUM to RUFORUM

FORUM had revealed a new path forward for the universities. By 2003, however, the Rockefeller Foundation had decided that support for the programme would not continue. The feeling was that the programme had run its course. The Foundation had new leadership and a new direction. Bharati Patel was preparing to retire. In most cases, when the funding ends for a foundation or development partner-supported programme, the programme dies a natural death. The question was whether to close the programme down entirely or to explore whether it could potentially be viable as its own entity, John Lynam recalls. FORUM was at a crossroads.

Several of the scientists and Deans who had been part of the FORUM family, however, wanted it to continue. They felt that significant strides had been made, that the journey they had been walking together had made them stronger, and those new strengths, capacities, and relationships they had built could be developed even further.

At Eduardo Mondlane University in Mozambique, for example, research had been deeply constrained by a devastating civil war that ended in 1992. When peace arrived, the country was ranked among the world's poorest and least developed. Dr Domingos Cugala had been recruited to the Faculty of Agronomy and Forest Engineering in 1995 after receiving his BSc degree in entomology. He dreamed of doing his master's, but there was nobody in his institution qualified to support his further training. Under FORUM, Domingos gained sponsorship through a special arrangement and joint supervisors from the University of Zimbabwe and the Nairobi-based International Centre for Insect Physiology and Ecology (ICIPE) were enlisted to work with him from afar⁴⁵.

The flexibility of this arrangement, which allowed Domingos to complete his master's work in Mozambique, gave new impetus to the project of building relationships across borders whilst levelling the playing field among disparate institutions. There had been tension in the competitive research grant system: how could a Portuguese-speaking Mozambican researcher with a bachelor's degree successfully compete for research grants with well-established academics, some of whom held international doctorates? Bharati's solution was to create a special 'nurturing grant' for Eduardo Mondlane University, which would enable greater numbers of master's students to be trained there to serve the wider purpose of strengthening institutions. Such initiatives had shown remarkable promise under FORUM (and the nurturing grants would later become an important fixture of RUFORUM). Now that the programme was ending, it would be a great pity to lose momentum just as such initiatives were bearing fruit.

In her final year of overseeing FORUM, Bharati agreed to support the scientists' initiative to continue the programme and worked with the Deans and grantee scientists across the ten universities to develop a way to carry it forward. She organised meetings to help them shape a vision of what some new iteration of FORUM might look like and develop a plan to bring this vision to reality. The Deans were all consulted, and meetings were held to deepen and sharpen the thinking around FORUM's next iteration. Agnes Mwang'ombe recalls:

⁴⁵ *Dirty Hands, Fine Minds*, pp. 69-72

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'Bharati Patel called meetings for us to discuss how this good work could continue when she left. How could we find a more sustainable way of getting research funds for training the graduate students that Africa needs? How could we continue to generate innovations and knowledge for the benefit of the communities? This was at a time when Africa was hardest hit by HIV and AIDS. In her own country, Zambia, Bharati used to give us the example of how she saw 18 PhD-holder agricultural scientists decimated by this terrible disease. She was very passionate about building capacity for agricultural impact. She got us thinking, and she found us resources. I was committed to the process of seeing how we could transform FORUM into an African-owned programme. How could we bring on board the issue of sustainability, and market the programme to other donors? We needed to come up with something visionary and forward-looking that answered African issues in agriculture. I was very happy to be part and parcel of that.'

Agnes, who had become Dean of the Faculty of Agriculture at the University of Nairobi, recalls meeting regularly with colleagues at the Imperial Botanical Garden Hotel in Entebbe, Uganda, often working long into the night to shape RUFORUM's vision. On one occasion, she had brought her ten-year-old daughter along because school was on break. One evening, when her daughter awoke and wandered out into the garden, a chair was brought out for her at the meeting table, where she sipped a Fanta while Agnes and her colleagues continued working until two or three in the morning.

After Bharati eventually retired, to four standing ovations at FORUM's final biennial meeting in Entebbe, Uganda in August 2002, John Lynam took over managing the transition. The discussions began in earnest regarding where the new initiative should be situated, its legal persona, its board and governance structure and how to fund it. As summarised in *Dirty Hand, Fine Minds*, the process had three objectives; these were to:



Agnes Mwang'ombe (left) with Bharati Patel

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*'... place programme management in African hands; retool strategy to accommodate changing needs and opportunities; and package and market the programme to broaden donor support. It was a rite of passage common to projects where fresh concepts have been validated through practice. Ideas tabled by a group of dedicated professionals had gained currency through their implementation. Now they needed to undergo the transition from donor programme to a formally recognised African institution.'*⁴⁶

⁴⁶ *Dirty Hands, Fine Minds*, p. 15

A key question was whether the new organisation should be governed by an independent board, or by the Vice-Chancellors. Agnes was among those who felt strongly that the Vice-Chancellors needed to take ownership. This was easier said than done. To Agnes and her colleagues, the value proposition was clear, but the university Vice-Chancellors, coming from disciplines as diverse as philosophy and chemistry, still needed persuading. Agriculture held little prestige within the ivory tower. Nevertheless, the Deans wanted to build on what FORUM had achieved and develop it into something the universities would collectively own. As a grant programme, FORUM had been remarkably successful, yet it would never evolve beyond the limited scope of its funder. If the organisation could successfully float itself as an independent African institution, however, it could deliver on a much wider mandate, with a more transformative scale and reach. As Agnes recalls:

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'I was very clear that this initiative would die if we didn't anchor it to the Vice-Chancellors. I was asked to deliver the request that the University of Nairobi be one of the founding members. When I went to see our Vice-Chancellor, Prof. George Magoha, his question was very clear. He said, "you are an agriculturalist, I am a medic. What is so unique about agriculture that you want Vice-Chancellors to be in charge of a forum?" That was the tough question, coming from my Vice-Chancellor.'

Agnes made a convincing case. The new programme had already achieved some visible outcomes, and eventually every Vice-Chancellor came on board. University leaders recognised that the new concept offered an opportunity to pool their strengths, develop important institutional linkages and strengthen the relations between their institutions and across borders. Some saw in the new programme the opportunity to secure new grant funding, out-compete rival institutions and gain access to wider policy and networking platforms that could open new funding doors. As recalled in *Dirty Hands, Fine Minds* by John Lynam, who served as interim coordinator of FORUM in the final months after Bharati Patel had retired, universities faced a context of such scarcity of research funding that Vice-Chancellors easily recognised that *'a dedicated programme for research and publishing was something to hang on to tight'*.⁴⁷ Malcolm Blackie and Prof. Kay Muir Leresche elaborate on RUFORUM's value proposition to the Vice-Chancellors at the time:

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*'The then ten-member universities of FORUM recognised that although they were competitors for the available resources from aid and development agencies, there was an opportunity to harness each other's comparative advantage to strengthen their own institutions and increase competitiveness. The strong impact the programme had shown in the quality and relevance of the graduates and research, the increased respect for the universities, the greater retention and attraction of faculty and the gains from networking persuaded the Vice-Chancellors to establish their own organisation to continue the FORUM approach to ensure greater relevance and improve the quality of their agricultural faculties.'*⁴⁸

RUFORUM charts a new path

In January 2004, the ten Vice-Chancellors from the five countries signed a memorandum of understanding, bringing RUFORUM to life – although the new name had yet to be agreed upon. The Vice-Chancellors got straight down to work negotiating the governance structures and operational mechanisms. It was agreed that a standalone Secretariat would be established to coordinate activities among the member

⁴⁷ *Dirty Hands, Fine Minds*, p. 17

⁴⁸ Blackie, M. & Muir-Leresche, K., 2012

universities. Makerere University in Uganda was identified as the most suitable location for hosting the new organisation. Among the Vice-Chancellors, Makerere University's leader, Prof. John Ssebuwufu (a Professor of Chemistry), had been a particular champion of FORUM and was equally enthusiastic about its continuation. He had visited Adipala's cowpea research sites and the communities that hosted them and had taken steps to introduce wider community engagement policies and practices across the university. With the support of the Ugandan Government, he offered to host the Secretariat offices rent-free on the Makerere University campus – an offer that was gladly accepted by the Vice-Chancellors.

The next question was who would lead the Secretariat. Asked his opinion by Bharati Patel, Prof. George Kanyama-Phiri, a FORUM PI working on soil and nutrient management who had since been appointed Principal of Bunda College of Agriculture in Malawi, immediately knew who would be most suitable – Prof. Adipala Ekwamu. George recalls:

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'There was a lot of scepticism about RUFORUM from various quarters, because these initiatives tend to die a natural death when the donor funds dry up. But I looked on this initiative as different, because it was African-driven. To me that was the difference. The change from FORUM to RUFORUM was intended to build new momentum. In the past, we had not involved the Vice-Chancellors, but now the Vice-Chancellors of all these universities as well as the Deans of faculties, Principals, and Directors would be involved. It grew significantly to involve so many people – and the students too, of course. It had to be handled by someone with the energy and courage to carry it forward. Adipala turned out to be the right person and has delivered a great deal. I don't regret having contributed to identifying the person who should lead RUFORUM.'

Adipala's passion for education and mentorship, and his qualities of leadership, empathy, humility, and vision made him the obvious choice. He had the resounding support of his colleagues, who had often been impressed by his hard work and leadership skills, if somewhat envious of his success in securing seven different grant awards across FORUM's lifespan. As described in *Unfinished Journey*, Adipala had interviewed for the position and taken up the reins of the new Secretariat. By June 2004, RUFORUM was operational. However, the new organisation would struggle to find its feet over the next five years. The capacities and depth of commitment of its leaders and members would be severely and persistently tested. Many expected that RUFORUM would not survive the next few years, let alone rise to become the continental powerhouse that it is today.

Over the first few months, Adipala and his initial staff of seven wrangled for funding and battled to establish the Secretariat offices in the then-dilapidated house they had been allocated in Garden Hill Road on the Makerere campus.⁴⁹ Hellen Kongai, whom Adipala had seconded from the Faculty of Agriculture to serve as administrator in the new Secretariat, recalls:

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'We were a small but efficient staff. We were happy to be part of a regional organisation and we were looking beyond the horizon. We didn't know how this new venture would turn out, but we felt like we were needed to serve the continent.'

⁴⁹ The extensive trials and tribulations of establishing the Secretariat offices are chronicled in *Unfinished Journey*, pp. 105-106

In his interview presentation for the job, Adipala had outlined a vision centred on strengthening education as the catalyst to develop an 'educated, creative and competitive' African continent; to develop universities as 'centres of knowledge and creativity' and to develop 'confident, creative and practical' graduates.⁵⁰ In *Unfinished Journey*, he elaborates:

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*'I felt clearly and strongly that as Africans we needed to learn to stand up and do things differently as a continent: we needed to find our own unity, just as we needed to tackle our challenges of food and nutrition insecurity. In my mind, these two issues were connected – and the work of building new generations of young scientists equipped with the knowledge, passion, competencies, and creativity to be changemakers in their societies was key to meeting these two interconnected challenges.'*⁵¹

As Prof. John Ssebuwufu recalls, the interviews had emphasised the question of how the funds would be raised to keep RUFORUM going.

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'There were a lot of mixed feelings,' he recalls. 'There was a feeling of excitement and challenge, a feel of joy and euphoria, but also a strong sense of the challenges we would have to surmount. It was a leap in the dark, but when people say it's impossible, I always say it can be done. Our work was cut out for us, and we had to find the money. The crucial factor was how to sustain the programme.'

This question underpinned a whole series of other questions about the overall size and shape and direction the new network would take. While FORUM had focused somewhat narrowly on research in agronomy and crop production to support food security, there was now an opportunity to expand and broaden this vision. But first, RUFORUM needed both to map its vision for change, and develop the practical mechanisms for achieving this.

The Vice-Chancellors were meeting periodically to hammer out the governance structures and mechanisms of decision-making and oversight. While these were being determined, the competitive grants which had been FORUM's mainstay continued apace. After much wrangling, the Rockefeller Foundation had conceded to RUFORUM one final \$3.6 million seed grant to move forward with its next iteration. The money enabled RUFORUM to fund three competitive grant cycles over the next three years, training almost as many students as it had over FORUM's 12 years⁵². Despite the chaos and uncertainty of the transition, some members of FORUM recall that the transition felt 'seamless' as their grants continued uninterrupted.

A Technical Advisory Committee had been established in 2004 to oversee the grants processes, and to shape programming and ensure quality more broadly. The committee was to consist of six representatives from among the RUFORUM member faculties and six representatives from outside the universities. It was also to maintain a gender balance of six women and six men. Prof. Kay Muir-Leresche, an agricultural and natural resource economist from the University of Zimbabwe, had been invited to the Technical Committee's launch by Adipala and was elected its founding chair – a position she held until 2018. A RUFORUM stalwart to this day, she was initially attracted by the organisation's fresh, hands-on approach to training students. She explains:

⁵⁰ Adipala Ekwamu interview PPT presentation, 2004

⁵¹ *Unfinished Journey*, p. 103

⁵² *Unfinished Journey*, p. 111

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'My passion is to see the universities help transform the lives of people in the rural areas. What was so different about RUFORUM was that it was one of the only initiatives to actually take students out in the field and look at developing solutions. This is all taken for granted now, but in those days it wasn't. RUFORUM helped to energise a completely different approach, which is now widely accepted and common, but it's been a dramatic change.'

Prof. Vincent Saka from Bunda College in Malawi was also appointed to the Technical Committee, and he brought in another colleague who would become a key RUFORUM founding mother who today chairs RUFORUM's finance and administration committee. Dr Mary Shawa at the time was serving as Secretary for the Commission on the Status of Women and as Deputy Principal Secretary for Nutrition, HIV and AIDS in the Ministry of Health and Population in Malawi. She brought RUFORUM its first strong linkage with African governments. Mary was highly motivated to prompt the new network toward a broader vision of agriculture that encompassed gender equality and nutritional status. Although women provide most of the small-scale agricultural labour, at the time they constituted just a tiny fraction of Africa's scientific community. A mere 8 per cent of FORUM students had been women. It was time to change this. In RUFORUM, Mary saw an opportunity to advocate for a sharp vision of gender equality, and to galvanise the universities towards science-led development. She elaborates:

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'Universities should not be white elephants – they should respond to the government and development agenda, and they should contribute and build that agenda. Agriculture is the backbone of most countries in the African region, so can agriculture spearhead development in all aspects, including health, nutrition, and food security?'

Shaping a strategic vision

Meanwhile, one of Adipala's first initiatives as RUFORUM Executive Secretary was to develop a new strategic vision, and that process was soon underway. John Lynam had advised him to develop a strategic plan highlighting the organisation's vision and goals to clarify the kinds of activities to prioritise and how to mobilise resources. As luck would have it, a bright young lecturer from Makerere named Dr Patrick Okori was just completing his PhD in plant breeding and biotechnology from the Swedish University of Agricultural Sciences in Uppsala. Patrick had never been a FORUM student, but he did complete a two-year apprenticeship working with the *African Crop Science Journal*, where he was mentored by Adipala (who was also his MSc and PhD research supervisor). As Patrick recalls:

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'Everyone was struggling with this baby, RUFORUM. What do we do with this baby? I had come back to Uganda and I had learned a few things, including strategic planning. At the time, strategic planning sounded like terminology from Jupiter. We were developing a strategic plan for the Faculty of Agriculture. I said, "I think we can do the same for RUFORUM."'

Adipala contracted Dr Jürgen Hagmann, an expert in innovative agricultural resource management, to develop RUFORUM's strategic plan, supported by Patrick. The two visited each member university and held

conversations with the Vice-Chancellors, Deans, Pls and researchers in the various faculties of RUFORUM member universities. In all these meetings, they asked the same four questions: Which of their immediate concerns could be solved collectively with RUFORUM support? Which of their concerns would they prefer to address without RUFORUM's assistance? How did they envision addressing these concerns? Where did they want RUFORUM to be in ten years' time?⁵³ In each place, they listened to peoples' wishes and concerns, gathering many different ideas.

A broad stakeholder meeting was held in Entebbe, Uganda in 2005, bringing together all the member universities. At this meeting, the key elements of RUFORUM's vision and strategy for the next decade or so were agreed upon, and it was recommended that RUFORUM take on the structure of an umbrella organisation. Later that same year the first strategic plan was formalised and RUFORUM began its long journey of introducing transformation to the higher education sector through strategic partnerships. The governance structures of RUFORUM were agreed upon and formalised. It was defined as a constituent agency of national forums, to be managed regionally through the Secretariat hosted at Makerere. Two additional member universities were admitted: Sokoine University of Agriculture in Tanzania, and the University of Zambia, bringing the membership total to 12 universities. At this meeting, RUFORUM's new name was agreed upon: the Regional Universities Forum for Capacity Building in Agriculture. Its acronym, RUFORUM, 'was coined as a bridge between old FORUM and its new unique nature going forward.'⁵⁴ Patrick recalls:

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The name itself was crafted after a lot of consultation. A lot of tears were shed over the terminology. People felt there was a need to make a break from the old FORUM. We called it the Regional Universities Forum so that the name would embrace greater regional networking yet remain anchored in the FORUM vision.'

The RUFORUM Strategic Plan 2006–2015 presented an explicit vision of RUFORUM as a member-based umbrella organisation of the universities. It conceived the Secretariat as a coordinating centre, positioned to respond to the needs and demands of all the universities, who were the owners of RUFORUM. Oversight would be provided by the Vice-Chancellors themselves, who formed the Board of Trustees⁵⁵. Governance had been a challenge, but eventually it was agreed that each Vice-Chancellor of a member university would sit on the Board of Trustees. Although controversial, this decision set the tone for the organisation's unique decision-making by consensus style. It also secured a sense of ownership among the Vice-Chancellors, which has ever since provided a sense of unity and commitment in decision-making processes, enabling the organisation to move forward with its diverse and now-expanding membership. Currently, as RUFORUM has expanded to include more than 150 universities, this structure is overwhelming at times, yet also contributes to the member universities' sense of ownership. Over the years, Adipala's leadership style and his relationship with the Vice-Chancellors in their unique governance arrangement has shaped RUFORUM's path in diverse ways.

Beyond this, the strategic plan mapped out a growth pathway for the network, with seven key strategic goals. These goals were to determine how RUFORUM would orient and position itself, both in terms of

⁵³ *Dirty Hands, Fine Minds*, p. 29

⁵⁴ RUFORUM History Malawi (email communication, 2021)

⁵⁵ It would take several years to iron out RUFORUM's formal governance structure. In the initial organisational design, one representing each member country was to serve on the board, with membership rotating annually among the university leaders. This arrangement proved problematic, particularly for the five Kenyan universities. As related in the *Unfinished Journey* (p. 113), it was later agreed that each Vice-Chancellor from each member university would retain a seat on the board.

strengthening member institutions and amplifying their voices to have a wider impact across the regions' agricultural landscapes. As outlined in the RUFORUM Genesis paper⁵⁶:

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The First Strategic Plan 2006–2015: Vision, Mission and Strategic Goals. The ten-year RUFORUM Strategic Plan (2006–2015) was developed to designate new thrusts and operational modalities to guide the Secretariat during the transition period from a donor programme to an autonomous member-based organization. RUFORUM envisioned 'vibrant agricultural innovation systems with fully integrated universities that play a leading role in nurturing the systems through high performing agricultural science graduates who are innovative and responsive to changing demands'.

The mission was to foster innovativeness and the adaptive capacity of universities engaged in agricultural and rural development to develop and sustain high quality in education/training, in innovative and impact-

oriented research, and in collaboration. To achieve the mission and vision above, seven strategic goals were formulated from the challenges universities face and the impact that RUFORUM would like to achieve. The strategic goals determine the orientation and positioning of RUFORUM and detail the organization's commitment to achieving outputs and impacts via a range of strategies.⁵⁷

The strategic goals were:

Strategic Goal 1: Master's and doctoral programmes responsive to stakeholder needs and national/regional development goals.

Strategic Goal 2: Shared research and education/training facilities and capacities rationalized for enhanced economies of scope and scale.

Strategic Goal 3: Innovative education/training, research and outreach activities supported by adaptive management structures in universities contributing to policy and development practice.

Strategic Goal 4: Operational capacity and approaches for innovative, quality and impact oriented agricultural R4D mainstreamed in universities.

Strategic Goal 5: Increased participation and voices of women in education/training, research, and production and marketing of knowledge.

Strategic Goal 6: Increased use of technology to support effective, decentralized learning and sharing of knowledge.

Strategic Goal 7: A dynamic regional platform for policy advocacy, coordination and resource mobilization for improved education/training, research and outreach by universities.

⁵⁶ Waswa et al., 2020

⁵⁷ RUFORUM Genesis paper, Waswa et al., 2020

Planting the seeds of policy engagement

As RUFORUM was taking form, the wider policy landscape for agriculture in Africa was also becoming more coherent. The African Union had recently been launched, and policymakers were excited about science, technology, and innovation. After a long famine, agriculture was coming back onto the horizon, and forward-looking visionaries within both universities and government systems began to see new scope for the universities. The first strategic plan recognised the aims and aspirations of the continent-wide policy processes already underway and initiated the articulation of the role of universities within this wider coalescence of policy thought around agriculture and development.

The African Union had emerged from its predecessor, the Organisation of African Unity, in 2002, and with it the New Partnership for Africa's Development (NEPAD) championed by South African President (at the time) Thabo Mbeki, which envisioned a New African Renaissance. These new institutional frameworks gave impetus for coordinated dialogues about the role of agriculture in driving inclusive development on the continent. In 2003, the Maputo Declaration signed by 36 African Heads-of-State signalled the commitment of governments to raise the levels of their investments in agriculture from five to ten per cent of national budget⁵⁸. The following year a new policy framework was developed under the auspices of NEPAD, the Comprehensive Africa Agriculture Development Plan (CAADP). This plan outlined a detailed vision for inclusive development through agriculture. The CAADP document identified four main pillars: I) land and water management, II) market access, III) food supply and hunger, and IV) agricultural research and technology dissemination.

Champions within RUFORUM recognised in this latter Pillar IV a clear link to the universities' work of training and capacity strengthening. Obviously, Africa needed a strong nucleus of scientists working to achieve the goals outlined in the framework. The opportunity was ripe for universities to find a common voice and organise themselves towards delivering within this larger CAADP agenda. But they would need to advocate fiercely for recognition of their roles in the wider systems where they increasingly found themselves interacting. Thus began RUFORUM's long learning journey of building relationships and navigating the different languages of policymakers, bureaucrats, and donor agencies; and positioning itself in multi-sector dialogues and collaborations among the diverse group of stakeholders. The critical training and research link provided by the universities was not yet widely appreciated. The CAADP document did not even mention a role for the universities under Pillar IV. The RUFORUM seed was ready to germinate, but it was also up to RUFORUM to convince its new prospective partners and collaborators in government, donor organisations and the private sector that it would be worth their while to partner with and invest in the universities.

RUFORUM needed allies, and it found a formidable one in Judith Francis. A dynamic Trinidadian with a strong vision for the role of science, technology, and innovation in supporting agricultural development, Judith had recently joined the Technical Centre for Agricultural and Rural Cooperation (CTA) in the Netherlands, a joint organisation between the European Union (EU) and African-Caribbean-Pacific (ACP) Member States. She had a mandate to work with high-level officials and scientists towards introducing the innovation systems concept and strengthening its uptake across agricultural organisations and networks in these regions. Judith recalls:



Judith Francis

⁵⁸ At the time governments were spending a mere 5 per cent of their budgets on agriculture

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'Back in 2003/04 the political direction globally was that higher education was not a priority. Because science and innovation were high on the international policy agenda; however, the EU was forced to pay some serious attention to it. 'National Innovation Systems' was the big buzz. I came in to do exactly that: strengthen innovation systems. I saw universities as being important strategic partners in that process. Partnerships with organisations like RUFORUM, helping them to grow and expand their base, were therefore a priority.'

As Judith recalls, those in RUFORUM's small Secretariat were always learning and taking notes during meetings, sharing what they learned with colleagues and steadily building up a picture of this new landscape and how they could fit within it. It was a period of intense learning and relationship-building, as Mary Shawa likewise recalls:

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'People like Patrick Okori and Moses Osiru were identified who could listen in on meetings, present issues, raise questions and package that into usable and disseminate-able information. This was very instrumental. One lesson that came out of these exchanges was the need to share information. It was pointed out that both the NARS⁵⁹ and the universities were producing information that needed to be shared with governments for policymaking and development.'

The high-level dialogues Judith convened brought Adipala together with other key figures in the sector, including Prof. Monty Jones, the Executive Director of the Forum for Agricultural Research in Africa (FARA), an apex body for agricultural research in Africa. These dialogues also provided a platform for RUFORUM to start talking more with the African national and sub-regional agricultural research organisations including ASARECA, CORAF and CCARDESA.⁶⁰ These meetings also introduced RUFORUM to the European Union Commission, which would become an important partner.

These institutions had also, like the universities, suffered to varying degrees under structural adjustment. Most of the NARS were likewise constrained by underfunding, while losing their scientists to retirement and brain drain. Younger scientists were often poorly trained and lacked mentors. Organisational capacities for planning and coordination had been hollowed out. The dialogues now building around CAADP and other processes such as the United Nations' Millennium Development Goals (MDGs) were slowly yet steadily injecting new life, new linkages, and capacities for planning, into these fragmented and disconnected systems. As Adipala recalls, RUFORUM leaders were beginning to realise the potential of their small network to provide a powerful platform for policy engagement in this emerging landscape. He wrote:

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*'Imagine if we could share and institutionalise – with others across the continent who shared our dreams of building vibrant, prosperous rural communities – all that we had learned over so many years of connecting students and the research system with communities like the P'KWI farmers. We needed to explicitly link our work to the CAADP process.'*⁶¹

⁵⁹ National Agricultural Research Systems

⁶⁰ ASARECA is the Association for Strengthening Agricultural Research in Eastern and Central Africa; CCARDESA is the Centre for Coordination of Agricultural Research and Development for Southern Africa; and CORAF is the West and Central African Council for Agricultural Research and Development

⁶¹ *Unfinished Journey*, p. 122

In 2005 FARA was mandated by NEPAD to implement CAADP Pillar IV, coordinating the policy and research agendas among the different sub-regional and national agricultural research organisations in Africa.⁶² That same year, the organisation held its General Assembly in Entebbe, Uganda. RUFORUM jumped at the opportunity to make connections and highlight the strengths of its students at the meeting. From this moment, RUFORUM would make the most of such international gatherings to provide a stage for its students to shine.

Adipala met privately with Monty Jones in Entebbe, and the two leaders began to flesh out more of the specifics of how the universities could be enlisted to help with building agricultural research systems through training as part of CAADP's implementation. As an initial step, FARA had developed a Framework for African Agricultural Productivity (FAAP), to guide the implementation of CAADP Pillar IV. As Adipala recalls, that process *'clearly spelt out what was needed to re-engineer tertiary education in support of a continental agenda for agriculture.'*⁶³

The universities would play a key role in training the scientists needed to staff the National Agricultural Research Institutes (NARIs). This would be a formidable task. FARA had recently completed a comprehensive assessment of the overall strengths and weaknesses of 26 different NARS. The findings were stark. The NARS Assessment, released also in 2005, revealed widespread dysfunction:

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*'A generation of ageing scientists who were on the verge of retirement were not being replaced. Management practices were weak and ineffective, and the available manpower in the system was poorly used. Research staff were trained at a low level and were overwhelmed by the enormity of their tasks. Technicians were poorly trained, and they worked on outdated equipment. Small and post-conflict countries, in particular, suffered from acute shortages of funding and trained staff.'*⁶⁴

The situation called for a bold and comprehensive response. It was clear from the outset that a university network of RUFORUM's calibre could offer invaluable support. Incrementally, RUFORUM was finding its way as an organisation. The network was starting to bring the voices of the universities into national and regional agricultural policy spheres. In August 2005, RUFORUM gained the endorsement of NEPAD and of the education ministers from each of its five member countries, Kenya, Malawi, Mozambique, Uganda, and Zimbabwe, who were present at the Munyonyo Resort in Kampala, Uganda. The organisation remained very small and new, yet its vision was expanding rapidly.

On the road of resource mobilisation

RUFORUM's growth continued apace. By 2007, however, the network was running out of money. The Rockefeller Foundation's final grant was nearly exhausted, with nothing further forthcoming. It was a make-or-break moment: RUFORUM urgently needed to broaden its funding base. As Kay Muir-Leresche observes, a facet of RUFORUM's autonomy as a network has always been its constant need to scramble for resources and position itself to attract these funds. She elaborates:

⁶² *Unfinished Journey*, p. 122

⁶³ FARA @15, p. 22

⁶⁴ FARA @15, p. 23

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'Because RUFORUM was a homegrown organisation, it had to stumble and stutter and go without for ages in order to maintain itself. They had to build their credibility, and they didn't have the external support that other institutions like the Association of African Universities do.'

There was no external mandate: there was only the vision and determination of the Vice-Chancellors, the universities, the Deans, and Adipala and his Secretariat staff driving RUFORUM forward.

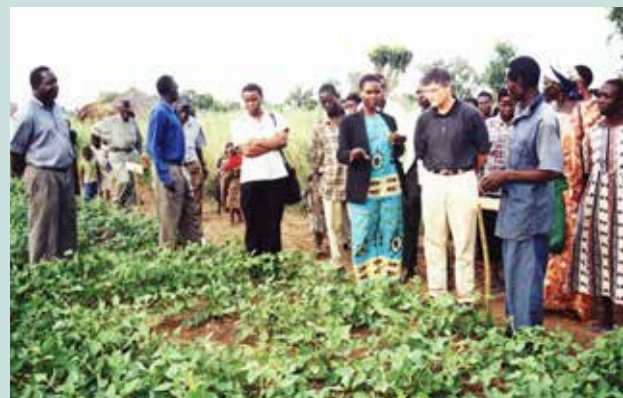
In April 2007, RUFORUM was to hold its first biennial conference in Malawi, hosted by Bunda College. Shortly before, Dr. Gary Toenninsen, the Director of Food Security for the Rockefeller Foundation, introduced Adipala to Melissa Ho, a programme officer from the Bill and Melinda Gates Foundation (BMGF). The Gates Foundation was a relative newcomer to agriculture but was seeking to invest in interventions to boost household food security, nutrition, and small-scale farmer livelihoods. Fortuitously, Melissa Ho accepted his invitation to attend the biennial meeting which was to be held at Mangochi, a resort on the shores of Lake Malawi.

She would be the key dignitary of a meeting that had been designed to attract attention. Mary Shawa, who was the government of Malawi's Secretary for Nutrition, HIV and AIDS at the time, had secured government funding to support this gathering. She recalls that RUFORUM's leadership intended to use the meeting as a springboard to promote its developing relationships with wider constituencies. In addition to Melissa Ho, dignitaries and colleagues from FARA, ASARECA, NEPAD, ANAFE⁶⁵, CGIAR⁶⁶, USAID⁶⁷ and other organisations were also invited, setting the tone for the vibrant networking and relationship-building for which RUFORUM

⁶⁵ The African Network for Agriculture, Agroforestry and Natural Resources Education

⁶⁶ Consultative Group on International Agricultural Research

⁶⁷ The United States Agency for International Development



meetings would soon become famous. Once again, the RUFORUM students took centre stage, impressing everyone with their passion and confidence.

At the meeting, Adipala presented Melissa with a concept note outlining the journey envisaged for RUFORUM over the next five years.⁶⁸ George Kanyama-Phiri, Mary Shawa and Kay Muir Leresche accompanied and attended to her during the meeting. George remembers promising Melissa: *'If Bill Gates funds us, they will not regret it. The impact will be felt widely across many universities in Africa.'*

The meeting had been an expensive undertaking for the new organisation, but it paid off. Melissa Ho had been suitably impressed, and RUFORUM was later invited to develop a formal funding proposal. The network's future remained uncertain, but the seed had been planted for RUFORUM to take root, nourished by new relationships to provide the resources it would need to develop into the strong, independent, and flourishing – albeit at the same time perennially precarious – network that it is today.

⁶⁸ *Dirty Hands, Fine Minds*, p. 34



PART II: Roots and Shoots (2007–2015)



'A tree without roots cannot stand'
– African proverb

Building capacity is an extensive journey. It is a marathon over a vast and varied terrain – as reflected in the saying that inspired the title for Adipala Ekwamu's memoir, *Unfinished Journey*:

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*'Every life is an Unfinished Journey. You run your part of the race, and then you pass the baton to others to run their leg of the journey.'*⁶⁹

While FORUM operated, its hub had been Bunda College of Agriculture, near Malawi's capital Lilongwe. Like other institutions across the continent, the College had been an isolated island, poorly resourced and disconnected from the outside world. Through FORUM, seeds had been planted for a new kind of institution to emerge. In the early years of FORUM, as head of the Department of Crop Science, Prof. Vincent Saka recalls having to beg his reticent fellow lecturers to learn the art of grant writing and apply for research funds through FORUM. Fast forward a decade, and a vibrant and productive academic culture was taking shape. Research projects were running, students were being trained, and academics were publishing. The College had come a long way since 1993.

As FORUM had branched out from its earlier narrow focus on crop research in its latter years, a young scientist named Dr Emmanuel Kaunda had been awarded a grant to study the fisheries systems along with the environmental impacts of crop farming on the Linthipe River, a river system feeding into Lake Malawi. In Malawi, fishing as well as farming had long provided the staples of most peoples' food and livelihoods. The lake, which runs two-thirds the length of the country from north to south, and covers one-fifth of its

⁶⁹ This saying comes from Adipala's Aunty Ada Odongo

surface area, along with its tributaries, had long fed the nation with abundant fish stocks. However, a combination of rapid population growth and serious overfishing had brought a dramatic crash in fish populations and sent the nutrition status of ordinary Malawians into sharp decline. While on average



Malawians consumed 14 kilograms of fish per year in the 1970s, by the early 2000s consumption had plunged to less than half that amount.⁷⁰ In addition, Malawi was suffering from economic turmoil, a raging HIV and AIDS epidemic and the effects of drought and flooding related to climate change.

Emmanuel's study was a small grant with a ripple effect, building on his expertise in aquaculture and fisheries science. Under the grant, one master's student studied the socioeconomic aspect of crop cultivation along the riverbank, while another investigated the effects of water quality on fishing yields – work that started to build a base of knowledge around managing the ecology of the country's water systems and fish resources. This body of expertise within Bunda College could assist the university in positioning itself.



Upon completing her master's degree, Annie Zidana, one of Emmanuel's students, had returned to her position at the Ministry of Agriculture, Irrigation and Rural Development, where she continued to collaborate with university colleagues from the policy sphere. She realised that the government's own policy of encouraging treadle pumps for irrigation was contributing to intensive farming along the riverbank, which in turn was causing destructive and unsustainable soil erosion that polluted the river and harmed the fish. From this new informed position, she was better able to advocate for change from within the government. She reflected:



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*'My master's thesis research sharpened my skills as well as my knowledge on how to conduct research. It gave me courage and confidence.'*⁷¹

Emmanuel's was the first of several studies at Bunda College aiming to contribute to better stewardship of the country's fisheries and water resources. Eventually these initial efforts would lead to larger initiatives to build small-scale fish value chains based on new aquaculture practices. The work had deep relevance not just for Malawi, but for the whole of Africa where fish provides the primary source of protein and micronutrients for one out of three people. Emmanuel reflects:

⁷⁰ According to former RUFORUM master's student Lisungu Banda, who was interviewed for a RUFORUM case study in 2012.

⁷¹ Zidana was interviewed in 2012 for a RUFORUM case study.

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'What would have happened if RUFORUM was not there? For me, that is a big question. Before FORUM and RUFORUM, our university was just a small college operating in its own corner. Interacting with a bigger community, we were able to start new programmes. That brought in more students and enabled more capacity building, and then Bunda College became more widely known.'

From this strength in aquaculture, Bunda College earned the designation of Regional Fish Node for the New Partnership for Africa's Development (NEPAD) African Biosciences Initiative in 2006. Building on the work of Emmanuel and his colleagues and students, this made the College a focal point for research and dissemination on fisheries and aquaculture for the region and introduced the College into networks such as the Aquaculture Working Group and the African Fisheries Experts Network (Afri-Fishnet) that were working to create and influence fisheries policies across the region and the continent. From small seeds of change, new offshoots and connections were sprouting thick and fast.

Regional postgraduate training programmes

FORUM's strategy had been to develop master's level training at African universities to the point of creating a pipeline for further PhD-level training. The programme had already succeeded in creating solid cadres of scientists in the different countries. Yet Africa still lacked a critical mass of PhD-holders – and without that, all efforts to train and retain successive generations of African scientists on the continent would never really take off. Only a few of the RUFORUM member universities were undertaking PhD training, but many thought it was high time that changed. The question of PhD training had been debated in RUFORUM's strategic planning process.

Today, with well more than 700 PhD graduates trained in Africa across the network, it is easy to forget what a revolutionary step this was. As RUFORUM was launching, however, donors were still reluctant to invest in training within fragile institutions and continued to cast doubt on whether African universities had the equipment and personnel to offer PhD courses.⁷² From the perspective of Agnes Mwang'ombe, Adipala Ekwamu, Patrick Okori and others who had experienced the challenges of PhD training abroad, however, the need to build a novel approach to PhD training on the continent was clear. Furthermore, it presented a strategic opportunity. As Kay sums it up:

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'There are three really bad things that could happen when you send your students away to other countries. The research that is undertaken at PhD level is often related to that country. They're looking at issues that have virtually no relevance for Africa and yet we are so desperately – and were especially so desperately back then – in need of research. Then they could end up living and working overseas because they can make so much more money. And their professional networks are all developed over there. When you train people in Africa, they're developing the research that Africa needs, they're strengthening the networks in their own discipline – and across sectors too. They make sure their work is relevant to local people and systems. They share their knowledge and help to integrate their universities better within society.'

PhD holders would be the ones to staff the universities and NARIs and enable them to expand and improve their training and mentorship. They would be the ones to drive science-led development to

⁷² *Dirty Hands, Fine Minds*, p. 35

bolster livelihoods and food security.⁷³ Furthermore, if the universities did manage to train PhD-holders successfully, they would demonstrate their relevance and at the same time strengthen their relationships with the wider national and regional agricultural research systems in tangible ways. As Patrick recalled:

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*'Newer universities were being established and needed new lecturers. Older universities felt they needed to graduate into PhD training. RUFORUM needed to move into more concerted investments such as working with communities and transforming lecturers and students into development agents.'*⁷⁴

The member universities developed a regional approach to creating new doctoral and master's programmes. This approach recognised that no single university held all the strengths and resources necessary to run a high-quality programme on its own. If the member universities pooled their resources and expertise, however, and developed programmes to serve students from across the network, everyone would benefit. So began a process to identify the most critical areas for training – namely those priority areas identified in CAADP – and to identify which of the universities would be best equipped to host each of the new programmes. Just as Bunda College of Agriculture in Malawi had developed its strength in aquaculture and fisheries, other member universities were similarly building their own strengths – and many of these strengths aligned to CAADP priorities. These regional programmes would tap the relative strengths of member universities, while drawing on resources from across the network and from the CGIAR and other institutions to support the training of young scientists from any of the member universities. Thus, the design of the new

postgraduate programmes would lend itself both to strengthening the member universities and weaving the relationships between them as well as with the NARS, the CGIARs and other stakeholders. With this new model, RUFORUM aimed to train 120 PhD students and 300 master's students by 2012⁷⁵.

As key areas of strategic focus were identified for the new programmes, a scoping study of the member universities, led by Prof. Malcolm Blackie and Dr Paul Woome, was conducted to give a neutral assessment of the different capacities and priorities of the network, as well as the weaknesses and gaps. The study identified the

priority needs and capabilities of each member country and institution, and thus helped to match the network's strengths and capabilities with the priority areas gleaned from the CAADP framework. It was an extensive process that eventually led to the creation of the following programmes, which became operational from 2008 onward:

⁷³ RUFORUM genesis paper, Waswa et al., 2020

⁷⁴ *Dirty Hands, Fine Minds*, p. 41

⁷⁵ RUFORUM Genesis paper, Waswa et al., 2020



- Addressing the impacts of climate change on farmers, a PhD programme in Drylands Resource Management was created at the University of Nairobi, drawing on its extensive experience of working with farmers and pastoralists in drylands areas (2008).
- Responding to needs for new crop varieties adapted to Africa's diverse ecologies and changing conditions, programmes in Plant Breeding and Biotechnology (PhD) and Plant Breeding and Seed Systems (MSc) were developed at Makerere University in Uganda, building on its developing strength in this area as well as its strong relationship with the National Agricultural Research Organisation, NARO (2008).
- A master's programme in Agricultural Information and Communication Management developed at Egerton University in Kenya (2008) was also introduced at the University of Nairobi (2009) and Haramaya University in Ethiopia (2010).
- A PhD programme in Aquaculture and Fisheries Science was introduced at Bunda College of Agriculture, building on that university's developing expertise (2009).
- A PhD programme in Agricultural and Rural Economics was introduced at Bunda College of Agriculture, building on that university's strong pool of lecturers with economics background (2009).
- A PhD programme in Soil and Water Management was introduced at Sokoine University in Tanzania (2009).
- A master's in Research Methods was established at Jomo Kenyatta University of Agriculture and Technology, JKUAT (2009).
- A master's in Agrometeorology and Natural Risk Management was introduced at Haramaya University in Ethiopia (2010).
- A master's programme in Monitoring and Evaluation was introduced at Uganda Martyrs University (2012).
- A PhD programme in Agricultural and Rural Innovations was introduced at Makerere University (2012), Egerton University (2012), and Sokoine University of Agriculture in Tanzania (2013).
- A PhD programme in Food Science and Nutrition was introduced at Jomo Kenyatta University of Agriculture and Technology, JKUAT (2013).
- A PhD programme in Agroecology and Food Systems was introduced at the Uganda Martyrs University (2016).
- A master's programme in Monitoring and Evaluation was introduced at Uganda Martyrs University (2016).

The network would be the catalyst for these programmes and would help to raise funds to sponsor the initial student intakes. Key sponsors, including the Carnegie Corporation of New York, DAAD, the CGIARs, and others, stepped up to provide crucial support over the years for these and other postgraduate and postdoctoral scholarships promoting mobility across Africa. Beyond the initial start-up funding sourced by RUFORUM for these regional postgraduate programmes, however, the universities themselves would be expected to assume responsibility for funding and running the programmes. The devolvement of the regional programmes from RUFORUM to the universities signalled the start of a gradual shift within RUFORUM, as the organisation began to position itself more as a catalyst and thought leader representing and connecting the universities, instead of a provider of grants. The network would continue to balance both roles, but the emphasis would steadily tip towards playing a catalytic role – a distinction that would become increasingly important as the network grew.

Makerere: hands-on training for plant breeders

A critical area highlighted in the CAADP document was plant breeding, and Makerere University in Uganda was the obvious home for new regional plant breeding PhD and master's programmes. It was evident that plant breeders had a vital role to play in contributing to food security, climate change adaptation and disease management across Africa, where an extraordinary diversity of climates, ecologies and cultural



preferences called for carefully adapted plant varieties to suit very particular local needs and conditions. It was equally obvious that the traditional approach of training plant breeders in narrow disciplinary silos, where they were cloistered away in the laboratories and trial fields at their institutions, did not foster the necessary sensitivity to place and context.

Adipala Ekwamu and his students' work with the P'KWI farmers in Bukedea had revealed the promise of a more collaborative and connected approach, in which scientists worked alongside farmers in their fields to select new varieties, while maintaining linkages with local governments, NGOs, research institutes, extension services and businesses through the work. In addition, they could draw on the expertise of Prof. Patrick Rubaihayo, a former FORUM PI who had been trained in plant breeding in the USA. This experience, combined with the emerging strengths of researchers and students in plant breeding and biotechnology, provided a solid base from which to initiate the ambitious new training programmes.

In 2007, Patrick Okori, who had earned his PhD in plant breeding, and another energetic, upcoming researcher, Dr Richard Edema, were handed the task of designing the new programmes at Makerere. Through the strategic planning process, Patrick had helped to craft the vision of a regional approach to PhD and master's training. Richard, as a FORUM-sponsored master's student, had

worked to map the diseases affecting the different varieties of cowpea that the P'KWI farmers were growing in their fields, and the efficacy of different prevention controls. He had recently completed his PhD in plant pathology at Ohio State University in the USA, mapping the genome of the maize streak virus. For his dissertation, he had examined the virulence of different strains, both in terms of their genetics and their distribution across Africa.

Patrick and Richard applied themselves with enthusiasm to the programme design, envisioning a curriculum that would be rigorous, interdisciplinary and boots-on-the-ground. They wanted students to be equally

comfortable working alongside farmers, as selecting genetic markers of drought tolerance or disease resistance in the biotechnology laboratory.⁷⁶ Richard had been struck by the fact that about half the crops grown on the continent were being lost to pests, crop diseases and environmental stresses. He believed passionately that every plant breeder the network could train would have a powerful impact.⁷⁷ They consulted with a wide range of stakeholders in the university, business, policymaking, and developmental sectors to identify specific skills and capabilities they considered most valuable and relevant, asking everyone: *'If we are to train for you, what kind of person would you like to have?'*⁷⁸

To give the programme real-world emphasis, Richard contacted the National Crops Resources Research Institute (NaCRRI), a NARO facility located on the outskirts of Kampala. The relationship between Makerere and NaCRRI had already been strengthened through the FORUM grants. In the late 1990s, an outbreak of a new fungal disease called soybean rust had devastated the crop throughout Uganda. In response to the crisis, FORUM grantees at Makerere had collaborated with NaCRRI researchers to develop three new rust-resistant varieties of soybean. Not only were these new varieties disease-resistant, but they offered higher yields and better nutrition than were found in previous varieties. They have since grown so popular that they can still be found growing throughout Sub-Saharan Africa.

As a FORUM master's student, Dr Robert Kawuki had worked on the team developing one of those new varieties, the Maksoy 1N. He had contributed with his colleagues to the world's first publication on soybean rust. His involvement in that research, he claimed, *'jumpstarted my career and implanted in me a new zeal for science, when I realised how important soya's high protein value is for childhood nutrition.'* He added: *'Whenever I move around the country and see that variety, I have a feeling of accomplishment. That was my contribution to Uganda.'*⁷⁹

As the new postgraduate programmes were getting underway, Patrick and Adipala had proposed aligning the curricula with NaCRRI's research agenda, creating a mutually beneficial arrangement by which NaCRRI scientists would supervise and provide hands-on research subjects for the RUFORUM students, boosting their own careers and networks in the process. By that time, Robert was working as a molecular geneticist at NaCRRI, and would soon be supervising some of the new students.



Richard Edema



Patrick Okori



Robert Kawuki

⁷⁶ *Dirty Hands, Fine Minds*, p. 42

⁷⁷ *Dirty Hands, Fine Minds*, p. 43

⁷⁸ *Dirty Hands, Fine Minds*, p. 43

⁷⁹ *Dirty Hands, Fine Minds*, p. 55

Building synergies through SCARDA

The findings of the 2005 NARS Assessment undertaken by FARA had helped shape the thinking behind the new postgraduate programmes. FARA had secured funding from Britain's Department for International Development (DFID)⁸⁰ to create a new programme called Strengthening Capacity for Agricultural Research and Development (SCARDA) that would respond to the issues identified in the NARS Assessment. The programme had been funded to run from 2007 until 2011.

SCARDA was to be a short-term, intensive, yet also 'integrated and holistic' programme of change. It would focus on building the institutional as well as the technical and leadership capacities of several weak and post-conflict countries identified within each African sub-region. Among other priorities, SCARDA aimed to provide master's level training for NARS researchers from the targeted countries. While the scope of SCARDA was limited by funding, its vision was ambitious. The aim was to produce a model of capacity strengthening that could be validated and then adopted widely across the continent. In East Africa, the focal countries were Burundi, Rwanda, and Sudan. RUFORUM was engaged by FARA to provide training.

This arrangement gave RUFORUM the opportunity to partner in, contribute to and learn from a wider process to develop postgraduate training, research support and mentorship of young scientists. In practical terms, it would also provide much-needed students and funding to help launch some of the regional master's programmes. In addition, it would provide a vehicle for further strengthening relationships between the universities, NARS, and sub-regional organisations.

It was an exciting opportunity, yet some members of the technical committee were uncomfortable. They feared SCARDA would distract RUFORUM from its core focus of capacity strengthening among its member universities. Vincent Saka recalls:

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'It was felt by some that RUFORUM needed to stay small. Other universities had wanted to come into the network but were refused. We were concerned about maintaining good administration and so on, but in hindsight I think we were wrong!'

As Adipala recalls in his memoirs:

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'Our Board had decided that RUFORUM needed to avoid expanding too fast, and some saw SCARDA as taking us beyond our mandate. But I kept pushing. Somehow, I saw a natural affinity between SCARDA and our organisation, with its design and values around mutual support. Burundi was a needy country, and we were pioneering a model to help build capacity in just such under-resourced settings!'

The challenges were daunting. In Rwanda, the 1994 genocide had robbed the country of its scientists and researchers. More than a decade later, the Rwanda Agricultural Board (RAB), the governmental agency tasked with reviving the agricultural sector and building food security, was staffed to only a third of its capacity. Food security naturally topped the agenda for Rwanda, Africa's most densely populated country – where even the steepest hillsides were under intense cultivation, with every hectare of cultivated land

⁸⁰ DFID closed in 2020 and was since reopened as the Foreign, Commonwealth & Development Office (FCDO)

needed to feed at least nine people.⁸¹ SCARDA-funded master's students who trained in RUFORUM's new regional master's programmes would inject key human resources into the system at a critical time.

Rwanda's tiny neighbour Burundi's agricultural system was no better off. A decade of conflict had decimated the national Institut des Sciences Agronomiques de Burundi (ISABU) and left few resources for rebuilding it. The war had displaced and impoverished the population and destroyed basic infrastructure. Between 1993 and 2000 the poverty rate had doubled, and life expectancy had plummeted from 51 to 44 years⁸². Sixty per cent of the population was food insecure.

For SCARDA, however, Sudan posed the greatest challenge initially, for political reasons. FARA and ASARECA had wanted to build capacity for South Sudan, decimated by decades-long civil war, through SCARDA – but South Sudan would only break away as an independent country in 2011. For the time being it remained part of greater Sudan, whose government in Khartoum was not inclined to allow such a selective regional focus within its borders. As Adipala Ekwamu recalled in his memoirs: *'The message from the government was clear: if you want to do something in South Sudan, it has to be Sudan you are dealing with, not South Sudan.'*⁸³

In 2007, he travelled to Khartoum with Patrick and Dr Tim Chancellor, then of the Natural Resources Institute of the University of Greenwich, in the United Kingdom, also a SCARDA partner, to try and convince the Sudanese to participate in SCARDA. In Khartoum, they were fortunate to meet with Prof. Ibrahim El-Dukheri, an official from the Agricultural Research Corporation of Sudan (ARC) who would later become the organisation's Director-General and then the Minister of Agriculture.

It was a meeting of minds. Listening to Adipala and his colleagues, Ibrahim quickly realised the potential of SCARDA to help Sudan rejuvenate its agricultural research system through new partnerships and connections with neighbouring countries. Around 80 per cent of the Sudanese population relied on agriculture for their livelihoods, but their support systems were poorly developed. International sanctions had left Sudan's universities and research system isolated. Senior staff of the ARC were ageing, while younger scientists were not being mentored or finding opportunities to publish or travel. Sudan had a high rate of participation in higher education, but systems were stagnant, and thousands of graduates remained unemployed. El-Dukheri recalls:

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'I learned a lot through that engagement. My involvement with SCARDA gave me the opportunity to interact with Adipala and other colleagues. It gave me the opportunity to look up the ladder and strive for more and more engagement. The discussion around the table gave me the courage to say, I see what my country needs, how it can be developed, and what we need to see happening. I am personally indebted to RUFORUM, and we continue to put our hands together to have a greater impact through engagements at a higher level. That all comes from the trust that was built in the early days through SCARDA.'

Ibrahim was convinced that SCARDA would bring innovative ideas and energy to Sudanese agricultural research systems. He made his case to the ARC's Director-General, Prof. Dr. Azhari A. Hamada and his two deputies, lobbying hard to bring his government on board. Adipala and his colleagues were also beginning to appreciate that much could be gained through engaging with the whole of Sudan. As a first step, RUFORUM organised workshops locally for young Sudanese scientists to be trained in data management,

⁸¹ *Dirty Hands, Fine Minds*, p. 57

⁸² RUFORUM Burundi Storyline, 2014

⁸³ *Unfinished Journey*, p. 141

and scientific and proposal writing. By the end of 2007, two Sudanese universities joined RUFORUM, the University of Kordofan and the University of Gezira, paving the way for an enduring partnership between RUFORUM and Sudan that continues to grow.

The following year, towards the end of 2008, the first batch of SCARDA students from the NARS of Burundi, Rwanda and Sudan went to join the new regional master's programmes at Sokoine, Makerere, Egerton and Nairobi Universities. Mayada Mamoun Beshir, a junior scientist with Sudan's ARC, was part of the initial intake of 15 students from ARC and Kordofan University to join these new master's programmes from Sudan. It was an amazing opportunity, and she knew very well how hard it was for young scientists to find their way in Sudan without support. After graduating from the University of Khartoum, she had lived hand-to-mouth for several years as a part-time lecturer, considering herself lucky to have employment at all, because so many of her peers remained jobless. Forty per cent of her undergraduate cohort remains unemployed, she says. At last, Mayada secured a better job at the ARC and from there was selected to join Makerere's master's in plant breeding and seed systems through SCARDA. Arriving in Uganda, Mayada was thrown into the deep end. She recalls:

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'I travelled on Eid after Ramadan. Uganda was a very different world. After two weeks, I decided I could not survive there. It was the language, the food, the culture, even the boda boda motorbike taxis. There was the issue of separation between north and south Sudan. They gave us exams every two weeks and my marks were so low. I couldn't pass. I said to myself, I have to go home. But after one or two months, people got used to me and I got used to the language. I started to think about the food and the language not as a challenge, but as an opportunity. With that change to my thinking, I started performing well.'



Mayada Mamoun Beshir

Today, Mayada is a senior scientist at ARC, responsible for plant breeding and tissue culture programmes for a wide variety of crops. She publishes widely and collaborates in vibrant networks of researchers across Africa and beyond. She remains a RUFORUM stalwart, having been supported through the network to earn her PhD doing innovative research developing genetic markers in sorghum for resistance to the turicum leaf blight disease. *'RUFORUM is like a mother and a father to me,'* she muses.

SCARDA posed a steep learning curve and became the catalyst for many individual and institutional transformations. The programme would also help to seed new thinking and models for post-conflict capacity strengthening and would foster various relationships and growth processes that continue to develop and reverberate in the network to this day.

Institutional transformation through drylands PhD training

Establishing the new regional master's and PhD programmes, RUFORUM's Secretariat staff and university personnel were pushed to think more comprehensively about how the universities could meaningfully engage with the deepest challenges facing their societies. RUFORUM's new regional programmes in

research methods⁸⁴ and drylands resource management introduced transdisciplinary approaches to research, which invited students and lecturers to develop wider lenses on interlocking local and global issues such as climate change, land tenure, trade, and subsidies.

None of these topics know disciplinary boundaries – yet many academics still found it hard to break the mould of hyper-specialisation fostered by the universities. These systems promoted narrow, disciplinary thinking, but were failing to provide big picture thinkers who grasped smallholder agriculture as a system and knew how to apply diverse research methodologies to effect change in that system.⁸⁵

Malcolm Blackie and Paul Woomeer’s scoping study of the network had highlighted the need for a greater response to climate change from the universities. The study had identified the University of Nairobi as the place to concentrate these efforts, on the back of a previous master’s training programme working with pastoralists on range science in arid areas that had occurred during the 1980s. The university had a base of knowledge and experience to build from but needed to radically overhaul its thinking in the design of a new PhD programme to engage researchers with the interconnected issues of climate, ecosystems, economics, and culture. It was becoming evident that wicked problems such as climate change needed novel kinds of thinking, research, and pedagogical responses from the universities. As Agnes Mwang’ombe had earlier reflected:

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*The question is: how can we manage very fragile resources to sustain humanity and life?*⁸⁶

Almost 80 per cent of Kenya’s land is considered arid or semi-arid. Northeastern Kenya borders the Horn of Africa, where environmental stresses had long been contributing to cycles of famine and conflict. Dry seasons were becoming longer and more unpredictable, and droughts more frequent. Rural populations remained vulnerable and neglected, often with scant access to water, roads and schools. Population pressures were pushing more people into marginal areas, triggering conflict, and increasing the pressures on fragile lands.

Researchers were beginning to understand that climate change would have profound impacts on farmers in all aspects of their livelihoods – further exacerbating existing problems of droughts and flooding, pest and disease management, food and livelihood insecurity, gender inequalities, soil depletion, population growth and urban migration. Researchers had a significant role to play in offering effective, creative, and appropriate interventions to meet these challenges. As the programme was in its prime, Adipala had reflected:

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*We needed to prepare students for an environment of working with a diversity of viewpoints. We are trying to create a group of critical thinkers, who can facilitate processes, and who don’t have to know it all but can learn from communities.*⁸⁷

⁸⁴ Deans in the agricultural faculties of member universities were also eager to develop desperately needed skills in proposal writing, research methods, biometrics, sociology, business and IT.

⁸⁵ *Dirty Hands, Fine Minds*, p. 47; RUFORUM Drylands PhD Storyline, 2012

⁸⁶ *Dirty Hands, Fine Minds*, p. 50; RUFORUM Drylands PhD Storyline, 2012

⁸⁷ *Dirty Hands, Fine Minds*, p. 51; RUFORUM Drylands PhD Storyline, 2012

Wellington Ekaya, a FORUM alumni and lecturer at the University of Nairobi, who was the programme coordinator, tapped expertise from institutions across the region and beyond to design the programme. He aimed to contribute towards higher education by making teaching and research more relevant and responsive to the needs of farmers and communities. Experts from other institutions including the International Livestock Research Institute (ILRI) and the International Union for the Conservation of Nature (IUCN) were engaged to teach modules in subjects ranging from ecology and economics to policy and philosophy.⁸⁸

A unique aspect of the drylands and other new PhD programmes was that they included taught courses. Adipala had advocated for this approach, common among American universities but not in the British academic system upon which the University of Nairobi and other RUFORUM institutions were modelled. Those few African PhD programmes in existence at that time were exclusively research-based. The RUFORUM doctoral programmes, by contrast, would combine an initial year of coursework with a further two years of dissertation research and writing. Through the taught course element, students would learn the fundamentals of research methods, leadership, facilitation, and administrative skills. Adipala wrote in his memoirs:

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*'We pushed the universities to look beyond their traditional scope of only building technical expertise, and to include cross-cutting skills training in their programmes. We recognised that students would be working with a diversity of actors, in a diversity of different contexts, and would need diverse skills to succeed in this. To me this was fundamental. But we encountered a lot of resistance... (w)e argued that our students would very likely one day find themselves having to serve as leaders, managers, and administrators, dealing with issues beyond their technical fields.'*⁸⁹

This three-year time frame for completion was remarkably ambitious. It was not unheard of for doctoral researchers in African universities to take up to a decade or more to finish. On top of this, students would be required to publish two papers in peer-reviewed journals to graduate. The same standards and graduation requirements were applied to all the new regional programmes introduced across the network. All students were required to conduct research on contemporary problems in collaboration with communities in their country, producing at least two peer-reviewed papers to meet requirements of graduating within a two- or four-year time frame⁹⁰. They also had to take leadership and other 'soft skills' courses outside of their technical fields, to gain competence engaging in development practices. In each institution, these requirements introduced unfamiliar new practices that lecturers and administrators had to learn to navigate and appreciate. The introduction of such changes was often contentious, and the reasons for these rules were not always well understood. Some feared that these stringent new requirements would prevent students from graduating. Over time, however, the new policies and practices would gain greater acceptance and in many cases they would become institutionalised. Eventually, this comprehensive and well-rounded programme design was a factor that attracted interest from the World Bank and informed the African Centre of Excellence (ACE) concept, to be discussed in Part III.

⁸⁸ *Dirty Hands, Fine Minds*, p. 51; RUFORUM Drylands PhD Storyline, 2012

⁸⁹ *Unfinished Journey*, p. 135

⁹⁰ Two years for a master's; three to four years for a PhD

Behind the scenes, the drylands PhD programme in Nairobi had faced its share of institutional hurdles. While Agnes Mwang'ombe's colleagues in the Faculty of Agriculture were enthusiastic about the new coursework-based approach, she met with resistance when she brought the proposal to the University Senate for approval. The Vice-Chancellor himself, who chaired the Senate, demanded to know why such a novel approach was necessary. Agnes recalls:

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'I was now the Principal. I had my Dean and chairman and others in the University Senate. We had prepared ourselves, because you had to fight hard to get a document passed in the Senate. You have to be very strategic. We were shot down, but not quite. We were asked to do some revisions on the programme, but at least we were not thrown out. I returned to the Senate with my team. This time we were more prepared, and we got the programme passed.'



Agnes Mwang'ombe

In 2008, the University of Nairobi welcomed its first intake of 18 new students drawn from seven countries, coming from as far away as Botswana. The Rockefeller Foundation had committed funding for this first cohort, but beyond that the university was on its own. The rich variety of dissertation topics chosen from students reflected just what a radical departure this was from traditional academic programmes. Students chose to study the economics of camel production systems, and the effects of termites on vegetation. They studied ethnobotany, genetic biodiversity, and conservation.

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'Armed with a broad understanding of the issues introduced in the coursework, they dispersed to the far reaches of northern Kenya and beyond, to learn what it meant to eke out livelihoods in the harshest of environments. In exactly 35 months, the programme graduated the first set of six students. Another 11 graduated in the four months that followed.'⁹¹

The programme was a success, despite the precarity of funding. As successive cohorts of students continued to graduate within the allotted three years, representing a substantial proportion of the university's overall PhD cohort, the university's leadership recognised that the drylands PhD programme must be doing something right. Agnes recalls:

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'The Vice-Chancellor wanted to know: what is making that programme produce graduates on time? I explained to him that the students all have the same instruction in class and reach the same broad baseline through the coursework. When they reach the second semester, they start preparing their proposals. They start their research at the same time and are closely supervised. We had very strong mentorship, and the programme remains strong until this day.'

⁹¹ *Dirty Hands, Fine Minds*, pp. 51-52

Convinced of the value of this approach, the university's leadership introduced a policy that all doctoral programmes contain a taught course component, as well as other new elements such as specified learning outcomes. Agnes reflects: *'We were not only able to increase the number of graduates, but we made institutional changes in how we do business because of RUFORUM.'*

Bringing the Bill and Melinda Gates Foundation on board

The BMGF would not become a major supporter of the new regional postgraduate programmes. However, as these were getting underway, a parallel process was ongoing in the Secretariat. RUFORUM had been invited to submit a funding proposal to the Foundation, and a grant writing team was hard at work to land this opportunity. At this stage, RUFORUM was a viable entity gauging from the levels of commitment of its membership. What it lacked was the financial resources to do the work it envisioned. The Foundation had invited Adipala to develop the concept note he had given Melissa Ho in Malawi into a full proposal for funding and had sponsored an external team of consultants to help RUFORUM craft the proposal. The team consisted of Joyce L. Mook, who had by then retired from her post as Associate Vice-President at the Rockefeller Foundation and was now serving BMGF as a senior advisor on human capital development in agriculture. She was joined by Adipala, Patrick Okori, John Lynam, development expert Catherine Namuddu, and ICT expert Liz Levey.⁹²



Kay Muir-Leresche

The proposal submitted to BMGF emphasised RUFORUM's role in strengthening agricultural innovation and promoting the universities' engagement with and responsiveness to rural farmers. It was envisioned that the competitive grants would continue to serve as one of the main vehicles for achieving this. The proposal asked for core funding support to help RUFORUM strengthen its capacities and engagements across the board. Various threads were outlined which connected to this wider aim: attracting greater numbers of female grantees; strengthening methodology and information and knowledge management; focusing on mentorship and retaining scientists within the system; and strengthening RUFORUM's own management and governance, including monitoring and evaluation, and ICT⁹³.

RUFORUM had asked for \$12.7 million in core funding over five years. In 2009, the funds were committed in full. An enormous financial constraint was lifted. At last, RUFORUM's leadership could breathe a little easier. The funding was granted to scale up and strengthen the network's activities. The grant award stipulated deliverables, but also allowed flexibility and freedom. RUFORUM was able to hire new staff and build capacity within the small, overstretched Secretariat. As Kay Muir-Leresche reflects:

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'RUFORUM didn't fit any neat boxes. The Gates funding allowed it to grow. They were happy to see RUFORUM grow organically and in a way that was driven by its own initiatives. They didn't need to dictate. Gates laid down rigid criteria only for financial accounting and for evaluations of what was being done. As long as the end goals were being met, they didn't micromanage.'

⁹² *Dirty Hands, Fine Minds*, p. 34

⁹³ Original BMGF grant proposal

This combination of programmatic freedom with strict oversight would set the stage for RUFORUM's further development and growth. BMGF support opened the path for RUFORUM to grow and strengthen as an institution and begin to realise its strategic vision on the ground, with strong capacities, oversight and governance mechanisms put in place, especially in the Secretariat. The oversight and focus on systems and accountability would be crucial to maintaining the organisation's credibility as it grew. RUFORUM's next phase would see it grow and become an established network with an Africa-wide footprint. In the process, it would become a catalyst and thought leader. It would also demonstrate the tangible value of its approach, particularly through new regional training programmes which turned out to be a powerful mechanism for strengthening post-conflict research systems in Burundi, Rwanda, Sudan and elsewhere.

Nurturing grants for emerging institutions

The funding from BMGF enabled RUFORUM to expand the nurturing grants that Bharati Patel had initiated under FORUM. From the earliest days of FORUM, the network had always faced challenges of sharing limited resources and balancing the diverse strengths and needs of its member universities. Following the admissions of the University of Zambia and Sokoine University of Agriculture in Tanzania in 2005, RUFORUM had been steadily developing new relationships with other universities interested in joining from elsewhere in Uganda as well as Ethiopia, Sudan, Burundi, Rwanda, DR Congo, Botswana, Lesotho, and Swaziland.⁹⁴ The Vice-Chancellors were reluctant to let RUFORUM grow too fast. Nevertheless, by the end of 2009, the network had grown to 25 member universities.

That same year, the Vice-Chancellors decided to prioritise mentoring and nurturing grants to those institutions needing support. These nurturing grants were provided to help historically weaker universities overcome their specific challenges and develop their research and postgraduate training programmes. They would become a mainstay of RUFORUM's approach to managing its expansion in the coming years.⁹⁵ Africa University in Zimbabwe, Sokoine University of Agriculture in Tanzania, and Jomo Kenyatta University of Agriculture and Technology, Kenyatta University and Egerton University in Kenya were all early recipients of nurturing grants.

In Zimbabwe, a nurturing grant to Africa University, a small Methodist university, had helped to sustain agricultural research during a period of political and economic turmoil. In FORUM days, the university's Dean of Agriculture, Prof. Fanuel Tagwira, had received a grant to study the effects of soil fertility on groundnut production. This grant had opened the way for the university to develop a broader research platform focused on the needs of smallholder farmers, on whose activities 70 per cent of the population depended at the time.

As crisis gripped Zimbabwe in the early 2000s, however, hard-won efforts to develop research with communities began to collapse. The university faced staggering inflation and shortages of currency, fuel, and other essentials. Researchers could no longer travel to meet with farming communities. For Zimbabwe's small-scale farmers, the timing could not be worse. They also suffered from the turmoil and shortages of essentials, in addition to being hard hit by increasing droughts and unpredictable weather patterns brought on by climate change, exacerbated by severely depleted soils.

During these challenging times, an \$80,000 nurturing grant from RUFORUM supported the training of ten master's students at Africa University, in subjects ranging from agribusiness to conservation agriculture. The support enabled the university's research efforts to continue amid adversity. One master's student,

⁹⁴ BMGF proposal

⁹⁵ *Dirty Hands, Fine Minds*, p. 70

Stembile Mbizi, had worked on improving yields of amaranth, a highly nutritious grain with strong potential for alleviating hunger because of its hardy drought tolerance. She had observed: *'Zimbabweans are hard workers, but they need knowledge. People want to shift to growing crops that suit their environment, but they don't know how to do it.'*⁹⁶

Her colleague, Bertha Mashayamombe, had completed her master's and then been promoted to senior agronomist with Zimbabwe's extension service, Agritex. This role positioned her well to bridge the worlds of farming and policymaking, working with farmers in drought-prone areas to employ techniques of crop rotation with minimal soil disturbance to conserve precious soil moisture and nutrients. Bertha was passionate about the potential of conservation agriculture to help farmers – especially women – prevent crop losses and adapt to climate change. Primarily through her efforts, around 14,000 smallholder farmers had adopted the techniques and increasingly found themselves empowered with knowledge to prosper even in dry years. Bertha had reflected:

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*'Women have been empowered because they no longer rely on their husbands to till the soil. My area is very traditional. My father owned the land, but it was always my mother working in the fields. I think it's important that the person who does the agriculture is the one who makes the decisions.'*⁹⁷

As RUFORUM continued to grow, the nurturing grants became an important mechanism for strengthening particular universities in ways targeted to their specific needs and goals. It was also to become an important mechanism for partnering institutions with one another so that a university with strengths in a particular area could assist other institutions needing to develop their own capacities in that area. This could be achieved in a variety of ways, ranging from tailored programmes of institutional support to the regional postgraduate programmes, which allowed for students to train in neighbouring countries and then bring those skills home. These diverse approaches were frequently combined.

The University of Zambia, for example, harnessed a powerful combination of networking, nurturing grants, and postgraduate training through Makerere's regional plant breeding programmes to successfully develop its own master's programme in plant breeding and seed systems.

Key to achieving this success was that the capacities of individual academic staff members were built through the regional programmes in tandem with institutional strengthening measures taken at the university, reflects Prof. Mick Mwala, who heads the university's Agricultural Technology Centre and was formerly Dean of the School of Agricultural Sciences. He said:

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'These interventions transformed our institutional strategy, in the sense that RUFORUM gave us nurturing grants to inculcate in our management the skills and culture to handle an MSc postgraduate programme. There is an individual component to this, but there is an even stronger institutional strengthening aspect. Through nurturing grants, RUFORUM helped us build considerable institutional capacity that has now enabled us to be competitive and solicit support from wider players.'

⁹⁶ *Dirty Hands, Fine Minds*, p. 73

⁹⁷ *Dirty Hands, Fine Minds*, pp. 73-74

Dr. Langa Tembo was one of three lecturers from the University of Zambia to gain his doctorate through the regional PhD programme in plant breeding at Makerere. In Uganda, through Makerere's special arrangement with the National Crops Resources Research Institute (NaCRRI), he gained mentorship and practical experience working with NARO researchers to identify the genetic markers for resistance to ear rot disease. The work was highly relevant for food security in Zambia, where maize is the staple food and was becoming increasingly vulnerable to the stresses of drought, poor soils, and crop diseases such as ear rot.⁹⁸ There he learned traditional plant breeding techniques and gained experience with the emerging tools of biotechnology. This was to prepare him to return to Zambia with his doctorate to build up the university's own plant breeding and biotechnology programme. As he had reflected a decade ago: *'Here (at Namulonge) I have the luxury of consulting the people around me. But when I go back, I'll be the expert!'*⁹⁹

To build the programme in Zambia and give it a regional flavour, staff linked with researchers from the Africa University, the University of Zimbabwe, and Makerere to develop the curriculum. They consulted with local industries to ensure the programme would be relevant and responsive. They decided to drop the focus on biotechnology, leaving that to Makerere, and instead focus only on plant breeding and seed systems to minimise competition between the universities and concentrate their efforts where they would have the greatest impact.

Fast forward to 2022, and the University of Zambia is now renowned for training plant breeding experts across the region. Mick observes: *'If you walk into any seed company or any centre of research in Zambia today, you will find a graduate of the university's plant breeding and seed systems programme.'*

The programme contributes to scientific knowledge and food security and continues to strengthen the capacities and connections of the university. The university has learned to manage and market the programme, attracting further support and sponsorships for students from the Alliance for a Green Revolution in Africa (AGRA), the European Union, Bioversity, and the International Food Policy Research Institute (IFPRI). More than half of the master's graduates have gone on to do their PhDs. As Mick says:

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'We are responding to the needs of society and industry. We have the skills to develop new crop varieties and put the right varieties in the right places to increase productivity and contribute to food security.'

⁹⁸ *Dirty Hands, Fine Minds*, p. 39

⁹⁹ *Dirty Hands, Fine Minds*, p. 39



Community action research platforms

Funding from the BMGF also provided the means to scale up the impacts of the competitive graduate research grants (GRGs), which had been a mainstay of the network since FORUM days. As the regional master's and PhD programmes were gaining traction, board members and university Deans were also looking for ways to deepen and strengthen the work of the GRGs. These small grants had been remarkably effective as a way of training people and producing valuable research. But it was felt that with more resources and a wider scope, the interventions could have a more far-reaching and long-lasting impact in the communities by building a broader stakeholder platform. The small grants typically focused on production constraints and had some but limited links with other agencies. In several cases, such as with Adipala's work



Abigail Otinga



on cowpeas in Uganda and the late Sheunesu Mpeperekí's work on soybeans with smallholder farmers in Zimbabwe, projects gained momentum naturally and achieved significant impacts on livelihoods and food security. Looking at these success stories, the board and technical committee members started looking for ways to make the impact and sustainability of new programmes more likely. It was felt that RUFORUM needed to create stronger multi-agency platforms designed more intentionally to engage the universities across value chains with communities for a longer and more meaningful duration. The Community Action Research Programme (CARP) was a new programme designed to do just that. By early 2010, the first three five-year CARP grants of \$300,000 each were awarded.¹⁰⁰

One of the CARP awards went to the University of Eldoret in western Kenya, where researchers had – in large part through FORUM and RUFORUM grants – produced several simple, affordable technologies that could help farmers improve their soils and their yields. However, very few of these technologies were being taken up by local farmers. Western Kenya had long been considered the breadbasket of the nation, but this status was beginning to appear doubtful. Soils were depleted from natural acidity, improper use of fertilisers and overproduction from intense population pressures on the land. The CARP programme was designed to help bridge the divide between farmers and university researchers, and to assist with the uptake of useful technologies through the strengthening of farmer groups.

Abigael Otinga, a young lecturer at the University of Eldoret, had worked on some of these earlier innovations intended for greater uptake through the CARP. Born and raised in a nearby community around Bungoma, Abigael had grown up watching her mother, a subsistence farmer, struggle to cultivate sweet potatoes to pay her school fees. Abigael recalls:

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'She would farm her field of one acre of sweet potatoes, but it was never enough. We used to help during harvesting. She would harvest into these very big sacks which weren't the standard sacks but were like one sack on top of another sack, and because of the middlemen the price was really low. I saw with time that the yields were getting lower. When I was an undergraduate, the yields were not as good as they used to be when I was in primary school.'

Such observations were enough to instil in Abigael a passion for helping small farmers gain better livelihoods. She had earned a university scholarship for undergraduate studies in forestry, and then was employed to work with farmers on an agroforestry project. In 2005, she landed a RUFORUM-sponsored master's scholarship to work with Prof. Robert Okalebo from the University of Eldoret, studying the efficacy of lime and rock phosphate as soil additives to reduce acidity. She went on to do her PhD through a sandwich programme with Belgium. Returning to Eldoret, she continued to work with Prof. Okalebo on RUFORUM-sponsored grant projects, including one to promote the uptake of the Mbili system. The Mbili system had been developed through a collaboration led by the NGO Sacred Africa involving Paul Woomeer, and then was promoted through FORUM. Mbili, the Swahili word for 'two', was an intercropping system to disrupt pest and disease cycles, while introducing symbiotic nitrogen fixation in the soils. Farmers using this method would plant two rows of nitrogen-fixing soybean between each row of maize to create beneficial interactions in which, through careful spacing, all the plants received optimal sunlight and reached optimal root system growth in the soil.

Part of the thinking behind the CARPs was to engage universities in filling the gaps left by the collapse of government extension services. University researchers were aiming to position themselves to work

¹⁰⁰ *Dirty Hands, Fine Minds*, p. 63

directly with communities in the uptake of useful technologies, but also to reframe the interaction as a collaborative learning process, in contrast to the top-down model of traditional extension. Besides the Mbili system, researchers held caches of knowledge they thought would be useful to farmers. They had developed a method of soil preparation which involved preparing organic compost, analysing its nutritional content, and fortifying it with precise amounts of missing nutrients such as nitrogen and potassium. Using this method would enable farmers to forgo expensive chemical fertilisers. Researchers had also developed their own fertiliser products using local materials, which made them cheaper and better suited to local conditions. Such technologies provided a basis for stronger cooperation among farmers in terms of sharing information, purchasing inputs, and selling their produce.

The CARP project was to support four master's and one PhD student in a process of transdisciplinary, participatory research with farmer groups to combine the different methodologies and interventions into holistic packages that farmers could use to address their challenges – ranging from soil fertility to control of the voracious striga weed to post-harvest value-addition – in the most appropriate, integrated, and comprehensive ways possible. As Prof. Julius Ochuodho, who was Dean of the Faculty of Agriculture at the time, observed:

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*'So many technologies have been developed, but they are not effective alone. The problem is they are being used singly. Our challenge was to look for a way to integrate some of these methodologies for maximum effect.'*¹⁰¹

Farmer groups across western Kenya had slowly been organising themselves over the last decade. Prior to that, grain, coffee, and cotton growers' cooperatives had once been widespread across Kenya, but these institutions had crumbled as commodity prices collapsed during the 1980s. As farmers now worked to revive their collectives, they aimed to learn from one another, pool their resources, promote their shared interest, and gain better access to markets. As the researchers and students were soon to appreciate, however, this was no easy feat. Often such initiatives lacked transparency and struggled to gain farmers' trust. Under the CARP, researchers developed relationships with three local umbrella farmer groups and began to explore their challenges together.¹⁰²

As Prof. Okalebo had earlier observed, the university and the farmers were a world apart. Researchers still had to win the farmers' trust. He reflected:

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*'Universities are known to be ivory towers. When we went to do our survey in Bungoma, we asked the community about their problems with farming. One farmer mentioned a pest, an insect that disturbs their maize. We asked if they had taken that insect to the university for researchers to study, and the response was, "no, we are afraid of that place.'*¹⁰³

By 2014, important strides had been made. On a field visit to Bungoma that year, farmer Stephen S. Ngoya shared with researchers how he had benefited from the combined methods. As he reported, using the Mbili system had not only improved his maize yields, but had given him a bonus soybean crop. Several

¹⁰¹ University of Eldoret RUFORUM Storyline, 2014

¹⁰² University of Eldoret RUFORUM Storyline, 2014

¹⁰³ University of Eldoret RUFORUM Storyline, 2014

years ago, he had nearly abandoned maize production in favour of the local cash crop sugar cane, because the yields were so low. He had commented:

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*'I find when you practise Mbili, your soil becomes rich, it becomes robust. Those soybean roots with those nodules carry a lot of nutrients for maize. The soil is more fertile, and whenever I mix Mbili with other approaches I find it very profitable because both crops are harvested.'*¹⁰⁴

Through a combination of Mbili, certified seed and soil fertility measures recommended by the researchers, Stephen reported that the yields from his two-acre plot had grown from six to 15 bags per harvest, leaving him enough money to buy extra food for his family. Now he was training other farmers in the Mbili methods and working with his farmer group to develop new, value-added products such as soap, bread, cake, and milk from the soybean.

Researchers had estimated that as many as 70 per cent of local farmers had switched to the Mbili method and were reaping similar benefits. In addition, producing soybean in bulk provided an impetus of cooperation amongst farmer groups to develop local markets for soybean and negotiate better deals from buyers. They were also coming together to develop new products and buy inputs in bulk and access financing on better terms.

This introduced the next level of collaboration, as researchers and farmers worked to develop strong platforms for farmers to coordinate and drive such activities, set their own agendas, and collaborate with outside partners on equal footing. Two of the CARP master's students worked with the farmers' organisations to develop strategic plans and business plans, forge links with a local NGO and to put organisational management structures in place such as regular elections for leadership positions. The students helped farmer groups to set up credit schemes and navigate certification processes for their products. These enabled the group to establish common input stocks and seed banks, and to commercialise their soybean and fortified manure products.

Three major lessons were learned:

1. Farmers' willingness to join an association depends on how they perceive the benefits of membership, transparent systems and ultimately on having solid management structures in place.
2. Farmer-to-farmer training and mentorship is needed to enhance the uptake of certain technologies.
3. Serious engagement is needed among all the people and institutions involved in the collaboration.¹⁰⁵

Abigael Otinga reflects:

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'One of the purposes of the CARP was linking the farmers to a platform, to input suppliers, processors, markets, the government, the insurance providers, and standards associations. As the university we are neutral, so it becomes easy to have that platform and integrate. We are still working with the different farmers on different projects established during the CARP.'

¹⁰⁴ University of Eldoret RUFORUM Storyline, 2014

¹⁰⁵ Eldoret CARP Storyline, 2014

Building on their continuous engagement with farmers, the CARP researchers sourced seed funding to establish an outreach centre to continue the work after the formal CARP project ended. Abigael continues:

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'We realised that when the researchers close up shop and go back to their offices, the farmers still have to produce, get markets and continue their dialogues with government agencies. If project funds are not going to facilitate this engagement anymore, then it's as if we have left the farmers where we found them. The outreach centre was established to ensure that the engagement would continue whether there are project funds or not. The project has been institutionalised within the university and is allocated a budget. The co-operative is institutionalised in the community and is growing. This was born from the initial interaction of RUFORUM, the university and the farmers.'

Institutional support for LUANAR

Emmanuel Kaunda's fisheries research work at Bunda College of Agriculture received another of the initial CARP grants. This project was to harness various technologies developed by university researchers to support small-scale inland aquaculture farming in fishponds. The collapse of Lake Malawi's fish stocks

had raised the impetus to look for more sustainable sources of fish, and Bunda College researchers had produced various interventions which, if combined effectively with the right support, farming communities could adopt to create viable aquaculture businesses for themselves.

Researchers had bred a hardier, fast-growing species of tilapia. They had also experimented with new techniques shown in research station trials to improve yields. These techniques included partially covering fishponds with plastic sheeting for warmth; submerging feeding trays in the water to help farmers calculate their fish feed requirements; and introducing an inexpensive yet highly nutritious fish feed sourced from local materials. As Kaunda remarked, through the programme students built both the skills and the passion to work with two farming communities



where trials were conducted, and the CARP programme ran. Through these interventions, farmers steadily saw their livelihoods improve as they gained skills, knowledge, and markets for their fish. Through the programme, a value chain was built in which farmers gained a reliable source of protein-rich food and income for their families. In the community of Dowa, husband and wife team Flora and Edward Mwase, for example, had purchased farming inputs, paid school fees for their grandchildren and purchased such comforts as a mattress and a television¹⁰⁶.

¹⁰⁶ <https://ruforumimpact.org/project/strengthening-universities-community-engagement-for-transformed-agriculture/>

The Regional Fish Node provided the strength to anchor a regional PhD programme in Aquaculture and Fisheries Science which was launched in 2009, and another PhD programme in Agricultural Economics. The two regional programmes attracted students from across Africa, planting a new seed of internationalisation and mobility in the College.

As these new initiatives were putting Bunda College on the map, the institution itself was undergoing transformation. Bunda had been a College housed under the University of Malawi. This arrangement had produced cumbersome bureaucracy, and as Dean of the College Prof. George Kanyama-Phiri had been eager to break away and establish Bunda as an independent university. He and his colleagues developed a strategic plan that would pave the way for this to happen. In 2004, the proposal was presented to Malawi's President Bingu wa Mutharika (now late). The university would host two PhD programmes. Its expertise in fisheries had been well established and tended over the years through successive Forum and RUFORUM grants. As the university became independent, support from RUFORUM was indispensable as was the vote of confidence given by the fledgling new programmes, recalls George Kanyama-Phiri.



Edward and Flora Mwase

The institutional strengthening provided by RUFORUM over the years through its diverse engagements had also sowed the capacities within the institution to become independent. According to Vincent Saka, these various programmes of research and support from RUFORUM over the years helped to build a case to convince Malawi's Minister of Education that the College could stand on its own. He recalls:

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'We had developed relationships with other universities and were also attracting international candidates to study in our PhD programmes. We started to get candidates from Tanzania, Zimbabwe, Kenya, Uganda, Namibia, and Zambia. The capability of offering that level of graduate training grew the university's capacity to supervise students and attracted financial resources.'

The College officially gained recognition as an independent university from the Government of Malawi and was renamed the Lilongwe University of Agriculture and Natural Resources (LUANAR). LUANAR was created through an Act of Parliament (No. 22 of 2011) and began operations on 1 July 2012. George recalls:



Emmanuel Kaunda

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'I was very unpopular. Some people within the University of Malawi were very unhappy, because Bunda produced more research than any other part of the university. But with the blessing of the President, in 2012 we became operationalised as LUANAR.'

Mobility, networks and connections

Meanwhile, in Uganda, Anthony Egeru was a young lecturer at Makerere who had attended RUFORUM's AGM in Entebbe in 2010. At Makerere, he had recently completed a master's looking at the availability of firewood as a source of cooking fuel – one of the few papers to be presented at the meeting that differed from common themes of agronomy and crop production. A dedicated social scientist, Anthony learned about the drylands PhD programme at that meeting and was determined to get there.



Anthony Egeru

There were bureaucratic hoops to jump through – but at last he was admitted to the programme without funding. Anthony sold his car and bought a bus ticket that same evening. Arriving in Nairobi the following morning, he left his suitcase in an office and went to join his classmates. Over the next

three years, he would conduct fieldwork in the Karamoja region of Uganda, travelling with the Uganda Peoples Defence Forces (UPDF) and carrying a Kalashnikov (AK-47 assault rifle, commonly used by the security forces) to learn about the impacts of climate change on the availability of animal forage, in a heavily stressed area where livestock raiding continues to breed ongoing conflict and insecurity. The work would prepare him for his present position as an internationally recognised climate change expert and a senior programme manager in the RUFORUM Secretariat, overseeing the flagship TAGDev¹⁰⁷ programme.

Anthony reflects that his experience in the PhD programme in Nairobi broadened his horizons and his 'landscape of interaction' and gave him the skills and the vision that shape his contributions today. The trans disciplinary of the Drylands programme brought him into contact with scientists at the ILRI and elsewhere. He recalls:

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'I developed networks that I have maintained to today and continued to build. My supervisors in Nairobi assigned me tasks and consultancies. Through that I met so many people in government, private sector, and civil society. I got the opportunity to move across dryland areas of Kenya. The only area of Kenya I didn't see was the coast.'

¹⁰⁷ Transforming African Agricultural Universities to meaningfully contribute to Africa's growth and development

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Each opportunity to enter different networks, organisations, and groups in Kenya had a multiplier effect. I travelled to the German Institute of Tropical Agriculture. I became part of a network of practitioners which helped to shape my research agenda. For me, Nairobi was a launchpad. It's also where I was able to discover some of my own talents: an ability to negotiate and provide leadership. If I had remained at Makerere for my PhD, maybe I would not have the same mindset that I do now. My networks would probably be limited. I would probably have taken a longer time to finish.'

Anthony's experience demonstrates the power of the regional postgraduate programme approach, particularly how their transdisciplinary focus has inculcated proactive and innovative thinking in many graduates from different African countries who remain connected in a network. As he observes, the taught courses levelled the playing field amongst students coming from different countries and provided guidance to those students coming from weaker academic systems and backgrounds, supporting them to develop quality research proposals and complete their degrees within the allotted three years. In addition, the transdisciplinary focus of the programmes created a different reference point for how the universities could position themselves as institutions.

The devolvement of responsibility for the regional postgraduate programmes to their host institutions was always a challenge. Some universities were quick to agree to host programmes, perhaps without considering what it would mean to sustain those programmes financially in the long term. As a result, the energy and quality of some of the regional programmes has lagged. However, Anthony argues that revitalising these programmes and building on their model in other institutions should be a top priority for RUFORUM. He says:

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'We need regional programmes to help us increase the mobility of students and create islands of success that are demonstrable. It is important to remember that regional programmes have also acted as pivot points for creating centres of excellence. They have helped the universities to articulate a different value proposition. Keeping the regional programmes moving and breathing will be a critical part of RUFORUM's future success.'

As Anthony observes, the regional programmes brought students from across Africa together and gave them the opportunities to forge professional links and networks. Many students, through their experiences with new learning styles in the programmes, developed a spirit of independence and proactiveness, and transdisciplinary thinking, and brought these qualities to their roles and institutions after they graduated. As Adipala recalls in his memoir, the programmes all attempted to inculcate a kind of thinking in which graduates would see themselves not as 'functionaries', but as change agents equipped with the diverse skills necessary to innovate, collaborate, mentor, and build the quality of their systems.

The SCARDA mobility funding brought several young researchers into RUFORUM's orbit as participants in the regional programmes. As they earned their degrees, many of them remained in touch with RUFORUM and helped to weave new relationships and ties between RUFORUM and their institutions back home. Graduates of SCARDA and the regional programmes became advocates for RUFORUM and helped pave the way for the network's expansion by lobbying to bring their own institutions into the fold. Thus, the regional programmes and SCARDA contributed to the network's growth and built relationships that continue to grow in diverse ways.

For Dr Micheline Inamahoro, a SCARDA student from Burundi who joined Makerere's plant breeding master's programme in 2008, it was a family matter. So urgent was Burundi's need for trained scientists in the aftermath of its civil conflict that Micheline was eight months pregnant when she arrived on campus. As a young researcher with ISABU, Burundi's national agricultural research institute, it was an opportunity she could not forego.

She met the challenges of studying in Uganda with aplomb. As a Kirundi and French speaker, she needed tutoring in English to keep up with her coursework. When her baby was born, she endured sleepless nights and full days of lectures, where she would have to race back to the house during lunch and tea breaks to nurse her baby¹⁰⁸.



Micheline Inamahoro

The support from Adipala and the RUFORUM Secretariat made it all possible, she said. After graduation she returned to Burundi and found that she had gained confidence as a scientist. Through continued contact with RUFORUM, she was awarded a PhD scholarship to work on horticulture at Stellenbosch University in South Africa, supported by the Carnegie Corporation of New York. Now back in Burundi, she continues to attend RUFORUM gatherings, working with her colleagues at ISABU to continue building the research system. She says:

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'With all of my training and exposure, I am now confident that I know the science. I know how to plan the work, how to manage research programmes, how to run projects, how to collaborate within my institution and beyond it, as well as outside of the country. Through all of my studies and all of the conferences and workshops I have attended, I have been able to start a horticulture programme in Burundi and continue to do research in horticulture. I am also leading the biotechnology lab.'

She reflects on her experience that started with the regional master's programme:

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'I was the first woman from Burundi to be supported in the network. The support from RUFORUM touched my heart. As women, we need support in order to embrace higher studies and also embrace our family lives.'

She continues:

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'Building The Africa I Want starts from my institution. My national research institution has 80 PhD holders among 200 researchers. Those few of us are responsible for running all the crops research in the country. But with RUFORUM facilitation, we can collaborate with the universities and other partners to improve agriculture in Burundi. This is the starting point. We need more highly educated researchers to increase

¹⁰⁸ RUFORUM Burundi Storyline, 2014

production in Burundi. We are collaborating with neighbouring countries and meeting to exchange knowledge, exchange seeds and agricultural products. We are targeting the improvement of agriculture in Africa starting from our nation.'

Leonidas Dusenge was another SCARDA alumnus, who had come to Makerere University from Rwanda to complete his degree in agricultural extension and education. During the Rwandan genocide of 1994, he had been in his final undergraduate year at the National University of Rwanda. Forced to flee with his family into the Democratic Republic of Congo, for nearly four years, he, his wife and two small children survived in refugee camps, sometimes having to flee into the bush to survive on wild fruits when insurgents attacked the camp. He did not expect ever to return home.

The genocide had left the country's research system in tatters, facing a critical shortage of scientists. When Leonidas returned to Rwanda in 1998, the university was empty of lecturers and students. Only three of his classmates had survived.¹⁰⁹ Employed as an agricultural economist in Rwanda's Institute of Agricultural Science, Leonidas arrived at just the right time for the opportunity of doing his master's at Makerere with SCARDA funding. He was to take responsibility for reviving the country's extension services.

At that time, the innovation platform concept was gaining traction in the agricultural development world. It was a paradigm shift away from a traditional, top-down approach to extension, where farmers were instructed, sometimes by coercion, in what to plant and how to take care of their crops. The innovation platform approach, by contrast, brought together all the different actors in a particular value chain such as maize or potatoes, and focused on building communication and alignment among them for the prosperity of each one, from the producer to the consumer. Graduating in 2010, Leonidas returned to Rwanda to pioneer this model nationwide. Working across such diverse sectors as livestock, maize, cassava, Irish potatoes, and fisheries, he was able to work with communities and help them utilise research and knowledge suited to their own circumstances and contexts. As Adipala had reflected in his memoirs:

¹⁰⁹ Building the Africa We Want, RUFORUM Documentary (Video, 2014) <https://www.youtube.com/watch?v=teMLEu8h8fU>



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*'Understanding these uptake pathways – the reasons why a farmer may or may not feel that a new technology suits their particular context – sheds light on how knowledge can be brought to scale. This remains one of the biggest challenges of research.'*¹¹⁰

Working in alignment with the country's One Cow, One Family Programme, for example, Leonidas was able to catalyse a dairy innovation platform. The platform helped to bolster the local dairy industry, providing a steady source of income to families. Under the programme, as each family attained their own dairy cows which then had their own calves, farmers with a 'surplus' calf would, after weaning, provide the calf to a neighbour that did not have livestock. Earning money from dairy, they can invest in their children's education or other productive assets such as pigs. The programme has generated new opportunities for smallholder farmers. It has also brought together the various players in the local industry, including local leaders, milk cyclists, milk collection centre workers, traders, veterinarians, and agronomists¹¹¹. As Leonidas reflected:

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*'I put people together where there is a problem to solve, so that the many actors complement each other, and everyone benefits from what they are doing. They discuss problems and offer solutions from their own context. I like how it involves different people having common interests and different needs.'*¹¹²

Policy engagement and expansion

As RUFORUM spread its footprint on the ground, there were now many people who could tell the story of how the network had impacted their own lives and institutions, and how they, in turn, were making a difference across the system. As Adipala recalls:

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*'The SCARDA process also brought us closer to FARA and the sub-regional bodies. Through all these engagements, we had built a case to put forward to our African leaders. We wanted them to recognise our contributions as universities and see our role in human capital development as an integral part of the broader agricultural development agenda under CAADP.'*¹¹³

The lessons from SCARDA helped to galvanise the November 2010 Ministerial Conference on Higher Education in Agriculture in Africa, an event hosted by RUFORUM, the government of Uganda, CTA and other partner organisations in Entebbe, Uganda. The meeting brought together Ministers of Agriculture, Higher Education and Finance from across the continent to shape a new strategy for revitalising higher education in agriculture and strengthening higher education's linkages to CAADP. More than 400 delegates attended, including national ministers of education, science, technology, and finance, representing countries across the network. Judith Francis recalls:

¹¹⁰ *Unfinished Journey*, p. 144

¹¹¹ Building the Africa We Want, RUFORUM Documentary (Video, 2014)

¹¹² RUFORUM Rwanda Storyline, 2012

¹¹³ *Unfinished Journey*, p. 145

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'People started to buy into what RUFORUM was all about. We had supported meetings where the Deans would come together, the Principals would come together. There was a forum where they could talk and learn from each other and meet with the different levels of management across the region, and with other partners. They were building trust in each other and mobilising together. So, when it came to the Ministerial Forum, there was already a strategy in place for engaging not only at national levels but at continental level.'

The event galvanised new energy towards strengthening the role of higher education in Africa's agricultural development agenda. To carry that process forward, Ministers at the conference established the Tertiary Education for Agriculture Mechanism (TEAM-Africa), a new coordinating body situated within the RUFORUM Secretariat, also involving ANAFE, DFID, USAID and the Food and Agriculture Organization (FAO) to build on the groundwork laid by SCARDA and strengthen higher education in agriculture across the continent. Seeds were also planted for an initiative to create African Centres of Excellence (ACE) as specialised hubs of expertise in universities. The ACE programme would eventually bear fruit as a World Bank initiative, bringing \$350 million investment into Africa's education and agriculture sectors. The conference would also introduce the regular Ministerial Round Table Dialogues that are held annually at RUFORUM convenings and Biennial Conferences.



Theopoline Itenge

By 2013, the network had grown to encompass 32 member universities. Namibia, Lesotho, Ethiopia, and Sudan had all joined, as did Stellenbosch University from South Africa. The breadth and diversity of the network was growing apace. Attending the RUFORUM AGM in Kigali, Rwanda, in 2013, Dr. Theopoline Itenge, a lecturer in biochemistry and genetics from the University of Namibia, recalls feeling tremendously inspired and energised by the gathering of this growing network, where she met colleagues from around the continent. When she returned to Namibia, she convinced her Dean that the University of Namibia should host the AGM.



Frans Swanepoel

In South Africa, Prof. Frans Swanepoel had been instrumental in bringing Stellenbosch University into RUFORUM. An expert in agricultural development and human capacity building with a passion for building sustainable food systems in the context of climate change, Frans had met Adipala at a global food systems meeting in Montpellier, France in the early 2000s and been inspired by his transdisciplinary vision. He had been talking with Adipala for several years about bringing South African universities into the network. Recently appointed as Deputy Director of the African Doctoral Academy at Stellenbosch, an initiative to bolster doctoral training and research across Africa, Frans found himself well positioned to champion the relationship. He recalls:

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'Adipala was at the cutting edge. He had a vision about the need to integrate thinking to address wicked complex problems requiring knowledge from multiple disciplines. Twenty years ago, you hardly heard about trans disciplinarity but this is what he has been driving all along. This approach to facilitate partnerships across different sectors and focus on farmers and making changes to their lives is powerful. It has produced a number of ripples including a greater focus on gender and youth.'

Further overtures were meanwhile bringing academics from West Africa to RUFORUM. The Board had so far resolutely declined to open the network to other regions of Africa, fearing that growth would become unmanageable. However, with new networks and connections forming rapidly, to many it now seemed that RUFORUM was steadily developing a pan-African presence. Nor was it lost on the RUFORUM leadership that the more their presence and membership expanded across the continent, the more compelling their platform for engaging with and drawing support from African leaders would be.

Taking stock as RUFORUM turns 10

Through RUFORUM's engagement with Stellenbosch University, which joined the network in 2013, Adipala Ekwamu was invited to a meeting in Pretoria, where he was introduced to Dr Nkosazana Dlamini-Zuma, then the chairperson of the African Union Commission (AUC)¹¹⁴. RUFORUM's next biennial conference was to be held July 2014 in Maputo, Mozambique. In a major coup for RUFORUM, Dr Dlamini-Zuma had accepted Adipala's invitation to attend the gathering.

Participants recall the Maputo meeting as a turning point for RUFORUM. The network was celebrating its tenth anniversary, and the meeting reflected all the energy of a vibrant organisation that had earned its gravitas. As Joan Apio, marketing and communications manager at the time, recalls:

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'It was a high point when we turned ten years old. That's when we all changed our thinking at the Secretariat. The way we talked about the network was different, and the way we positioned it and sought funding was different. It was about pushing the envelope.'

In addition to Dr Dlamini-Zuma, the Maputo meeting was attended by dignitaries including the humanitarian leader Graça Machel, an eminent person of the African Union and the former first lady of Mozambique and of South Africa, and Dr Akinwumi Adesina who was then Nigeria's Minister of Agriculture and Rural Development and who went on to lead the African Development Bank.

In an impassioned address to the plenary, Graça Machel commended RUFORUM for its African-led vision, yet also reminded the audience of a fundamental contradiction that remains a part of RUFORUM's, and indeed Africa's, unfinished business.



Eminent humanitarian leader Graça Machel

¹¹⁴The meeting is described in fuller detail in *Unfinished Journey*, p. 155

She spoke as an African grandmother, and as a daughter of a rural widowed mother who had been left with six children to feed by herself. She reminded the audience that more than 200 million Africans were going hungry, and that more than 40 per cent of African children were stunted from malnutrition, meaning they would never have the opportunity to reach their full intellectual potential. She said: *'Poverty for me is not a theory, it's something I experienced.'* She told the audience:

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*'I'm proud that this forum exists. You are an example of Africans taking responsibility to face African challenges. You're not waiting for anybody else to do it. You organised yourselves, you decided to take up this challenge, to interrogate what was happening, what needs to be done and what could be done better. I'm very proud of this.'*¹¹⁵

On the back of this, however, she raised a challenge. While African governments had good visions and policies to alleviate hunger and promote development, Machel noted that African governments were still failing to commit the magnitude of investment required to reduce poverty, never mind eradicate it as she was calling for. It was telling, she said, that the funds to initiate RUFORUM had come from international donors, just as 80 per cent of the budget of the African Union itself was supplied by foreign donations. She remarked:

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*'In my language there's a saying, which is "Your granary will never be filled by your neighbour." Our institutions have to be fulfilled by African resources; otherwise, we will have these very high dreams but we will never fill our tummies because our granaries will never be full.'*¹¹⁶

It was a sobering reminder of how much remained to be done. Food insecurity in Africa had been the driving impetus behind the creation of RUFORUM. The network had started out as an initiative of the universities to share ideas and pool their resources to build research systems and position the universities for wider engagements. Over the early years of RUFORUM, the mechanisms had steadily developed to embed new human and institutional capacities systematically. Across RUFORUM's growing network, the cumulative benefits of various collaborations and relationships were accruing at a rapid rate, visible in the mobility of young African scientists, and in the vibrancy of institutions enlivened by innovative community engagements.

After a decade of work, RUFORUM had trained more than 2,000 postgraduate scientists. The network had mobilised more than \$60 million in resources. More than 300 technologies had been developed through all the various research efforts, reaching more than a million farmers¹¹⁷. But how much had all this work actually contributed to changing the realities of farmers on the ground?

The CARPs were generating new insights geared towards strengthening farmer organisations and developing value chains. The postgraduate training programmes were producing groups of scientists inculcated with leadership skills and transdisciplinary experience, embedded in continuously strengthening regional networks. Through SCARDA, RUFORUM was developing relationships with post-conflict institutions, and innovating new ways to nurture and support scientists in fragile systems while supporting the development

¹¹⁵ Graca Machel, Keynote Address, 2014. <https://www.youtube.com/watch?v=XGwvBRecT00>

¹¹⁶ Graca Machel, Keynote Address, 2014. <https://www.youtube.com/watch?v=XGwvBRecT00>

¹¹⁷ Building the Africa We Want, RUFORUM Documentary (2014)

of those systems. Small cadres of capable and proactive scientists had been deployed through RUFORUM's efforts across the research systems of 12 countries – including Rwanda and Burundi – and counting. Successful products such as the Maksoy 1N variety of soybean released in Uganda, and the aquaculture research in Malawi, had made tangible impacts on food security in communities and regions. These were some of the islands of success emerging from the network's efforts. The regular biennial meetings convened by RUFORUM brought together students, Deans, university leaders, network partners and funders from across the world, creating the blueprint for the organisation of global stature that RUFORUM would soon become. Celebrating a decade of existence, RUFORUM's members were enjoying a moment of pride, but also taking a deep breath to redouble their efforts and impact.

The biennial conference held in Maputo, Mozambique, in July 2014 marked the beginnings of the network's formal expansion across Africa. The Board voted to begin admitting new member universities from west Africa. The meeting also succeeded in cementing RUFORUM's alliance with the African Union. Attending the meeting, Dr Dlamini-Zuma had engaged fully, meeting with the passion and vibrancy of the students, and dialoguing with university leaders and government ministers. The Vice-Chancellors had requested her to assist in convening a meeting between themselves and the African Heads of State, and she was ready and willing to deliver on this promise. She told the conference plenary: *'I have listened carefully to all the things you asked me to take to our Heads of State and to the (African Union) Commission and I will faithfully do that on your behalf.'*¹¹⁸

This was just the boost RUFORUM needed. In the same meeting, RUFORUM signed an MOU with the African Union, in which the network was tasked with playing a greater role at the continental level, and broadening its scope to encompass science, technology and innovation, particularly in the implementation of the Science Technology and Innovation Strategy for Africa (STISA) 2024. The Maputo meeting signalled RUFORUM's continued growth in both scale and scope, in recognition of the reality of agriculture's vast footprint in terms of Africa's livelihoods, environmental concerns and economic activities. It was also at this meeting that the Board established the Graduate Training Assistance (GTA) programme to facilitate staff members' travel to member institutions for their PhDs.

Several months after this pivotal meeting, Dr Moses Osiru, who served as RUFORUM Deputy Executive Secretary until 2018, reflected on the network's journey thus far. As he noted, RUFORUM had served as a key platform for the universities at a time of deep growth and transformation, as the numbers of universities proliferated along with the complexity of the challenges they faced. Moses reflected:

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'RUFORUM has a special place as a network, because they recognised the need to have an African-owned institution through which to work to transform the universities. RUFORUM is an exciting place to be, and a place where I believe I can make my contribution count. It is a place that can actually leverage change through its relationships with many different institutions for the Africa We Want, as Dr Dlamini-Zuma put this question to us. The Africa I Want is to see is one where we have Africans leading change that will ensure our populations can feed themselves, that men and women live equally, that everyone has an opportunity to live a quality life, and that there is food on their tables.'

By this time, RUFORUM was on a clear path of growth, weaving new connections with member countries and universities, and building a vibrant culture of mobility and collaboration among its existing constituents.

¹¹⁸ Building the Africa We Want, RUFORUM Documentary (2014)

Over the next few years, RUFORUM would find that having the chairperson of the African Union Commission as a supporter would open many new doors and smooth the way for the growing network to move even faster and further than many had imagined possible. RUFORUM would need to rise to the challenges and opportunities that accompanied the network's growth and expanded engagements with greater energy and resolve than ever before.



PART III: The Mycelial Network (2015–present)



'Your granary will never be filled by your neighbour'
– Graça Machel

RUFORUM was now on a marked growth path. Like mycelium, its spores were spreading everywhere, and at a furious pace that was exciting to some yet made others uneasy. As the first west African universities joined the network, it became clear that for better or worse, this new growth path would shape RUFORUM's future in every way. This was no longer a simple cohort of dedicated individuals and institutions walking a new path together; the network now held unmistakably diverse constituencies travelling in ever-changing configurations along multiple intersecting pathways. RUFORUM was becoming a large and diverse extended family. Inclusive sustainable development for Africa remained the ultimate purpose, but it would clearly be a multifaceted effort for an organisation growing in size and complexity. In some respects, RUFORUM was becoming like those mycorrhizal networks that Prof. Adipala Ekwamu had first studied and been fascinated by many years before as an undergraduate at Makerere University.¹¹⁹

Mycorrhizal networks are 'living bridges' forged between plants and soil fungi. Threaded through healthy living soils, these microorganisms occur in all major edible human crops, essential for the health of both plants and soil. They conduct the mutually beneficial exchanges of minerals and nutrients between the plants and fungi.

For RUFORUM, these mutually beneficial exchanges were happening through the new Graduate Training Assistance Programme (GTA) where universities supported each other, waived fees, and exchanged faculty members for PhD training. They took place through the nurturing grants, the CARPs and the regional postgraduate programmes. If RUFORUM's previous chapter had been about establishing and institutionalising different mechanisms to have a visible impact, the story of the next chapter would be about networking and relationship-building, from the smallholder farming communities where students

¹¹⁹ *Unfinished Journey*, pp. 51-52

and lecturers were building engagements, to the halls of African governments and the African Union. As noted in a RUFORUM evaluation report (2018):

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*'Most importantly, 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.'*¹²⁰

The Graduate Training Assistantship (GTA) programme

As a lecturer in the School of Agricultural Sciences at Makerere University in Uganda, Anthony Mwinje had dreamed of an opportunity to undertake his PhD studies in South Africa. The dream was born from a Grade 5 memory, when he suddenly saw the teachers running from their tea break, waving a newspaper with great excitement. The newspaper headline told of the release of anti-apartheid struggle activist Nelson Mandela from prison. That was how Anthony learned about South Africa and its dark history of apartheid. Catching the excitement and jubilation of his teachers upon Mandela's release, he developed a fascination with the southern African country as it was emerging from a long night of isolation and seeking new connections with its African neighbours. From that day, he dreamed of going to South Africa.

When the new GTA programme was announced in late 2014, Anthony looked at the flyer and saw the opportunity to do his PhD at Stellenbosch University. The next day, he found himself canvassing the halls of the Makerere administration building and the RUFORUM Secretariat, filling out his application forms. The programme had been designed to further the impact of RUFORUM's pioneering efforts to train critical masses of scientists on the continent, utilising all the combined and different resources of the member universities.

Through the GTA, member universities could support one another through their doctoral training initiatives, and young lecturers such as Anthony could find opportunities for advanced training and broaden their horizons beyond their home institutions. While PhD holders were still sparsely represented among the teaching staff of many of the smaller and newer RUFORUM member universities in particular, those universities with more established PhD training credentials also stood to gain from the GTA programme. Most of all, they continued to require students to populate and maintain the quality and vibrancy of their programmes. In the process, the students they hosted would bring resources and contribute to research and to the international flavour of their host institutions. It was a win-win arrangement to boost the ranks of homegrown African scientists. Under the agreement, the institution hosting the doctoral candidate would waive tuition fees and provide accommodation, and the sending institution would provide a stipend to the student.

¹²⁰ Building Africa's Capacity to Train for Africa, RUFORUM@15 Summative Outcome Evaluation, p. 11

Anthony applied immediately to the programme, and in early 2015 enrolled in Stellenbosch and got to work with his supervisors in the Department of Horticulture to develop his proposal. He was the first student to be placed in the GTA programme, and recalls: *'Other students later on in the GTA were drawing lessons from my journey. They came to me for advice on how they could do the same.'*

Anthony recalls that he grew as a scientist and as a person. He worked on the protection of apples from heat and temperature stress known as 'sunburn'; work with important implications for protecting crops against the effects of drought and global warming¹²¹. His time in Stellenbosch broadened his horizons and networks of collaborators. He reflects:

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'Looking back, the experience pulled me out of my shell. What one learns is not only science; you grow as a whole human being. You learn to relate in a different environment with different people and cultures. It's learning about the agribusiness and the fruit value chains.'

For Anthony, the experience of studying in Stellenbosch brought him lifelong connections and new insights to draw on in his teaching and research back home at Makerere. He reflects:

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'There are some very good universities on the African continent, and if African universities collaborate our impact will be greater. African PhD research targets African problems: we are all struggling with similar problems in our economies and our governments. The GTA programme has shown that the more we all move together, the better.'

For Joyful Rugare, a lecturer at the University of Zimbabwe, the GTA programme could not have come at a better time. He had also enrolled for his PhD at Stellenbosch University, taking out an expensive loan. With the GTA award, the financial strain on his family was lifted. At Stellenbosch, he gained supervision and mentorship as well as useful teaching and data analysis experience. He was also able to complete his fieldwork in Zimbabwe, working on weed management in conservation agriculture, testing various leguminous groundcover crops for their efficacy in controlling weeds. Local farmers were using herbicides in their fields, he explains, which was polluting the environment and leading to the growth of herbicide-resistance. He wanted to help farmers develop more biologically friendly ways of protecting their crops from being overtaken by weeds.

The flexibility of the GTA programme allowed him to work between Stellenbosch and the University of Zimbabwe for maximum effect. He recalls:

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'I wanted to study in a different environment with new supervisors. I wanted to benefit from people experienced in my research area. The analysis I did required expensive equipment. We don't have the equipment at the University of Zimbabwe, and I knew Stellenbosch had the equipment. But I also wanted to do research in Zimbabwe because I was trying to develop solutions for farmers in Zimbabwe, but I understood that process would require expertise and equipment we did not have in Zimbabwe. That blending to me was key.'

¹²¹ <https://ruforum.wordpress.com/2015/04/20/sharing-experiences-graduate-teaching-assistantship-first-beneficiary-of-ruforum/>

After Joyful completed his PhD, he was awarded a RUFORUM postdoctoral fellowship supported by the Carnegie Corporation of New York. From the inception of the regional PhD programmes, the Carnegie Corporation had stepped up to provide key funding for both doctoral and postdoctoral research. Their support for scholarships considerably enhanced the success and quality of the regional programmes, and their ongoing postdoctoral grants, PhD scholarship and research funding contributed to the success of the GTA.

With the postdoctoral support, Joyful returned to the University of Zimbabwe and formed a multidisciplinary team composed of a senior academic mentor and PhD, master's and bachelor's students. Through this experience, he learned to supervise doctoral students. He lists the successful impacts of the support he received:

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The whole process of the GTA and the postdoc enabled me to develop capacity to carry out demand-driven research that responds to the needs of industry and to the problems experienced by farmers. I also had the opportunity to nurture upcoming researchers, two of whom have already completed their studies. I was able to give them financial support which enabled them to complete on time. Both are lecturers at other universities in Zimbabwe, who didn't have capacity to supervise programmes. I supervised four master's students and all of them successfully completed their studies and have already graduated. One of the students received the Chancellor's Award for research that has potential for commercialisation, and she is now doing a PhD in the USA. Another did research that was identified by the university as having potential for industrialisation and is now embedded in the University of Zimbabwe Innovation hub. When I finished my PhD, I had 11 publications and now I have 42 to my name. I can now say I've managed grants successfully, thanks to the assistance I received from RUFORUM. The support had a clear impact. My CV has changed, and I can now apply for associate professorship.'

Prof. Levi Nyagura, a mathematician and the former Vice-Chancellor of the University of Zimbabwe who was also RUFORUM's longest serving Board Chair, observes the impact that programmes such as the GTA have had at the university and on the production of future researchers across the network. At the RUFORUM biennial Conference in Cape Town in 2016 he reflected:

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'RUFORUM has been a major driver of postgraduate training at the University of Zimbabwe. We've produced people running the research seed houses in this country. RUFORUM-trained plant breeders in this country have come up with new drought-tolerant varieties of maize and soybean. It has been a major innovator in terms of research and capacity building in agriculture... RUFORUM is also unique in that it has been a key vehicle for empowering smallholder farmers. We have not seen an organisation similar to it which blends academic activities with practical activities at the grassroots level.

For me, RUFORUM is a key vehicle for promoting unity, and a common vision in the training of specialists in agriculture. It is a vehicle that promotes working together among the universities. I'm able to bring experts from Sokoine University in Tanzania, from Makerere University in Uganda, and vice-versa. That I think is a unique innovation on the continent.'

Balancing growth and impact

The outcomes of the Maputo meeting two years prior to Cape Town's biennial conference had effectively set RUFORUM on this new phase of its journey. There was to be Africa-wide growth, which the Board felt was necessary to secure RUFORUM's credibility and influence with governments, and its position as a strong voice and platform for the universities. The comprehensive support from the Gates Foundation had laid the foundations for RUFORUM to expand its programmes in multiple directions and therefore gain traction as a pan-African organisation. That crucial financial injection had given RUFORUM the resources and the autonomy to envision its own path forward, and to scale up its activities and consolidate

its operations – positioning itself, mobilising resources and attracting new member universities – all of which combined provided a stronger platform from which to engage African governments.



Levi Nyagura

RUFORUM's expansion brought out an inherent tension that had been there from the beginning and would only grow stronger. With rapid growth, it was no longer practical or feasible to expect that each member university would have its own grants and postgraduate programmes all funded and overseen by RUFORUM. The Secretariat's funds and personnel were already stretched. In this new growth phase, the network would emphasise its roles of catalyst and thought leader. It would focus on becoming a platform to connect university students, researchers, Deans and leaders across the widening network, securing resources and brokering partnerships to foster thriving conditions in the network, while strengthening its advocacy role.

Yet, there remained tension. Some saw the network's growth as a sign of RUFORUM's growing reputation and influence and were excited to see its strengthening convening power and policy voice. Others wanted to see 'less boots in space and more boots on the ground'. Some thought RUFORUM was growing too fast and wanted the network to stay focused on the quality and impacts of programmatic work. What really mattered, they said, was that each member university derives tangible impacts and benefits from being part of RUFORUM. Only then would the universities strongly invest in maintaining the network and ensuring its continued prosperity. As always, the Vice-Chancellors and the Secretariat staff would strive to strike a balance of both. In moments such as these, Adipala's relationship of mutual trust with the Vice-Chancellors, along with the Board's consultative, if at times unwieldy, style of leadership made it possible to reach consensus when complex decisions needed to be made.

In 2015, Emmanuel Okalany joined the Secretariat to coordinate partnerships both within and beyond the network. In this role, he assumed responsibility for building 'vibrancy' into the network through pairing member institutions with complementary strengths and needs to work together on projects, often also involving external partners such as European partner universities from the AGRINATURA network. These would range from responding to calls for proposals from external funding sources such as the European Union, to sourcing opportunities for staff and student exchanges among the member universities.

When it came to RUFORUM's expansion, Emmanuel favoured a moderate and phased approach to growth. He explains:

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'I must be honest – I was not for the expansion in numbers. What I have to think about every day is, how do I make the network more vibrant? Vibrancy means that each member benefits from being part of the network. With the numbers we have right now, it is difficult to achieve that. The 2006 Strategic Plan recommended a phased expansion. The phasing was to allow the consolidation of success or effectiveness over a period of time. In my role, I don't look at the numbers, I look at how to make all these universities function in partnerships. Personally, I feel that the success of the network depends on the satisfaction that each member receives. If they are just there to fill the numbers, at some point they will not see the benefit and they will leave. It will not add value to RUFORUM.'

He continues:

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'While that is me, I believe Prof. Adipala's vision was looking at a wider picture, and of course I have had to reconcile with that. One day I was asked this question in a Board meeting, and I gave my honest opinion. The Board Chair told me, "we understand what you are saying function-wise, but we also need the numbers. Many applications are coming in, and if applicants are turned away it will destroy the image of the organisation".'



Didier Pillot

RUFORUM was indeed becoming a household name in many quarters. Prof. Didier Pillot of L'Institut Montpellier SupAgro in France, who previously served as Vice-President of AGRINATURA, a network of European universities working on tropical agriculture and development-oriented research, and an important RUFORUM partner from the beginning, had observed, at the 2016 biannual meeting held in Cape Town:

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'I remember ten years ago when I used to go to RUFORUM meetings, when I met colleagues in those meetings, I had to explain that RUFORUM was an attempt to build in Africa what in Europe we had built with AGRINATURA. When I come now to the biennial conferences, I have to explain that AGRINATURA in Europe is similar to what RUFORUM is doing in Africa. This shift is a positive expression of what the organisation of universities has brought to the landscape.'

As RUFORUM grew, it became more important than ever to focus on partnerships with other entities such as AGRINATURA to stay relevant and engaged on the ground, and to attract the resources to develop skills, strengthen institutions and carry out research through partnerships. Even prior to RUFORUM's expansion, international partnerships across and beyond Africa had provided important and sustaining lifeblood to the network. From the very beginning, when the convenings held by Judith Francis brought the two organisations together, RUFORUM universities had collaborated with AGRINATURA member universities on

student exchanges and joint research projects. Such initiatives had long provided important mechanisms for RUFORUM member universities and researchers to upskill themselves in proposal writing and project management and had attracted much-needed and sustaining research funds, helping to maintain the vibrancy and relevance of agricultural research on both continents. According to Didier, the benefits of collaboration were not just practical, but political. Collaboration helped both networks to strengthen the links between the practical work and policy advocacy. He had commented:

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'Being organised in Europe and in Africa, I think we can have more impact on the policies that frame our institutional environments. Those policies need to be framed with some of the insights coming from the actions of our universities.' Such relationships, he pointed out, were strategic to the quality and relevance of the work produced by the universities.

As Didier reflected, over the ten-plus years of RUFORUM's existence at that point, the context of higher education, agriculture, food security and development was changing – and with it so was the universities' scope of engagement. He elaborated:

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'The objectives of food security and economic development through agriculture have always been there and continue to be there, but we have much enlarged the basis of the reason why higher education in agriculture has to face a bunch of challenges that it had not needed to face before. The SDGs are much broader and much more diverse than the Millennium Development Goals were. Climate Change is there. The universities now have a much greater responsibility to train future leaders in those challenges.'

As global policy discourse around agriculture and food systems advanced, RUFORUM continued to adapt its approach to be guided by emerging new frameworks such as the Sustainable Development Goals (SDGs). The network continued to integrate more interdisciplinary and transdisciplinary thinking in response to rapidly emerging problems facing Africa such as climate change and the triple burden of malnutrition, as populations were simultaneously found to be impacted by high levels of hunger and under-nutrition, micronutrient deficiency, and obesity – all arising from the complex dynamics of poverty. At present, a healthy diet is unaffordable to three-quarters of Africans¹²².

As Frans Swanepoel, who also sits on RUFORUM's Technical Committee observes, Adipala's foresight and thought leadership to promote trans disciplinaryity over many years positioned the network to respond to such emerging challenges. He observes: *'If RUFORUM hadn't taken the lead to make people aware of systems methodologies and integrated thinking we wouldn't be where we are today.'*

¹²² <https://www.ruforum.org/sites/default/files/Current%20status%20of%20food%20systems%20in%20Africa%20and%20implication%20for%20poverty%20food%20security%20and%20nutrition-revAbebe.pdf>

Growing young baobabs in west Africa

The first west African institutions from Nigeria and Ghana were soon admitted to RUFORUM, and a deluge of new applications followed from universities in Benin, Cameroon, Egypt, Sierra Leone, Liberia, Senegal and Mali¹²³. For Brice Sinsin, a Professor of Natural Resource Management who was the Rector of the Abomey Calavi University in Benin at the time, RUFORUM membership represented a powerful opportunity to link his small country into academic networks extending beyond Francophone Africa.

Attending a meeting on natural resource management in Uganda in 2006, he had met Prof. Adipala Ekwamu and was struck by his 'extraordinary' vision. As he got to know RUFORUM over the following years, Brice observed rare qualities in the network that distinguished it from other university organisations. He was excited and inspired by the collaborative and participatory way RUFORUM operated. He observed a friendly and innovative culture, where a spirit of togetherness and 'thinking outside the box' prevailed. The style of leadership and the personal relationships among RUFORUM stakeholders was different from anything he had encountered before, and he wanted his university to be part of it. He reflected:



Brice Sinsin

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'In Francophone Africa, the culture has been much more about waiting for the government support to come. RUFORUM has helped us to develop a fundraising culture, and a culture of participatory leadership and governance. The links with RUFORUM have built the capacities of our staff to collaborate and raise research funds. Collaboration is the future.'

At Abomey Calavi University, a husband-and-wife research team exemplified the proactive and community-oriented ethos that Prof. Sinsin was trying to inculcate through association with RUFORUM.

Prof. Achille Assogbadjo, an agronomist, and Prof. Flora Chadare, a food scientist and nutritionist, initiated a multidisciplinary research project centred around one of Africa's most iconic species: the baobab tree. Both Achille and Flora had always shared a passion for edible wild plants and indigenous foods. During Achille's PhD studies, starting in 2006 as he mapped the genetics of baobab trees, he collected baobab seeds from his travels to Sudan, Malawi, Burkina Faso, and Mali and around the continent, and planted them in the fields adjacent to one of the local TVETs in Cotonou. Baobabs are a slow-growing species that can live 5,000 years. As Achille's pan-African baobab garden slowly began to mature, he and Flora began to formulate an agenda for engaged action research, built on the valuable qualities of baobabs.



Achille Assogbadjo

123 *Unfinished Journey*, p. 156

Baobabs are an extraordinarily genetically and geographically diverse, adaptive, and resilient species – they are found growing in a wide range of ecological zones across all regions of Africa from deserts and drylands to tropical forests. They are drought-tolerant and provide food and shelter for wild insect and animal species. They hold extraordinary nutritional and medicinal properties and are revered in many cultures. Yet baobabs are also intensely threatened by climate change and biodiversity loss. The bat species that pollinates baobabs is under threat from habitat loss, while young baobab seedlings are often grazed on by goats or are burned in brush fires, threatening the future of the species.

However, the greatest pressures on baobabs are from humans, who harvest the leaves, fruits, and seeds intensively, interfering further with the natural propagation of the species. All products derived from the baobab tree are highly sought after, and for good reason. While the leaves and fruit powder offer extraordinarily high nutrient value, the oil pressed from the seeds is prized for its medicinal and skincare properties and sells for up to 200 Euros per litre. Achille's goal was to contribute to protecting the wild species by developing



Flora Chadare

techniques for cultivating baobabs so they could be grown as 'crops', thus relieving the pressures on wild trees. Through a GRG grant, Achille and his students experimented with different techniques for germinating baobab seeds, firmly encased in hard seed pods. They developed advanced grafting techniques through which the trees began producing edible leaf crops that could be harvested after only three months. Grafting cuttings from 'mother trees' onto young baobabs, master's student Mariette Agbohessou was also able to reduce the time it took for the young trees to bear fruit. Partnering with local NGOs, the researchers were able to train local farmer groups in these techniques and to help them begin to grow baobabs as a small-scale commercial crop to improve their livelihoods and their families' nutritional status. Achille explains: *The leaves are what people consume every day. Our strategy is to help people grow young baobabs themselves in a home garden to use for food.*

Working with communities in northern Benin, 800 kilometres from Cotonou, scientific coordinator Dr Valere Kolawole Salako recalls that farmers were initially sceptical of the project:

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'When we told them that they could grow baobabs, they said no, baobab is a 500-year tree. We planted two hectares of baobabs with students and farmers and wanted to use this as a showcase, to show that even if baobabs do live for hundreds of years, you can cultivate them in less than ten years and in six months for their leaves. The idea is to have some gardens dedicated to leaves and some gardens dedicated to the fruits.'

With this approach, he explains, baobab cultivation can naturally be integrated into an agroforestry farming system in which a variety of different crops such as pineapples and okra grow synergistically. Achille explains:

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'Now in the context of climate change and the threats it poses, if your other crops fail from drought or flood, you still have baobab, but it's not a competitor, it will protect the soil against hard winds or high rainfall. You can grow all the crops together as an agroforestry system, so it is very adaptable and useful, and also builds resilience.'

He continues:

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'The ecological ambit of baobabs is huge – you see them growing near the sea, near the desert, even in the rainforest in Central Africa! We need to know the diversity within the species. This is very important for selection. We can improve the species based on the needs of local communities and develop varieties that are particularly suited for commercial growing.'

Flora Chadare had met her husband while studying at the University of Ghent in Belgium. While Achille worked on his PhD on the ecology and genetic variability of baobab, Flora was completing her master's in food technology. Reading some of Achille's manuscripts, she saw rich opportunities to conduct her own research and development on the nutritional properties of baobab and applied to do her PhD on this at Wageningen University in the Netherlands. Investigating indigenous knowledge of baobab food



products and the diversity of these products, she learned traditional processing techniques for some 36 baobab products, including dried leaf powder, nectar produced from the fruit pulp, and a fermented drink produced from the fruit pulp called *muchaya*. She carried out nutritional studies of the baobab leaves and pulp, finding prominent levels of Vitamin C and other micronutrients. Flora says:

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Working with indigenous knowledge is important. We can't develop with an imported model. Food is a culture, and if we go to our roots, we can communicate with people about what they eat and then use science to analyse and develop further based on this, so it is a co-creation.'

In a related GRG project to Achille's work, Flora Chadare and her students worked to develop locally available foods with high nutritional values for children and vulnerable populations. They adapted local traditions of fortifying foods such as porridge with baobab and moringa leaves for better nutrition, further developing these formulas and testing them in the lab to find out the bioavailability of the nutrients.

These projects laid the groundwork for further work to develop the baobab value chain and improve the nutrition, quality, and access of baobab products for people. In 2017, Achille and Flora were awarded a CARP grant under the new TAGDev programme, to be discussed further. As the work on baobabs continues, students have contributed to the science of baobab production and food product development, and some have struck out on their own as entrepreneurs. Achille says: *'Baobabs are much more than a superfood. It is a fantastic tree. Many of the solutions to the problems of our lives can come from the baobab. It is a blessing.'*



African Centres of Excellence

Haramaya University in Ethiopia was a pioneer member of RUFORUM, joining in 2009. Attending the RUFORUM AGM in Benin in December 2021, the university's President Prof. Jemal Yousuf reflected on how the relationship with RUFORUM has helped the university to become a more visible, competitive, and sought-after partner with an international profile. Jemal himself had led a GRG grant as PI. The university had introduced two regional master's programmes in 2010: one in Agricultural Information and Communication Management and one in Agrometeorology and Natural Risk Management. It had also received nurturing grants to support female students. These initiatives had contributed towards establishing the university as a leader in climate change adaptation and climate smart agriculture.

Haramaya University is in the Oromia region of eastern Ethiopia, in one of the most arid places on Earth. The area has suffered a series of intense and prolonged droughts, decimating farmers' livestock and livelihoods and spreading food insecurity and hunger. As of February 2022, a third consecutive failure of the rainy season had triggered a humanitarian disaster affecting 8.1 million people, including 2.5 million children.¹²⁴

Several years earlier, as the region similarly faced drought, a film crew had travelled to the nearby village of Babile to document the university's efforts to help local farmers cope with the brutal effects of climate change, supported by RUFORUM¹²⁵. Selam Kassahun, a young master's student, was working with local groundnut farmers there to help them improve household incomes and nutritional status. The situation was desperate. Farmers had just suffered a total failure of their groundnut crop because of the drought, and they were left with nothing. As a last resort, farmers from one household with an extended family including 23 children were sending every member out to collect bundles of wood scraps to sell as firewood. It was an overwhelming task for Selam to restructure her research to respond to this desperate situation. She had expressed her strong resolve to find ways of helping farmers at a time when no other support was available to them.

Climate disasters are likely to become more widespread and prevalent. Haramaya University has been a leader in finding solutions and has benefited from institutional strengthening which enables it to work more impactfully towards addressing these problems. For example, the university has developed stronger institutional mechanisms for project management, reporting, budgeting, and monitoring and evaluation. Jemal reflected:



¹²⁴ https://civil-protection-humanitarian-aid.ec.europa.eu/news-stories/stories/ethiopia-worst-drought-generation_en

¹²⁵ <https://ruforumimpact.org/project/groundnuts-where-there-are-no-groundnuts/>

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'In all these projects, my learning impacted my way of doing business. I learned a lot about the value of partnership. We developed partnerships with universities in Africa, Europe, and the U.S. It's important because we live in an era of competition. Resources are out there, but they are given on a competitive basis. On this journey through different engagements with RUFORUM, I learned that if you are passionate and committed and raise your values and become visible to the world – only then can you survive.

On the strength of its work on climate change adaptation and climate smart agriculture, the university successfully bid to host one of the World Bank's African Centre of Excellence (ACE) awards, granted in 2016. The ACE programme had developed out of seeds planted during the 2010 Ministerial Conference on Higher Education in Agriculture in Africa, hosted by RUFORUM. In this phase of the project, \$140 million credit was provided to support 24 new centres across southern and eastern Africa, selected from 108 proposals, across a range of disciplines, to strengthen postgraduate training and research in priority areas.¹²⁶

The programme was designed to promote regional specialisation among universities in strategic areas addressing key challenges, while strengthening the capacities of universities to deliver quality training and applied research. It would be administered by the Inter-University Council for East Africa, which had stated that:

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*'Over the project duration of five years, collectively these ACEs are expected to enrol more than 3,500 graduate students in the regional development priority areas, out of which more than 700 will be PhD students and more than 1,000 will be female students, publish almost 1,500 journal articles, launch more than 300 research collaborations with private sector and other institutions, and generate almost US\$30 million in external revenue.'*¹²⁷

Several RUFORUM member universities garnered new centres of excellence, with funding of up to \$6 million over a five-year period, on the strength of research programmes that were initiated with RUFORUM support. Haramaya University's new Centre of Excellence in Climate Smart Agriculture and Biodiversity Conservation was one of them. As Jemal recalls:

¹²⁶ <https://www.universityworldnews.com/post.php?story=20160618095557616>

¹²⁷ <https://www.universityworldnews.com/post.php?story=20160618095557616>



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'When this request for proposals came out, RUFORUM was out there encouraging us and saying you have to go for it! I remember Adipala was on campus with his team. They supported us on the ground, and they also assisted us in pulling in different partners, including Purdue University from the U.S. and Wageningen University from the Netherlands. We made it, and now the centre is running smoothly and attracting different projects. This has built the confidence of our partners. Going for it and making it happen makes all the difference.'

The two regional postgraduate programmes which have drawn students from across Africa, and the African Centre of Excellence, have put Haramaya University on the map. Jemal said:

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'Our programmes have made us visible, and as a result Haramaya University is being differentiated and distinguished as a research and postgraduate university in Ethiopia. In all of this, I can see the influence of the engagements we have had with RUFORUM. Personally, I have learned a lot and my institution has become visible. It means a lot to be visible and competitive in this globalised world.'

LUANAR in Malawi was also made an African Centre of Excellence for Aquaculture and Fisheries Science, based on the strengths that had developed through the regional PhD programme and the CARP in aquaculture and fisheries. Makerere University was likewise made an African Centre of Excellence for Crop Investment, building on the base of the regional postgraduate programmes in plant breeding, seed systems and biotechnology. Richard Edema, who had collaborated with Patrick Okori in the design of those programmes, was appointed to head the new ACE programme at Makerere. Richard is now the director of the Makerere University Regional Centre for Crop Improvement, which has so far trained 127 masters and 57 doctoral students from 20 African countries¹²⁸.

The ACE initiative signalled RUFORUM's growing engagements in the policy arena. After the RUFORUM biennial conference in Maputo in 2014, RUFORUM's policy efforts were gaining momentum. RUFORUM's champion within the African Union Commission, Dr Dlamini-Zuma, together with President Mackey Sall of Senegal, convened a summit on higher education in Africa, held in Dakar in March 2015. This led to another special summit of the African Union, where leaders agreed to establish a Committee of Ten Heads of State and Government ('C10') to champion the role of universities in education, science, and technology.¹²⁹ In 2016, with support from the President of Malawi, RUFORUM had the opportunity to conduct a side event at the UN General Assembly, further raising the network's profile. RUFORUM had contributed to and was benefitting from a wider sea change in attitudes towards the role of universities in development. RUFORUM was also steadily gaining name recognition and reach across Africa and globally. The universities had not even garnered a mention in the UN's Millennium Development Goals which aimed to drive development and reduce poverty in the early 2000s. By 2015, however, the UN's SDGs to address poverty, developmental and environmental challenges, outlined an explicit role for universities as drivers of development through science and innovation – particularly through SDG 2 (food security), SDG 4 (education) and SDG 17 (partnerships).

Attending RUFORUM's biennial conference held in Cape Town in 2016, Dr Florence Nakayiwa was struck by the network's dynamism. An African higher education expert who had been employed with the HERANA Network and subsequently joined RUFORUM as Deputy Executive Secretary in 2019, Florence reflected:

¹²⁸ <https://rcci.mak.ac.ug/>

¹²⁹ *Unfinished Journey*, p. 156

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'It was phenomenal. I saw how these conferences bring people together and galvanise and motivate people to think about RUFORUM. The AUC Commissioner Zuma came, Dr Peter Materu¹³⁰ came, the President of Mauritius Dr Ameenah Gurib-Fakim came. I saw that opportunity and potential to influence the entire continent as RUFORUM.'

¹³⁰ Peter Materu is the Chief Programme Officer of the Mastercard Foundation who was former Practice Manager for Education in West and Central Africa at the World Bank, and a key architect of the Bank's Africa Centres of Excellence Initiative



An enterprising university

Moi University in Eldoret, Kenya, meanwhile, gained an ACE in Phytochemicals, Textiles and Renewable Energy based on the innovations of its then-Vice Chancellor Prof. Richard Mibey. The Vice-Chancellor had met the perennial funding challenges faced by African university leaders with an extraordinary degree of entrepreneurialism. The Rift Valley region of Eldoret had once been a famous cotton-growing area where 11 textile factories operated.¹³¹ In the early 1990s, however, Kenya was forced to open its tightly controlled economy and compete in a globalised free market, which, along with a flood of cheap, used clothing imports into the country, killed the local textile industry.



Richard Mibey

More than a decade later, these factories remained shuttered and local farmers who had once grown cotton were destitute. The old Rivatex factory, a short distance from the university, had been East Africa's largest textile factory, but closed its doors in 1995. Visiting the abandoned facility in 2006, Richard saw an opportunity to revive it as a university enterprise for the purpose of *'profit, training and research.'*¹³² He convinced the Kenyan government to help the university buy the old facility and set off on an innovation spree to turn it into a hands-on workshop for students of chemical, mechanical and textile engineering, finance, human resource management and other related fields – and at the same time a revenue-generating enterprise for the university that would also provide employment in local communities.



Incrementally, the revival of operations at Rivatex helped to stimulate local cotton production once more. However, along every step of the way Richard and his colleagues encountered obstacles that called for creative solutions. They needed fabric dye but could not get it. Incredibly, efforts to source materials were disrupted not only by Kenya's post-election violence of 2007-08,



but then subsequently during trips to source dyes from South Africa and India which both were disrupted by local crises. For Richard, it was a reminder of the fragility of globally dispersed supply chains. He resolved to develop dyes locally at the university, rather than depend on costly and unreliable imports.

¹³¹ <https://ruforumimpact.org/project/reviving-an-industry-universities-take-on-challenges/>

¹³² <http://repository.ruforum.org/system/tdf/Ruforum%20Case%20Study%20-%20Moi%20U%20Tamidy%20Email.pdf?file=1&type=node&id=33632&force=>

The solution was to be found in developing natural dyes from local plants. A series of GRG grants from RUFORUM helped the university to develop the dye industries with smallholder farmers. Richard, a prominent mycologist, had first looked to mushrooms. However, it was a local weed that he had spotted growing on the side of the road, the *Targetes minuta* known as Mexican marigold, that offered the necessary consistency and quality of colours to provide a commercial-scale solution. Researchers discovered they could produce a powder from the dried inflorescences of the yellow flowers, from which the dye could be extracted. By varying the temperature of the dye baths, they were able to produce seven shades of colour from the *Targetes minuta*, ranging from lemon yellow to olive green, mustard, rich gold, and tobacco brown.¹³³

Since the successful commercialisation of Tamidye, as the natural fabric dye is called, the university has continued to develop as an entrepreneurial hub. The Rivatex factory employs about 200 weavers, dyers, seamstresses, and tailors – along with 150 students from different disciplines. The factory produces about 20,000 metres of fabric per day, and sells a range of apparel, school uniforms, tablecloths, and other products across the region and, increasingly, across the world. Earnings from the business have been reinvested in developing further enterprises through which students continue to learn and gain hands-on experience, including power generation from solar and wind energy, and the treatment of wastewater effluent at the factory. Richard commented:

¹³³<http://repository.ruforum.org/system/tdf/Ruforum%20Case%20Study%20-%20Moi%20U%20Tamidye%20Email.pdf?file=1&type=node&id=33632&force=>



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*It's good to do research, but let it be research that leads to products for commercial purposes. We do not have money to do research for publications that stay on the shelves, that will not take us beyond dependency.*¹³⁴

Sowing new seeds of entrepreneurialism

While Richard Mibey was pioneering entrepreneurialism at Moi University, others in the network were also taking their first tentative steps towards this novel terrain. In 2013, Prof. Adipala Ekwamu travelled with a group of 12 RUFORUM Vice-Chancellors to visit EARTH University in Costa Rica. A seed was planted during this trip which would shape the direction of growth in the network for many years to come. The purpose of the trip was to explore new lessons on engagements with communities, to enrich the CARPs as well as other RUFORUM programmes. Adipala had visited the university several years before, but as he wrote in his memoirs, only during this second visit would he truly appreciate the power of its student-centred model. He wrote:

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*We were looking to EARTH University, with its long track record of socially engaged learning, for fresh insights. Visiting this institution more than a decade earlier, I had missed what it was really about... Returning now to EARTH University with a different perspective, I saw a different institution. I saw a university providing its students with the tools to become change insurgents. In the classroom, they were holding robust dialogues and challenging their lecturers. Outside the classroom, they were digging in the fields, running their own businesses, and developing collaborative pilot experiments with local community groups. Through these diverse and self-directed activities, the students, I could now see, were being empowered to explore and develop their own personalities, find their own strengths, and build their own confidence and inner drives. This was a real developmental university, and I could see that manifesting through the students.*¹³⁵

Adipala later recalled: *The focus was on developing people's potential so they would gain confidence and become a different person by the time they graduated. It was about exploring the personality of the student to bring out that inner strength, that inner drive for change.*¹³⁶

The Vice-Chancellors were hosted by EARTH University Rector Prof. Jose Zaglul and the Provost Prof. Daniel Sherrard, who had impressed them with their vision of an entrepreneurial university realised through a student-centred learning approach. A mutual appreciation of these qualities became the basis of a fruitful and enduring relationship between RUFORUM and EARTH University. Like Prof. Mibey at Moi University, EARTH University was striving both to inculcate a spirit of entrepreneurship in students and make the university itself an entrepreneurial venture. The university had developed a successful banana producing and export business, raising revenues to support its operations by shipping around a million boxes of bananas each year to the United States and Europe. Daniel later reflected:

¹³⁴ <http://repository.ruforum.org/system/tdf/Ruforum%20Case%20Study%20-%20Moi%20U%20Tamidy%20Email.pdf?file=1&type=node&id=33632&force=>

¹³⁵ *Unfinished Journey*, p. 148

¹³⁶ *RUFORUM TAGDev Stories*, p. 35

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'When a university becomes entrepreneurial, you really start to confront those issues and understand the challenges that our students are going to have as entrepreneurs when they have finished their studies and are out in the real world.'

Two of the Vice-Chancellors travelling with Adipala had been similarly inspired by EARTH University and wanted to adapt aspects of the model for their own institutions. These Vice-Chancellors were Prof. James Tuitoek of Egerton University in Kenya, and Prof. Nyeko Pen-Mogi of Gulu University in northern Uganda. They and others within their institutions appreciated the need for universities to impart the skills and confidence in their students to become job creators given the stagnancy of Africa's labour markets. They also appreciated the ever-continuing need to evolve the value proposition of the university itself.

As James Tuitoek recalled, Egerton University had initially been founded as an agricultural training college. He envisioned reorienting the university to its practically-focused and community-oriented roots, and at the same time modernising it for the twenty-first century. At Egerton University, two dynamic women, who had also been inspired by their own visits to EARTH University, were well prepared to take up the challenge. Prof. Patience Mshenga, a specialist in agri-enterprise development, was granted RUFORUM funding to establish a new master's programme in agribusiness. The programme was to have a decidedly practical flavour. It would prepare students to become entrepreneurs, fully equipped to seize the opportunities in the agrifood sector to start and grow their own businesses. For their training, students were attached to nearby farms and enterprises, where they could apply their classroom learning



Prof. Nyeko Pen-Mogi

to solving practical challenges with farmers. As Patience argued, if students were prepared with the skills and mindsets to succeed in business, the more they would value their university degrees, and the more students and higher education institutions alike would demonstrate their relevance and worth to governments, industry and other agrifood sector partners.¹³⁷ In the programme, students formed small groups and developed business proposals, which they pitched to a panel of expert judges. The strongest proposals received start-up funding – and several of the resulting enterprises remain in operation on the campus.



¹³⁷ RUFORUM TAGDev Stories, p. 36

Patience's colleague Prof. Nancy Mungai, meanwhile, had in 2014 initiated programmes of community engagement, supported by a small nurturing grant from RUFORUM. Through this programme, the university developed relationships with nearby farmers and paired them with students in extension, horticulture, agricultural economics, and other disciplines for field attachments to support hands-on, mutual learning. Through the programme, Nancy observed:

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*The students gained a real appreciation of the knowledge that the farmers have, while farmers who were responsive took up some of the suggestions students gave them, and began to realise productivity gains.*¹³⁸

Sicily Karimi and Felix Mungambi were two local farmers who had enthusiastically collaborated with successive groups of student attachés. They managed the nearby Jacaranda Farm, located next to Lake Nakuru National Park on the outskirts of Nakuru town, which operated as a charitable home for orphaned children. Sicily had begun growing vegetables and keeping dairy cows to feed the children and supply them with fresh milk. The land was very fertile, and each growing season she would expand cultivation, up to the point that the farm was growing more food than its inhabitants could eat. With the help of Egerton students, Sicily and her son expanded their operations, sinking a borehole and installing drip irrigation to grow crops year-round and develop as a business supplying nearby tourist hotels with fresh, organic produce. The support from students helped her to manage the farm finances and integrate organic practices and management techniques, enabling the farm to support 21 orphaned children up to university level.¹³⁹

¹³⁸ RUFORUM TAGDev Stories, p. 37

¹³⁹ RUFORUM TAGDev Stories, p. 38



Gulu University in northern Uganda, meanwhile, was created with a mission of transformative education. Opened in 2002, the university itself was a response to a civil conflict that had terrorized much of northern Uganda for well over a decade, until 2007. Established with the mission of contributing to peace-building efforts, with the motto 'For Community Transformation', the university was set up for community engagement. The course programmes prepared students to support the health, education, food security, livelihoods, and social wellbeing of a population whose lives had been shattered by war.¹⁴⁰ Similar to Egerton's approach, Gulu University lecturer in agricultural economics and microbusiness Dr Walter Odongo had noted:



Walter Odongo

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*'We designed a student-centred outreach model so that the students could learn from the community, and the community could learn from the students. There has been a lot of learning in this process.'*¹⁴¹

Envisioning transformation through TAGDev

The initiatives of Egerton and Gulu Universities to orient themselves towards entrepreneurialism and engaged, development-oriented learning laid the groundwork for a new flagship RUFORUM programme, Transforming African Agricultural Universities to meaningfully contribute to Africa's growth and development (TAGDev). The new flagship programme was launched in 2016 with support from the Mastercard Foundation. Dr Dlamini-Zuma had brought the two organisations together. She continued to champion RUFORUM both in the policy limelight and behind the scenes. Through her introduction, the TAGDev programme was conceived to leverage the power of RUFORUM's network towards the foundation's ambitious goals of driving job creation among African youth, particularly the poor and marginalised.



Prof. Nancy Mungai

The TAGDev programme signalled a new entrepreneurial focus for RUFORUM, which also targeted greater inclusivity of marginalised students in the universities. This new programme would introduce an explicit focus on skilling Africa's large and growing young population to drive a broader movement of agro-industrialisation – and building strong, connected institutions to help drive this transformation of youth from job seekers to job creators.

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The TAGDev programme, supported by the Mastercard Foundation with a \$27.1 million grant, is small in scale yet transformative in its vision. The full story of the programme is captured in the short book *TAGDev Stories: Young Africans Seeding Agri-Entrepreneurship in African Universities*¹⁴². The eight-year programme

¹⁴⁰ RUFORUM TAGDev Stories, p. 32

¹⁴¹ RUFORUM TAGDev Stories, p. 33

¹⁴² The book can be downloaded from RUFORUM repository

(2016 to 2024) was designed to build on the prior entrepreneurial and community engagement initiatives of Gulu and Egerton Universities. The two universities would provide the pilot and proof of concept for a deeply transformative approach to entrepreneurial and development-oriented higher education that could be scaled out more widely across the network. TAGDev also built on the RUFORUM Community Action Research Platform (CARP) model. It has several other aspects, each contributing to the programme's broader aims of catalysing personal, institutional, and societal transformation through an explicit focus on university enterprise development and community engagement as the transformative lever.

The TAGDev programme was designed around four pillars:

1. Developing a new model of higher education
2. Building young peoples' skills in agribusiness and entrepreneurship
3. Scaling new higher education models to other institutions
4. Increasing collaboration and mutual learning among different actors across the innovation systems.¹⁴³

The pilot programmes at Gulu and Egerton Universities provided 220¹⁴⁴ master's and undergraduate scholarships to students from disadvantaged backgrounds from across Africa, admitted over several annual cohorts. The programme was designed to nurture these students to become agri-entrepreneurs and agents of change. In the process, the universities themselves would gain valuable insights to help embed entrepreneurialism within their institutional cultures.

The process of recruiting the TAGDev students was revealing of just how little attention the universities generally paid to inclusivity. Most institutions were simply admitting students on the narrow basis of their test scores, with little thought to helping those coming from marginalised backgrounds or rural areas. Nor were most campuses very welcoming of or sensitised to the needs of those students who struggled financially, faced difficult family situations, or were coping with the effects of trauma. This was problematic. It tilted the playing field strongly in favour of students from affluent backgrounds, who never had to struggle with overcrowded rural classrooms or with paying university entrance exam fees or supporting orphaned younger siblings.

Universities were beginning to realise that they needed to do a better job of supporting gender, economic, ethnic, and religious diversity on their campuses. If the universities were to play a more engaged and transformative role in society, they would need students who understood the challenges of rural development first-hand and were motivated to become changemakers. They would need to learn to harness diversity as a 'wellspring of innovation'.¹⁴⁵

Holistic programme design for inclusivity

One of TAGDev's aims was to raise awareness of the barriers preventing bright and capable yet vulnerable students from accessing universities, and to start shifting these values and reference points towards greater inclusivity. Less than one per cent of Africa's economically-disadvantaged students typically gain access to higher education.¹⁴⁶ The scholarship's aim of starting to shift these numbers made it necessary to design innovative new recruitment strategies. In the first year of TAGDev, the recruitment team had received more than 500 applicants for 30 scholarships. Dr Sylvanus Mensah, a university training and vocational education specialist in the RUFORUM Secretariat, oversaw the selection process and found it a delicate balancing act. He recalls:

¹⁴³ RUFORUM TAGDev Stories, p. 9

¹⁴⁴ By stretching their budgets, the universities were able to extend this to 245

¹⁴⁵ RUFORUM TAGDev Stories, p. 13

¹⁴⁶ <https://ruforumimpact.org/project/training-a-generation-of-agleaders-for-agricultural-transformation-in-africa/>

“

*'It really becomes a challenge when you want to balance all the components – the representation across Africa, the gender balance. We use tools like the progress out of poverty index (ppi) but it doesn't always give you a good comparison between countries. The biggest challenge is finding the balance between selecting for a very disadvantaged student and selecting for some other criteria. You could have 15 male applicants to a programme and only one female, and then you find that comparatively she isn't really all that needy. What do you do?'*¹⁴⁷



Sylvanus Mensah



From the moment the first cohort of students set foot on the Egerton University campus in July 2017, a path of holistic learning and self-discovery opened before them. As all the students gathered for a three-week orientation at Egerton University, the energy and excitement were palpable. Each student had a unique story to tell of the hardships they had overcome to reach this moment. Some of the students had been orphaned. Some had lived through conflict and displacement. Some had grown up and completed their schooling while living in camps for refugees or the internally displaced (IDPs). Some young women had grown up in communities where girls' education is not valued, and young women are pressed into early marriages for their family's survival. For each student, whether they came from rural



Joshua Ayiri

¹⁴⁷ RUFORUM TAGDev Stories, p. 13

Kenya or Lesotho or Cameroon, receiving a Mastercard TAGDev scholarship was a momentous and life-transforming event. *'You can see that I am shaking, because it is my first time sitting together with a professor,'* Nigerian TAGDev student Joshua Ayiri quipped during the orientation, to much laughter from his fellow students in the audience.¹⁴⁸

The orientation set the tone for the unique student experience that would follow. Students delved into concepts of entrepreneurship and leadership. They engaged in robust discussions of emotional intelligence, personal mastery and ethical leadership. They explored their own strengths and weaknesses and developed their own unique visions of purpose. They visited local farms and eagerly questioned the farmers about their production systems, inputs, finances, and challenges. The purpose of these activities was to give the students a powerful kickstart along the road to becoming successful entrepreneurs. The orientation set the stage not only for the students' individual journeys, but also for the universities to grow a holistic understanding of what it really takes to empower young people as entrepreneurs. As Prof. Nancy Mungai explained, serving as TAGDev Programme Coordinator at Egerton University, students needed to be encouraged to develop their leadership qualities, explore their values and passions, learn from their mistakes, and pursue their goals. Above all, they needed to believe in their own capabilities to change their lives for the better.

In addition to their regular coursework, students also were attached to CARP projects, and undertook research within these multidisciplinary, community-oriented action research programmes to complete their master's degrees. The CARP model was another mainstay of RUFORUM that was to be scaled out to other institutions through TAGDev. Two new CARP projects were initiated at each of the TAGDev pilot universities. At Gulu University, these are in the rice and pig value chains. At Egerton University, these are in the potato and cassava value chains. In addition, the TAGDev programme gave support for new CARP projects to be formed in a dozen different universities from Botswana, Namibia, South Africa, Zimbabwe, Kenya, Uganda, Ghana, and Benin. In Benin, Flora and Achille's work on baobabs was granted new funding under CARP to focus on developing the baobab value chain and further consolidating previous accomplishments in production, food science and nutrition. These new projects also provided a mechanism to train additional

¹⁴⁸ <https://ruforumimpact.org/project/training-a-generation-of-agleaders-for-agricultural-transformation-in-africa/>



technical and vocational, undergraduate, master's and PhD students through the multidisciplinary research platforms. Including CARP support to these students, the TAGDev programme has supported 535 student scholarships.¹⁴⁹

Student entrepreneurs

From the outset, many of the students – particularly those from Gulu and Egerton Universities – wasted little time starting up their own enterprises. The students of agribusiness formed small groups and developed enterprises as part of their coursework. Others struck out on their own, saving small amounts from their monthly stipends to invest in poultry or livestock to support their families back home. Not long after completing the orientation, Egerton undergraduate Gabriel Muhindo had spotted an opportunity in starting a dairy. His enterprise, Comrade Dairy and Food Enterprises, is located a short distance from campus, and does a brisk business processing and selling about 400 litres of milk, cultured milk (*maziwa lala*) and yoghurt per day. He tells his story:



Gabriel Muhindo

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'I was propelled from the orientation – from one speaker Johnson Mwakazi – who said that you either disrupt or perish. I focused on this because I needed not to perish but to disrupt. I needed to develop myself – that's how I came up with the company Comrade Dairy and Food Enterprises. We noticed that there was a lot of milk being hawked around on the campus, and this was not appropriate because the hawkers did not have knowledge of dairy and they were exposing consumers to diseases.

It was being sold in cans without any processing or value addition. There was only one cooling station in that area, so most of the milk would get spoiled because of lack of access to the cooling station. This gap prompted us to develop the enterprise – to bulk the milk and then add value to it – to provide either yoghurt or sour milk, or pasteurise and sell it to people.

The business started almost immediately after the orientation in 2017. The registration with the Kenya Dairy Board and the Kenya Bureau of Standards took time – so operations started about six months after the orientation.

I contributed my stipend funds and approached two of my friends who contributed what they had. We put our monies together and we bought a batch pasteurizer and some laboratory equipment to test the quality of the milk. We collect the milk from farmers every day. That is the beauty of Comrade Dairy and Enterprise: every day we get to engage with the farmers. We know the plight of the farmers and we are able to work together with them to bring greater profits both for the farmers and for the business. Together we are building the capacity of the farmers to produce more – we are giving extension services and sharing our knowledge in milk production.

We work with some 21 farmers – the number has grown gradually, given our limited capacity and funds. Currently we have a technician who goes on a motorbike to collect the milk and who must test the milk

¹⁴⁹ Through frugal use of funds, Gulu and Egerton Universities stretched their support to include 245 students. An additional 290 students were funded through the CARPs. See <https://thepienews.com/news/mastercard-african-scholarship-scheme/>

on site before accepting it from the farmer. If it conforms to the standard, the milk is taken. If it does not conform, it is rejected, and the farmer is advised what to do to ensure the milk is of a consistent quality. This is quality assurance so that the farmer does the right thing.

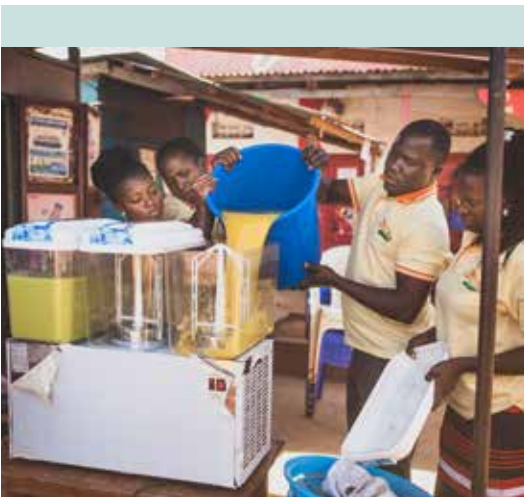
I'm very excited about the business – you can see the transformations. The farmers are happy because they produce with an assurance that Comrade Dairy will collect and buy their milk. And this aspect of training the farmers to improve production is also improving their livelihoods – because they produce more, they get more from their produce. It's a good thing for the community we are in. We are living by the standards and the objectives of TAGDev – transforming the agricultural university to be meaningfully contributing to development. We are not limited in ideas; we are just limited in funds.

My dream for the future is to have a community where we have food security, where we live in security and have food security, nutrition security. That's why we developed Comrade Enterprises – to live that dream – for example in our model of working with the farmers. We could have chosen to work in isolation, to just get the milk in a normal way from the middlemen. But we are working with the farmers each day, solving their problems with them so that we grow together. So, we don't just aim at making money, but we aim at making an impact to serve the community. So that even when I die there will be some legacy left out of the work that I initiated.¹⁵⁰

The ripple effect of such student-run small businesses is already evident. Dr Anthony Egeru, the TAGDev programme manager, said that as of mid-2022 TAGDev students had created 225 enterprises, providing 1,328 jobs. While 43 of these were seeded with TAGDev funding, the remaining enterprises were started by young people taking the initiative and pooling their resources, stretching their monthly stipends and investing. Altogether students have so far invested a combined total of around \$441,000 in their enterprises. Anthony says: *'If young people can be inspired to start their own businesses, and can be mentored, you see that they can begin to think differently and grow. It is possible to inspire and guide young people to take risks and grow their enterprises. And they are doing this while they are still at school!'*

For TAGDev student Lucy Aciro, the chance to study and become an entrepreneur has also allowed her to develop her natural gift for leadership. Growing up on the outskirts of Gulu with her family, Lucy's childhood was marked by the LRA conflict. She considered herself lucky, however, to be raised in a family that valued education for girls as well as boys – many of her peers growing up were not so fortunate.

¹⁵⁰ RUFORUM TAGDev Stories, pp. 49-50



Lucy's father Bartolomeo earned a meagre salary working as a night guard for the Lacor Hospital in the neighbourhood – but he made it a priority to support all 13 of his children through school. Whenever her studies were interrupted for lack of fees, Lucy would cry. She did not mind going hungry at home, but she felt terrible about missing school¹⁵¹.

As the conflict intensified, the family frequently had to run for their lives as insurgents attacked their village. Sometimes, as they prepared dinner in the late afternoon, they would hear gunshots, meaning the rebels were nearby. They would flee to seek shelter at the nearby hospital, often leaving their dinner behind for the rebels to eat. Lucy remembers crowding with hundreds of other refugees at the hospital at night, all praying they would be safe from the rebels. Returning home the next morning, they would often have to step over the dead bodies outside the compound.



Lucy Aciro

Lucy had earned one scholarship after another through her diligence in school. The support carried her right up to her last semester of university – but finally the money ran out. Still falling short of the fees needed to sit for their final examinations, Lucy and several of her friends tried to find a way, without success. Finally, she negotiated a compromise with the university authorities which allowed the young women to sit their exams and pay after graduation to receive their transcripts.

Successfully negotiating this arrangement on behalf of herself and other female students stuck in similar situations, Lucy realised her leadership potential. Entering Gulu University in 2017 on a TAGDev master's scholarship, she dreamed of eventually becoming a Member of Parliament to fight for better policies and support for farmers. Her community also elected her as the women's representative to the local government.

Through her coursework, she also became passionate about uplifting her family and community through agribusiness. As part of her coursework, she had established a successful local fresh juice business along with three of her classmates. Earning a Field Attachment Award Programme from RUFORUM upon her graduation, she worked with pig farmers to help them produce value-added pork products for a growing market. She said: *'If I can employ three people, it can also inspire them to change their lives. They can be inspired over time to start their own businesses. I was telling my parents that I want to touch peoples' lives.'*¹⁵²

¹⁵¹ Lucy's story is told in fuller detail in *RUFORUM TAGDev Stories*, pp. 17-18

¹⁵² *RUFORUM TAGDev Stories*, p. 18



Seeding institutional transformation

A field visit to Gulu University in 2019 provided a taste of the international and multicultural flavour and vibrancy that TAGDev brought to the campus. Late one afternoon, a group of TAGDev students had gathered in a courtyard to produce charcoal briquettes made from an innovative combination of rice straw waste, charcoal dust, water, clay soil and cassava starch. As the students mixed the slurry in a hand-cranked green metal drum and pressed the mixture out into metal cylinder moulds to form the briquettes, the feeling of teamwork and camaraderie was palpable. The project was an offshoot of the rice CARP. Working with local farmers, the students and researchers had spotted an opportunity to develop a new source of wealth from waste – utilising the farmers’ discarded rice husks to develop a new technology and potential revenue stream for farmers and entrepreneurs.

Mainimo Edmond Nyuki, a TAGDev master’s student from Cameroon, explained that the clean-burning briquettes also offered an environmentally friendly energy source and could protect local forests from being stripped for the wood charcoal trade. Since 90 per cent of Ugandans’ energy use comes from biomass, and 70 per cent of that is wood charcoal, Edmond explained, the students hoped this alternative fuel source could help prevent deforestation. Through this and many other aspects of TAGDev, Edmond was thriving. He reflected:

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‘It is a great privilege in my life to be here. When I finished my undergraduate programme, I had this desire, this urge in me to travel. Doing my master’s in another country, I get to meet people of diverse backgrounds and cultures. It is really enriching and has contributed to my life in amazing ways.’¹⁵³

¹⁵³ RUFORUM TAGDev Stories, p. 32



As Anthony Egeru reflects, TAGDev has brought knowledge production alive in the university and in students' lives:

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The most amazing transformation has been seeing the students become brighter, not only in terms of the knowledge they hold but in terms of happy faces, in terms of seeing the future, in terms of holding something different in their lives.¹⁵⁴

While the impacts created by new cohorts of community-engaged and entrepreneurially-minded students under TAGDev have already been formidable, inculcating an entrepreneurial spirit within the universities themselves has been an equally important process. Prof. Duncan Ongeng, who is Dean of the Faculty of Agriculture and Environment at Gulu University and serves as programme coordinator for TAGDev, observes that institutionalising the learnings of TAGDev has brought new cohesion and purpose to the university's endeavours. He says:

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Community engagement has now been institutionalised at the university. Previously we had bits and pieces here and there. With the new policy, however, each faculty is required to develop or adapt the policy to their specific interests and needs. The lessons we have learned from the student level, the staff level, and the community level have informed the university's change trajectory.¹⁵⁵

As Anthony Egeru argues, such changes to university policy and culture are essential if universities are to become true drivers of agro-industrialisation, enterprise creation and sustainable development. He observes:

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Students have been writing business plans for many years in the universities, but they have not been making projects. We have learnt that to get young people to move from theory to practice, you need to provide the right environment for practical work. Most of the universities are starting from zero. They need that policy environment in the university, which means they even need to reorganise how promotional processes work. A professor is judged by how many students he or she has graduated, the number of publications in scholarly journals. But I would also want to see that he or she can be evaluated by how many enterprises he or she has nurtured that are out there operating as businesses.'

Implementing such changes in the universities has been a long journey now gaining traction with TAGDev. As Daniel Sherrard observes, universities can often be conservative institutions that are slow to embrace change. Just as Adipala and his colleagues returning from overseas training during the 1980s had once fought to introduce changes to the academic culture, new champions within the network today such as Nancy Mungai, Patience Mshenga, Walter Odongo and Duncan Ongeng are seeking further reforms.

The seeds of these reforms were planted through earlier processes in the network. As RUFORUM oriented itself ever-increasingly over the years towards community engagement and development, evident in the

¹⁵⁴ RUFORUM Impact Stories, Gulu University Institutional Transformation (video) <https://ruforumimpact.org/project/gulu-university-institutional-transformation/>

¹⁵⁵ RUFORUM Impact Stories, Gulu University Institutional Transformation (video) <https://ruforumimpact.org/project/gulu-university-institutional-transformation/>

design and structures of the GRGs, the CARPs, and the regional postgraduate programmes, many were seeing the need to provide more training in leadership, people skills and other ‘soft’ non-technical areas. The universities typically provided very little training outside of technical fields, while researchers focused on building their publishing track records. Academicians were not being trained with the necessary skills for working with communities, building relationships, managing diverse teams of stakeholders, and responding to the emergent processes of development through community engagement. Patrick Okori recalls:

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The universities were exploring how to engage proactively with communities, but they didn't have the wherewithal to actually do it. All the publications and papers were not going to help researchers engage with farmers or build relationships with the government. The objective was to take a more people-centred approach to create institutional transformation that Africa needed.’



Walter Odongo and Duncan Ongeng

To bridge this gap, RUFORUM had piloted a new ‘soft skills’ programme at Makerere University, developed by Adipala and Patrick Okori. It was later scaled to other RUFORUM universities under the leadership of the late Dr Washington Ochola, targeting Deans and other future university leaders. Patrick and Richard Edema had taken part, as well as other young leaders including the late Prof. Christine Dranzoa, the Vice-Chancellor of Muni University, Prof. J.D. Kabasa, the first Principal of Makerere University College of Veterinary Medicine, and Prof. Frank Mwine, the current Principal. The ‘soft skills’ training was also included in the regional PhD programmes. The programme provided mentorship and focused on human-centred leadership development. It introduced new thinking in RUFORUM about how to nurture much-needed skills for people-oriented leadership, including interpersonal relationships, building teams, working in partnerships, synthesising ideas, and solving problems. To some on the Technical Committee, this new approach at first appeared a bit ‘fluffy.’ Yet it grew increasingly clear that particularly those researchers in weak and post-conflict settings needed the full range of skills for managing people and projects, collaborating with communities, and building multi-sector partnerships, assembling effective multidisciplinary teams, and much more. Over time, the sceptics began to understand why it was important, and even to embrace the new ideas of holistic leadership development in the design of TAGDev. The initial pilot programme had planted a seed that grew and flourished with TAGDev.

Implementing the different aspects of TAGDev deepened the processes of institutional change at both Gulu and Egerton Universities. Through TAGDev, Egerton as well as Gulu developed a community engagement strategy to build these linkages into its own institutional culture. Nancy Mungai explains:

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‘Because of the synergistic effects of departments knowing what others are doing, we can shape the focus of our research and develop our curriculum based on the feedback we get. We also hope that in positioning the university as a more effective collaborator and partner, we can more easily demonstrate our impact to government and the private sector, and attract more resources to support our work.’¹⁵⁶

¹⁵⁶ RUFORUM TAGDev Stories, pp. 39-40

These processes of stitching community engagement and entrepreneurialism into the institutional fabric have also been supported and strengthened through the ongoing relationship with EARTH University, which is another Mastercard Foundation grantee. Through TAGDev, the institutions have been able to share lessons and deepen their mutual understanding of experiential learning. Daniel Sherrard observed:

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'We need a lot less of filling up people's brains with information, and a lot more of discovery, working in teams and being challenged as a group to develop a project. The problem is, how do we move from that earlier model to a model which is intrinsically, totally integrated with the community? That is easier said than done.'

EARTH University was an early grantee of the Mastercard Foundation, which made it possible for the small institution to dramatically increase its intake of African students, who now represent roughly a quarter of the student body. The award of the TAGDev grant to RUFORUM further strengthened the impetus for collaboration between EARTH and RUFORUM. As Daniel recalls:

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'EARTH was learning a lot more about Africa from RUFORUM. This opportunity provided an opening to have a much more significant exchange with RUFORUM, because it is now pan-African, while we have students from around 20 African countries where RUFORUM has member universities. The relationship with RUFORUM has provided EARTH with a viable partnership in Africa for everything from student recruitment to student exchanges with EARTH to new opportunities to think about our models of community engagement, student-centred learning, and inclusivity. Looking back, it's been a really enriching experience on both sides.'

Harnessing the learnings of TAGDev, conversations of community engagement and practical, entrepreneurial learning have been steadily taken up across the network, through forums such as the Deans meetings at RUFORUM's AGMs. Anthony Egeru observes:

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'Fundamentally, for me, TAGDev has provided us with the launchpad for proof of concept. The current conversation is around shifting from Education 3.0 to Education 5.0 where innovation and industrialisation are very important. We need to be shifting how dissertations are done, how research is done. We need research that is developing products and services. Instead of recommending agro-processing, you should be able to write a proposal to go and pilot-test your agro-processing idea. We need Education 5.0 if we are going to address the youth unemployment challenge. For me that is a radical shift. That is what we have been trying to pilot through the TAGDev programme.'

As RUFORUM continues to grow, monitoring and evaluation and learning within the Secretariat become increasingly invaluable for enabling the uptake of new ideas and practices across the network. Moses Waswa, a technical specialist in Planning, Monitoring, Evaluation and Learning in the Secretariat, observes that while it is easy to measure the outcomes of programmes such as TAGDev, only over time does one begin to understand the deeper impacts of the programmes – how lasting and meaningful the change has been. He observes:

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Through the CARPs at Gulu, the university has developed an office and a policy on community engagement. To me, that means the university is picking up and institutionalising the ideas of the CARP. They were interested in my M&E tools because they didn't have a tool to measure their community engagement. Now they are developing this.'

As the lessons of TAGDev continue to unfold, it will be important to continue adapting the programme as new learnings emerge, while also making these learnings available for uptake across the wider network. These processes are still in their early stages and will continue to grow and unfold over many years to come. Anthony Egeru notes:

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'In facilitating the TAGDev, one of the things I have appreciated working with Mastercard is that they ask you where the failures are, what has caused the failure? What have you learnt from the failure?'

I think the most important thing we've learnt is that it's good to fail. When something fails, you begin to think and ask how to do better. Now I'm organising training sessions for incubation hub leaders because I have seen their failures. The failures that are happening not because they want to fail – but you are shifting people whose lives have been primarily in research, and teaching in the classroom, to shift to help you to create a business. They have no idea how businesses function. Perhaps they have never even owned a business, but now you're telling them to create businesses. That means we need to mentor incubation hub leaders, help them understand the processes so they can support others.

But we didn't think about that. It has come as a result of having failures and reflecting back on what is causing failure. That for me is a very big learning.'

Taking CARPs to the next level

The CARP platform design was a good fit with the TAGDev, having been initiated as a modification of the GRGs. The TAGDev provided a vehicle and the resources for scaling the CARP approach to new universities. The CARP design emerged from previous efforts by the RUFORUM leadership and the Technical Committee to broaden and bolster the signature graduate research grants so they would have a greater and more lasting impact in the communities where the research took place. The CARPs were an important step in RUFORUM's evolution in building quality training and impactful research in the universities. Building upon this, the CARP programmes signalled a growing emphasis on the broader and more complex objectives of institutional transformation and societal change – aligned to the deeper question raised in the Introduction: What is a university for?

The gradual processes of leadership development and 'soft skills' training that had been seeded in the network were meeting with a broader vision of the universities themselves as change agents. Under TAGDev, the CARPs have served as a practical and powerful mechanism for orienting the universities towards delivery and impact – and towards serving as fulcrums of development in their societies. TAGDev support allowed for far wider uptake of the CARP model. From its inception in 2009, the CARP approach has been piloted across 19 institutions in Benin, Botswana, Ethiopia, Ghana, Kenya, Malawi, Namibia, South Africa, Sudan, Uganda, and Zimbabwe. The very first CARP programmes presented in Part II showed how

university students and researchers could work together with farmers and other stakeholders to solve their challenges and improve their livelihood opportunities in sustainable and lasting ways. In Malawi,

for example, the aquaculture CARP had helped farmers improve their incomes. With TAGDev came the opportunity to develop the CARP model further and link it more explicitly to a new focus on entrepreneurship and the Entrepreneurial University. The new CARPs would all focus on working with farmers to develop specific value chains.



Through TAGDev, young people working on the CARPs were mobilised to lead transformations in the agricultural sector, creating new enterprises based on value addition that also provide employment or improve farmers' opportunities in the rural areas. Patience Mshenga, along with many others, envisions harnessing community-engaged value chains

implemented through the CARPs to finally spur the science-led development that Africa has missed out on for decades. This has already been happening, in small and incremental ways.

In Gulu, post-conflict recovery is a long process. Many local farmers are still finding their feet, having spent a generation or more living in camps for the internally displaced because of the civil conflict. Both the rice and pig CARPs have catalysed vibrant farmer groups and helped them link to markets, local TVETs, industries and government and the university. Farmers participating in the CARPs have made visible strides – their livelihoods have improved; they have developed new businesses and diversified their skills and products. Rice farmers have established local businesses selling quality assured seed which they learned to produce. They have also developed a business producing parboiled rice as a value-added product – a skill they learned from one of the Beninese TAGDev students. All these activities and relationships have contributed to a very rich learning environment, says Irene Akite, a PhD student who serves as research coordinator of the Rice CARP. Irene says:



Irene Akite

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'The relationship that has been built between the university and the community is one that can never be broken. The farmers know why they want to be working with the university, and the university knows why they want to be working with the farmers. We have built bonds.'

She continues:

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'I have grown mentally, psychologically, academically and in all aspects of my life. I have been mentored in the process. I've learned how to work with communities, how to handle students, how to resolve conflicts, how to manage projects, how to write and report. My PI – I call him my boss, my mentor, my father, my friend – he has been very patient with me as I have learned and has given me the opportunity to do things my way and be innovative under his guidance. When someone gives you the opportunity to express your potential, that person has given you a lot.'

The practical, income-generating work with farmers has ranged from developing indigenous microorganisms (IMO) to help raise pigs in sanitary conditions, to developing livestock feed and clean-burning charcoal briquettes from rice straw waste. According to Dr Basil Mugonola, the PI of the rice CARP, through the platform, contracts have successfully been negotiated among the different farmers' groups, producer organisations, farmers' cooperatives, input stockists and business service providers who are part of the platform, including the local rice mill operator.¹⁵⁷ He highlighted the importance of these negotiations which *'help build trust amongst the different actors in the value chain, whilst ensuring that farmers earn fair prices.'*¹⁵⁸ Two local vocational colleges have played a key role in training community knowledge workers and developing and delivering curricula and fabricating tools, equipment and value-added processes. The TVET students provide essential support services to rural smallholder farmers on the path of agri-industrialisation – and they can also become agri-entrepreneurs.



The pig CARP activities have also brought farmers and other stakeholders together, building social cohesion as well as practical knowledge. The collaboration has resulted in far closer relations between the university and the Northern Ugandan Youth Development Centre (NUYDC), a local TVET. According to the report from one meeting:

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*'Sharing the research findings brought more joy, love and hope for agriculture to the participants and also the Gulu and TVET students because they practically participated in setting up the experimental unit, trapping the IMO, making the IMO solution and laying the deep litter floor IMO bed.'*¹⁵⁹

¹⁵⁷ RUFORUM TAGDev Stories, p. 56

¹⁵⁸ RUFORUM TAGDev Stories, p. 56

¹⁵⁹ RUFORUM TAGDev Stories, p. 59

The TVET was then able to develop its own services offering the IMO solution and providing artificial insemination services to local farmers. The CARP platform had enabled a rapid uptake of these new



technologies within a short space of time, resulting in tangible benefits to farmers. Pig farmers taking part in the CARP reported that their incomes had increased by 75 per cent, enabling them to spend more on food and education for their children, according to the PI Prof. Elly Kurobuza Ndyomugenyi. One pig farmer named Charles Okello said he had been able to raise four piglets who all then had their own litters. He had earned \$2,500 from selling the piglets. He said: *'When capacity is given to farmers, there is going to be a very great change in our community.'*¹⁶⁰

Pigs are the most popular source of meat protein locally, but farmers had faced many challenges to raise them – not least the

difficulties of finding food during the lean months from May until July. Through the project, farmers were helped to develop low-cost, high-quality pig feed, which enabled them to tap into a strong and growing market for high quality pork.

Prior to the CARP, Hilda Auma, a local nursery school teacher, observed that many children in the community were hungry and could not focus at school.¹⁶¹ As she explained, most local farmers previously were only able to raise one or two pigs – and these animals were often diseased and stunted due to lack of affordable and effective resources. The project has helped to shift this situation, providing families with a rich and nutrient-dense food source, as well as better livelihoods.

TAGDev master's student Kenneth Kidega brought his deep passion for community engagement to the CARP. Suffering from malnutrition himself in childhood, Kenneth described the joy and satisfaction of seeing the farmers lifted to a state of food security and relative prosperity. He said:

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*'Someone who has been eating one meal a day is proceeding to two, and someone who has been eating two meals a day is proceeding to three. Most people tell me they are using their extra profits to send their children to school. This encourages me to continue with the work.'*¹⁶²

For the graduating TAGDev students, small field attachment grant awards of \$5,000 each have helped further their research work with communities. Forty-three field attachment (FAPA) grants have so far been awarded. In Gulu, master's graduate Lucy Aciro worked with the local government to strengthen market linkages in the local pig value chain. Convening meetings between small local pig farmers and institutional buyers such as butchers, hotels and restaurants, Lucy discovered that the demand for pork far outstrips supply. She then established a platform to connect producers and buyers and helped farmers

¹⁶⁰ Gulu pig CARP film, 2021; RUFORUM Impact Stories: <https://ruforumimpact.org/project/gulu-pig-carp-2021/>

¹⁶¹ RUFORUM TAGDev Stories, p. 58

¹⁶² RUFORUM TAGDev Stories, p. 60

to collectively market their products and increase their bargaining power. She wrote: *'I am thrilled that I have started to put into practice my mission statement cultivated in 2017, and to me this is a dream come true!'*¹⁶³

Linking with the TVETs

TAGDev has harnessed the strengths of universities to generate evidence-based science. It has galvanised their roles as innovators, collaborators, and catalysts for multi-sector solutions to address climate change, rural livelihoods, value chain development, food and nutrition security and many other issues impacting farmers' lives. Under CARP, the university's knowledge production has served as the vehicle for building collaborations of students, researchers, rural communities, technical training colleges and local governments, industries, and NGOs.

In particular, the CARP approach has helped to build long-neglected relationships between universities and technical and vocational training colleges (TVETs). The role of the TVETs was a missing link highlighted in discussions with the World Bank and other international actors about Africa's human resource needs during the early years of RUFORUM. If the universities had been neglected under structural adjustment, the TVETs had arguably fared worse. In stakeholder discussions, it became obvious that while progress had been made in training scientists at the postgraduate level to staff the universities and the NARS, not enough attention had been paid to training at the undergraduate and technical and vocational levels. As Anthony Egeru notes, to have a well-functioning system there should be at least 16 TVET graduates for every PhD holder. But this was not the case. Increasingly, the innovative thinkers and leaders at the PhD level were there – but there was an acute shortage of 'boots on the ground' – and the gap was widening. Africa's human resource pyramid was upside down.

Early on, RUFORUM's leadership had discussed collaborations with the TVETs, but the network had never seriously taken this up. The TVETs had long been neglected and were working in isolation from the universities – yet it would soon be discovered that these two forms of institution are in fact ideally suited for collaboration. While universities produce high-level research, TVETs have the mandate to train technicians to implement their findings. And while it takes up to ten years (or longer) to train an advanced researcher, technicians can sometimes be trained by the TVETs at various levels in a matter of months. As partners in the CARPs, TVETs are thus able to plug into the system and train young people who are in desperate need of employment to serve key roles in the rural sector. Anthony Egeru observes:

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'They are what we call the missing middle, who are able to work with farmers at the grassroots level. They have the skills and the knowledge and can translate those into products and processes at the local level. It's an alternative to rural extension systems. That is a frontier for unlocking the value in agrifood systems.'

According to Sylvanus Mensah, a similar kind of overhaul to the TVET systems will be necessary, equivalent to the changes in universities being piloted through TAGDev. He says:

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'I believe that RUFORUM as a network and as the Secretariat should focus much more on how to link young people – and especially from post-conflict areas – to education opportunities and skills development through the TVETs. That's where the impact will be.'

¹⁶³ RUFORUM TAGDev Stories, p. 60

Early glimpses of how this may happen can be seen at the Baraka Agricultural Training College, a TVET located near Egerton University. Both the potato and cassava CARP projects initiated by the university have provided the mechanism for an extraordinary degree of collaboration between the institutions.



Fertile central Kenya has rich soils and a cool climate that are ideal for growing potatoes. Production has been rising to the point where potatoes are the second most widely consumed staple in the country, after maize. Potatoes are essential as a commercial as well as a food security crop. However, getting access to clean, disease-free planting materials has been a major challenge for farmers. The seed potato CARP has focused on working with farmers to develop their potential to produce their own clean seed potatoes in farmer groups and cooperatives. Baraka College has been a key partner in these efforts, which have brought them into collaboration with the university as well as with the National Potato Council of Kenya, the Nakuru County Government Ministry of Agriculture, the Nakuru Smallholder Farmers Association, and other actors. They have been working with six local small-scale farmer groups to build capacity to supply clean seed potatoes across the region.

According to Virginia Nyamu, the former Principal at Baraka College, the CARP made it possible for the two institutions to collaborate and complement one another in terms of education, research, knowledge creation and practically oriented training. She commented:

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The niche of Baraka College is to deal with small-scale farmers, so that they can get the skills to put food on the table and make money. The fact that we were not growing potatoes here before was a mistake.¹⁶⁴

Through the CARP, Baraka College linked with the government seed producing facility ADC-Molo and was able to become certified as an out grower of seed potatoes. Virginia commented:

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We cannot overestimate the value of the collaboration. At the university, they are the researchers. As the TVET, we consume their knowledge, and experiment with their innovations and then the farmers come to us to learn about what we are doing.¹⁶⁵

¹⁶⁴ RUFORUM TAGDev Stories, p. 62

¹⁶⁵ RUFORUM TAGDev Stories, p. 62

Baraka's certified seed potatoes are so popular with local farmers that their production often cannot meet the demand. The College had earned \$30,000 from its seed potato production, while farmers using their seed potatoes have also seen their incomes rise. *'It has acted as a marketing strategy for Baraka, which is now known all over the country and even beyond,'* says Acting Principal Pamela Nasimiyu.

Sustaining the impacts

The CARP approach has generated numerous innovations and adaptations through its flexible, iterative, and emergent structure. Communities and researchers have been learning from the process of building and developing value chains together. The impacts of this work so far have been diverse and multi-faceted. In Benin, where work on the baobab tree value chain has enabled communities to harness both the economic and nutritional benefits of the iconic tree, students have been inspired to develop new enterprises aiming to uplift the nutritional status of children. In Kenya, where farmers have been developing the cassava value chain in traditional maize-growing areas, the unexpected and catastrophic effects of maize crop failure due to drought have been alleviated. In Botswana, where chronic drought conditions make farming tougher by the year, farmers are discovering the potential benefits of growing hardy, resilient safflower – a high-value crop with amazingly versatile applications.

As multifaceted interventions, the CARPs have potential to impact society and contribute to sustainable development in many ways. Most direct, immediate, and obvious are the impacts on farmers' livelihoods. Yet the potential impacts of CARP reach much further. In arid Botswana, Namibia, and Zimbabwe, for example, the platforms have galvanised water retention, bushveld thinning, and other adaptations increasing the resilience of communities to the threat of climate change. While in Kenya and Uganda, innovations in food processing and improved market linkages offer a wider potential to address the detrimental effects of Africa's current food import imbalances. The development of high-value crops and products from baobab, safflower, and other indigenous resources, meanwhile, offer new pathways to explore shifting farmers from subsistence to high-value crop-production and product development. The CARPs are but



small microcosms, but their learnings and successes demonstrate the potential of this engaged approach to achieve wider impacts in society, influencing many areas such as nutrition and health, trade and industrialisation, biodiversity, and climate change.

No matter how successful a programme may be within its finite lifespan, however, there is always the question of how to sustain the work and its impacts beyond the funding period. At Eldoret University in Kenya, one of the initial three universities where the programme was piloted, RUFORUM support helped to institutionalise the impacts of the CARP after the programme came to an end in 2014.

Through Eldoret University's new outreach centre, engagements with farmers have been institutionalised. The university has granted a small operating budget to the new centre, and work is underway to complete a strategic plan for the next five years. The centre was able to buy food processing equipment and continue with farmer trainings. As Abigael Otinga reflects, all the learnings gleaned through the process of the CARP have made the university a much more intelligent and effective collaborator than it otherwise would have been. She comments:

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'One of the biggest issues we have dealt with is group dynamics and conflict management: coming to a common understanding and a common objective. In the beginning we never considered those things because our aims were more scientific. Along the way, we have realised that things like gender integration are very big issues because of their impacts on decision making and allocation of resources. These are the things that keep groups together, and unless you work with them, you won't be able to forge ahead. So of course, we do all the technical training, the soil testing and analysis, the agronomic issues and diseases and post-harvest losses. But we have learned that these social and economic aspects are very important. If we're soil testing or training on types of soils, there must be someone who can interpret the issues of gender in soil management. There has to be somebody to deal with the issues of socio-economics, the issues of youth. We did not pay attention to those areas when we began working with farmers, but now we are realising how important they are. Sometimes just managing people is the hardest thing of all!'

According to Julius Ochuodho, the centre is enabling the university to continue to deepen its relationships with farmers, while consolidating the strengths that were developed through the CARP. Through the outreach programme, the university has restructured student practicals. Now, instead of working on the university farm for practicals, the students work directly with farmers in field attachments that bolster mutual learning. Because of this, students have gained more skills and are more employable. Now, thanks to the fourth-year field attachments of students with farmers, about 40 per cent of students get employed by local industries upon graduation. This, he says, has been a spinoff of the CARP programme and the new outreach centre.

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'Farmers now feel they have a partner they can come to with any issues. It has made the relationship between us and the farmer groups more open,' he says.

At the University of the Free State in South Africa, meanwhile, a CARP project in the sheep wool value chain is helping local small farmers to compete in the global marketplace. The past 30 years has seen a major shift in agricultural markets and the international trade of agricultural products. The South African wool

industry has a huge growth opportunity to supply international markets, but the capacities of its small farmers need to be developed to realise this opportunity.

As the world moves from local to globalised trading systems, small farmers may find themselves competing with deep-pocketed international conglomerates even as they struggle to survive amidst land scarcity, climate change and many other factors. The CARP has sought to respond to this shifting reality, through consolidating the efforts of small local farmers through cooperation and the uptake of modern technologies. Under the CARP, three master's and two PhD students are working with farmers on innovative research ranging from wool processing and washing to marketing. TVET students are also being trained as interns, with support from the university and from the South African Wool Growers Association.

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*'Being a female farmer is not easy. People will believe that you know nothing,' commented local sheep farmer Keikantseng Matekoane. Holding up pictures of her late parents, she said: 'I'm very proud of this. My father is the one who taught me about farming. I feel like they can wake up and see what I am doing. I feel like they can wake up and eat my money. I will be a commercial farmer.'*¹⁶⁶

The project has so far trained more than 100 communal wool growers and sheep shearers. The university's experimental farm has been upgraded into a demonstration hub where new innovations are being developed, tested, and showcased – with the potential to be scaled up. Value addition to process the wool into products is a major growth area, as the country still lacks skills and training in value addition. Wool spinner and weaver Thabo Madini said that the project has changed his life, enabling him to put food on the table and support his family.¹⁶⁷

The CARP project reflects qualities of 'engaged scholarship' that the University of the Free State (UFS) has recently sought to inculcate through its inclusive, ethical, entrepreneurial and community engagement focused ethos. In a June 2022 RUFORUM thought piece, the university's Rector and Vice-Chancellor Prof. Francis William Petersen writes:

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*'In essence, it is all about linking the best of the research, teaching and learning skills of staff and students to specific learning and development needs of society.'*¹⁶⁸



¹⁶⁶ RUFORUM Impact Stories, University of the Free State wool value chain (video) <https://ruforumimpact.org/project/ruforum-university-of-free-state-wool-value-chain/>

¹⁶⁷ RUFORUM Impact Stories, University of the Free State wool value chain (video) <https://ruforumimpact.org/project/ruforum-university-of-free-state-wool-value-chain/>

¹⁶⁸ https://www.ruforum.org/Triennial2021/sites/default/files/Thought%20Piece%20Issue%2028_Prof%20Francis%20Petersen.pdf

In South Africa, the introduction of free tertiary education for low-income families several years ago has levelled the playing field somewhat but has also raised the stakes of ensuring that students who do get to the university have ample support to succeed. In South Africa, with an estimated 66,5 per cent youth unemployment, such a practical and entrepreneurial focus is essential for ensuring that universities produce competent graduates who are well-prepared to build society. Petersen writes:

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The UFS is successfully developing an ecosystem where the institution, the private sector, industry, commerce, government and communities co-create and collaborate to provide human-centred solutions, which are digitally supported to respond to the challenges of society.

Internationalisation, digitisation, and embracing sustainable development through the SDGs are all essential to this mission, he writes.

A pan-African knowledge network

In 2014, Prof. Emmanuel Tanyi was invited by the African Union to give a talk at the African Economic Platform in Mauritius, chaired by then-President Dr Ameenah Gurib-Fakim about the use of technology to reduce youth unemployment. At the meeting, he met Prof. Adipala Ekwamu, who invited him to give the same talk at the RUFORUM Secretariat.

Visiting the Secretariat a few weeks later, Emmanuel, who is Dean of the Faculty of Engineering and Technology at the University of Buea in Cameroon, became a RUFORUM devotee on the spot. He recalls:

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'Before I joined RUFORUM, it was the best kept secret in Central Africa! I was so impressed that there was such a big, impactful network that I didn't even know about. I joined RUFORUM as a researcher and went back to Cameroon and prevailed upon my Vice-Chancellor to join as a university. Then I became an ambassador for RUFORUM.'

It did not take him long to come to the same realisation that so many others from Zambia, Malawi, Uganda and elsewhere had before: when it comes to innovating, scaling, and solving challenges, a network can be extremely powerful. As a RUFORUM devotee, Emmanuel lobbied other universities from Cameroon and Gabon to join the network and was also elected to head RUFORUM's Technical Committee. Emmanuel reflects:

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'If you look at many universities in Central Africa, they are all doing the same thing. They are all at the same level of development. They are all grappling with agronomy for transformation, but at a very small scale. A network like RUFORUM is very important to bring people together and leverage the things they want to do. There is no point in doing university research at a purely microscopic level. When you share your experiences as researchers, it is very beneficial to the universities as a whole. RUFORUM gives us this bigger platform to leverage our experiences.'

As the network expanded, the Secretariat itself began to reflect more of Africa's linguistic and cultural diversity, as French and Arabic-speaking staff were recruited from Sudan, the Democratic Republic of Congo, Benin and elsewhere to reflect RUFORUM's pan-African flavour. Multilingual staff members have played instrumental roles in many of the overtures to attract new countries and member universities to RUFORUM.

As the network expanded throughout east, west, southern, central, and north Africa, there was a need to strengthen and consolidate RUFORUM's vision. The result was a new strategic plan, adopted at the RUFORUM 13th AGM in Malawi in December 2017: *Vision 2030: African Universities' Agenda for Agricultural Higher Education, Science, Technology and Innovation (AHESTI)*. The new strategy noted the increasing complexities of food systems, environmental challenges, and African demographics. It provided a restructuring of the network, positioning the universities as vibrant changemakers, leading the charge towards building the Africa We Want.

One of the four essential pillars of the new strategy was the creation of a Regional Anchor Universities programme to partner established universities with key strengths together with emerging institutions to work together towards capacity strengthening. Coming from Bukavu in the Democratic Republic of Congo, Prof. Majaliwa Mwanjalolo joined the Secretariat to manage RUFORUM's Regional Anchor Universities programme. The programme's approach is to mobilise resources through various proposal development and research collaborations as well as through mechanisms such as the Graduate Teaching Assistantship Programme. Through fielding calls for proposals from many different funding sources, the network is able to bring universities with different capacities and languages together to collaborate and at the same time receive mentorship in developing proposals. As Majaliwa explains, this approach has been particularly effective in strengthening post-conflict institutions. He says:

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'Many of the world's fragile countries are on this continent. Building capacity for these countries will be very important. Capacity is not only human-related, but also infrastructure-related, as, for example, labs have been destroyed. This is a very powerful element of RUFORUM. It is training Africans within Africa with the minimal resources we have. In Congo, I have seen a lot of changes happen through these initiatives. Ten years ago, the situation was totally different and there were only two or three professors. But with the GTA and the different grants that institutions have managed to leverage in the past ten years, there have now been about ten PhD graduates in the last ten years. For eastern Congo where there has been war, that is a very big contribution. That is a RUFORUM effort. Now they have developed a PhD programme as a joint effort. That is enormous for an institution that ten or 20 years ago could not have dreamed of doing something like this. Together we can mobilise resources, push our governments and improve our education. Even where we are weak, we can partner with strong institutions and build ourselves. Even if you compare the University of Nairobi or Eldoret or Makerere University of now to what it was ten or 15 years ago, you will see a great difference. Leveraging resources through RUFORUM, and the different training people have gone through, has built the capacity to mobilise resources. Now people are starting to believe that they can actually change the education system.'

Building political momentum

Achieving significant impacts with scarce and piecemeal funding has been a persistent struggle for virtually every programme and institution across the network. At LUANAR in Malawi, for example, the flagship fisheries programme struggled along as a CARP for years before attracting ACE status. Even now, says

Emmanuel Kaunda, a lack of policy cohesion and support hinders the programme's performance, and likewise the growth of the country's aquaculture fisheries sector. Malawi currently produces about 9,000 tonnes of fish per year¹⁶⁹ but according to Emmanuel the number should be closer to 20,000 or 30,000 tonnes – a number that has been exceeded recently by neighbouring country Zambia. He says:

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'In the fish industry we have trained students who are developing technologies, but people are not looking for students as such, they want to see fish on the table. If there is no fish, you are not doing your job. But to do this you need resources to do research and build capacity. In Malawi we have trained people but we haven't had the results on the ground. We have struggled as a country. You find the success stories in our neighbouring countries like Zambia, where people we have trained at LUANAR are actually the champions of aquaculture fisheries.'

Emmanuel continues:

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'There's a whole process of building the ecosystem and the policies. All the different sectors and partners have to come together to drive the agenda. In addition to the financial resources and the technological development, the policy is also very important. You need to have the policy frameworks in place to make sure the private sector is there to drive it. You need to have all the facets in place in order to have an impact.'

Even as LUANAR continues to struggle for a favourable policy ecosystem, Malawi has been championing RUFORUM's political advances. In line with Vision 2030 AHESTI RUFORUM continued to intensify its engagements with policymakers and advocate for greater investment in agriculture, food and nutrition security, capacity building, and skills development. In January 2018, the African Union Assembly endorsed the C10 initiative. In November 2018, through its MOU with the African Union, RUFORUM had helped to organise the first Extra-Ordinary Summit of the C10, held in Lilongwe, Malawi. The meeting was hosted by Malawi's then-President Arthur Peter Mutharika and drew Presidents from the ten countries represented on the Committee: Chad, Egypt, Gabon, Kenya, Malawi, Mauritius, Namibia, Senegal, Sierra Leone, and Tunisia¹⁷⁰.

As then Malawi President Mutharika observed:

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'The Africa we have today is the product of its education systems or our lack of the same. We can change Africa by changing what we do in education. Africa needs to turn its assets into capital, and as such, education, science, and technology are needed to empower people to be productive forces of progress. Labour as a factor of production will take us to African industrialisation, which demands a skilled labour force. Africa needs to cultivate its scientific, technological, and innovation skills.'

For Emmanuel, Malawi's political support has meant a lot. It has brought higher education in Africa to the agenda in African Union planning processes. And it has brought renewed focus on higher agricultural education to the World Bank and other institutions. New programmes, including a \$100 million programme

¹⁶⁹ <https://data.worldbank.org/indicator/ER.FSH.AQUA.MT?locations=MW>

¹⁷⁰ RUFORUM Annual Report 2018-19 https://www.ruforum.org/sites/default/files/Annual%20Report_2018-2019.pdf

derived from the SHAEA¹⁷¹ proposal, that build further on the African Centres of Excellence have been established. Malawi, in step with the African Union, has recognised education and particularly higher education as a cornerstone of its own 2063 Agenda, based on three pillars of agricultural productivity, industrialisation and operationalisation. He says:

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'All these three pillars speak to agriculture. By recognising the importance of higher education in agriculture, and the importance of higher education in general, it means there is recognition that higher education has a big role to play in driving the country's agenda.'

With historically low higher education enrolments compared to its neighbours, Malawi has prioritised expanding access to university. In addition to the success of its transition to an independent university, LUANAR has expanded from 1,900 to around 12,000 students. The university has also won international accreditation for two of its programmes. Emmanuel says:

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'As incoming Vice-Chancellor, my vision is to make LUANAR an international centre of excellence in agriculture. I want LUANAR to be known for its participation in the Fourth Industrial Revolution in agriculture and to transform the agricultural sector of Malawi and the region because of its innovative, state of the art research. If people think of agriculture in the southern region, they should think of LUANAR. And, of course, RUFORUM wants all of its member universities to be like this. So how can we build that into the core of our universities? I think it can only happen if our network becomes stronger.'

Pivoting to ICT in a pandemic

Another pillar of the AHESTI strategy, meanwhile, was a new Knowledge Hub for University Networking, Partnerships and Advocacy.¹⁷² To achieve greater integration and sharing of knowledge across the network, RUFORUM needed to strengthen its digital platforms for creating and sharing all manner of content, from research outputs to impact stories and e-learning. As Dr Francis Otto, Knowledge Hub manager at the Secretariat, explains:

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'Knowledge is very important. Universities exist to create knowledge. How do we disseminate this knowledge? How is this knowledge utilised for transformation to create the Africa We Want? How do we mobilise the universities to produce knowledge that is useful to the continent, and how do we mobilise the other stakeholders outside the universities to make use of the knowledge generated in the university? That is where the technology comes in. ICT is a critical tool that helps us to create, transmit and store information – and produce other knowledge based on that.'

As a coordinating agency, the Secretariat has had to develop increasingly sophisticated systems for

¹⁷¹ Strengthening Higher Agricultural Education in Africa – a RUFORUM proposal for strengthening universities' role as fulcrums in facilitating agricultural transformation.

¹⁷² The four pillars include TAGDev, the Regional Anchor Universities for Higher Agricultural Education, Cultivating Research and Teaching Excellence, and the Knowledge Hub for University Networking, Partnerships and Advocacy.

supporting students and researchers, managing partnerships, conducting monitoring and evaluation, and sharing key learnings and insights with university leaders, policymakers, and various other constituencies. As the university membership numbers have grown, the Secretariat has also increasingly needed to develop such systems to understand the different needs and capacities of the various universities, to partner them effectively in collaborations that achieve mutual strengthening. All these aspects are managed through the Knowledge Hub.

As the vision of AHESI was fuelling the expansion of RUFORUM's ICT systems, the COVID-19 pandemic struck the world in March 2020. The impacts of the pandemic reverberated across the network, as students found themselves locked down, often far away from their home countries, and researchers were unable to travel to the field. Several RUFORUM-affiliated researchers and university leaders sadly died from the virus. For the Secretariat, the pandemic pressed the pause button on crucial negotiations over new projects and funding – choking off critical lifeblood of the network when it was needed most. Some of these disruptions were temporary, while others have proved to be more enduring.

In a challenging time, however, RUFORUM's strengths in ICT proved to be an important silver lining. The process of developing the Knowledge Hub had positioned RUFORUM to respond relatively seamlessly to the digitised new world that arrived with the pandemic. While the uptake of ICT and e-learning had often been slow and lagging in the universities, suddenly everybody was forced to pivot to digital communication platforms. Francis Otto and his colleagues found that they could push the frontiers of digital networking and communication farther than they had thought possible.



Francis Otto

In 2020, the Secretariat offered a series of 40 different webinars, engaging people in the network on topics ranging from food systems development to the digitisation of education. As Francis recalls, he and his team invested great effort to offer engaging 'edutainment' through these webinars. Careful attention was given to the design and format of these engagements. Speakers were briefed on the issues and coached to ensure that they gave compelling presentations and connected well with the audiences. In one of the webinars, students had the opportunity to speak with a former president and with other high-level policymakers.

Meanwhile, Prof. Adipala Ekwamu had been selected as one of 100 UN Food Systems Champions, in advance of a global UN Food Systems Summit to be held in New York in October 2021. This recognition put RUFORUM in a position to use its convening power to mobilise the network and facilitate dialogues to bring the unified voice of African universities to the World Food Systems Summit. Francis Otto and his colleagues in the Secretariat swung into action to identify stakeholders and develop an agenda to engage diverse voices in online dialogues held over the six months running up to the event. RUFORUM's longstanding policy engagements, including the annual Ministerial Round Table Dialogues held during its convenings, provided a platform for building dialogue between the universities and policy leaders in a pre-UN Food Systems Summit dialogue for African Heads of State and governments in July, 2021¹⁷³. Francis recalls:

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'With the Food Systems Summit, we rode on our previous experience of the webinars. I don't mean to overrate it, but I think our online convenings were particularly interesting and engaging because we brought so many aspects together. Through these engagements we have built a kind of digital culture that is passed on to everybody we invite to participate. By the time the food summit came along, we could bring forth a clear message on what needs to be done. It was a clear voice, but from different levels and different perspectives. It was a strong message of working together.'

On the strengths of its ICT initiatives, RUFORUM also secured funding from BADEA, the Arab Bank for Economic Development in Africa, to create a regional e-learning platform to support member universities and deliver capacity building courses online. Just before the Triennial Conference in December 2021, participants from across the network gathered in Cotonou, Benin, to begin working on the development of this platform.

Prof. Jude Lubega, Vice-Chancellor of Nkumba University in Uganda, has been at the forefront of e-learning in African universities. According to Jude, there are four key challenges to overcoming Africa's digital divide and implementing effective e-learning: capacity building, infrastructure, digital content, and policy frameworks. COVID-19 had forced many universities to jump into the digital deep end without much guidance, and this meeting had provided an opportunity for many of them to share lessons and learn from one another from this sudden and forced experiment. In a sense, he reflected, the pandemic galvanised energy toward the digital space, and left many higher education leaders more open to the opportunities of e-learning to integrate and share resources. He said:

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'It is time for Africa to integrate through e-learning. The time has come for us to offer courses across different countries taught by the same African experts. For example, a course in agro-informatics can be worked on collaboratively and offered by experts from Uganda, Benin and South Africa and attended by students across all the different countries. I see that such an integration will completely erode the physical presence, and we can have an African education rather than an education which is only focused on one country. To me that is the biggest opportunity. Africa has had a lot less digital content than the rest of the world.'

With the power of its network, he said, RUFORUM is well positioned to tap the expertise of the continent and formulate high quality and innovative e-learning programmes. This could also potentially earn revenue for the network, for example through the provision of Massive Open Online Courses (MOOCs). Because of COVID-19, he said, governments are finally seeing the potential of e-learning and investing resources in it. This is an opportunity to drive integration and share resources across the continent – and RUFORUM is well-positioned to lead the journey ahead on this emerging new pathway.

Voices of women leaders

As a network, RUFORUM has made important strides toward achieving gender equality. While a mere 8 per cent of FORUM students were women, today female participation in the network has reached 45 per cent. For all the progress towards women's equality, however, the gender gap remains widest in top leadership positions. Only 2 per cent of African university leaders are women. At the triennial meeting in

Benin, however, the strong presence of women university leaders was noteworthy. Those interviewed in Benin expressed their passion and determination to continue fighting for women's equality and serving as role models for younger women scientists.



Prof. Theresia Nkuo-Akenji, Vice-Chancellor of University of Bamenda in Cameroon, was elected as the new RUFORUM Board Chair, after previously serving as Deputy Board Chair. She said:

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'We are proud that we can be role models to encourage girls to be resilient and persist, to not give up and to reach their full potential. That's what it's all about.'

'It is inspiring,' comments Theopoline Itenge from the University of Namibia (UNAM). *'At the 2013 RUFORUM meeting in Kigali, most of the Deans and lecturers were men. This prompted discussion about how we can encourage women leaders. It inspired me to found an association for women in science at UNAM, where we come together to mentor one another and encourage the girls. We invite young girls into the laboratories. We are working towards seeing more women take up leadership roles. Research has shown that when females do not participate fully in science, our needs may be overlooked. We need everybody on board. We need policies to enable women to participate, such as lifting age restrictions on proposals, to acknowledge that women often take a break from their careers to have families. We need to be mentored, and we need to mentor each other. We need to help young girls feel confident. We need to inspire them, so they see that they can start their own companies and become entrepreneurs.'*



Theresia Akenji



Address Malata

Also attending the ICT meeting was Prof. Address Malata, a health professional and Vice-Chancellor of the Malawi University of Science and Technology, which opened in 2014 with the mission to serve as 'a world class centre of science and technology education, research and entrepreneurship'. As she recounted, when the pandemic struck, the university pivoted to widen student access to ICT. Address and her colleagues had scrambled to reach out to students locked down in the rural areas and find ways of offering courses in their home villages. She recalls:

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'I went around personally to banks in Malawi to ask for resources, and we got them. I think that's something we need to do more of. Getting involved in digital learning is a great opportunity for every part of our society, whether it's government, civil society, or the private sector. Sustainable development talks about leaving nobody behind. For us to build the Africa We Want we must leave nobody behind. For me, the issue is about giving young people opportunities to access education. With standard education you can reach 4,000 students. With online education you can double that – or more. Through digital learning, we can push to improve the socioeconomic status of our countries.'

Speaking passionately in support of the week's conference theme of 'operationalising higher education', she said:

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'The challenge now is to make sure that our higher education institutions really make a difference. We have always offered programmes and degrees. But what really makes a difference is action. For me, that means, after these discussions let's go back and work to show results, which we normally don't do. Publications are not results, but if we can feed a village, or a family, those are good results.'

Prof. Theresia Nkuo-Akenji meanwhile reflected on how the network has supported the university, in the midst of war:

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'The University of Bamenda is barely ten years old, but we have already benefited from RUFORUM grants to intensify our programmes in agriculture, and our staff have had the opportunity to engage in workshops and training.

My university is exactly in the heart of the conflict in Cameroon. It has not been an easy six years for us, but we have never closed our doors. The students and staff are very resilient. The students want an education, so we are forced to give them what they want. As Vice-Chancellor, I am proud that even in a time of crisis we have always remained open.

Even before COVID-19, because of the conflict crisis we saw the need to start online teaching. We started this through emails and WhatsApp. Of course, there have been many challenges with electricity and connectivity, but we started building up our online and distance learning capabilities, because there were many times when the students couldn't get to campus, or when the lecturers couldn't get to campus.

Our teachers have benefited a lot from RUFORUM's online programmes. We have a three-year grant to strengthen capacity in our School of Agriculture through RUFORUM. We've had several students benefit from the Graduate Teaching Assistantship programme and TAGDev to finish their master's and PhDs in East Africa.

I would like to see more participation from Central African universities in RUFORUM. The universities in Central Africa need these kinds of programmes. They need training and capacity building. They need to establish partnerships with other African universities.

In our experience, the biggest role the university can play is in peacebuilding, because without peace there is nothing. That is what we have done in Bamenda. Initially all the lecturers ran away, but as head of the institution I was forced to be on campus. There were many times I was there alone. But then we got the students to create peace clubs in the various faculties. The students have helped us a lot in talking to other students, in trying to focus on the future. They have played a big role in carrying forward the peace message and encouraging more students to focus on their education despite the difficulties, instead of going to the bush to fight.

We are fortunate that because we are a State university, the Ministry of Higher Education has established the University Digital Development Centre in all eight State universities. It will give us the environment to facilitate e-learning across the universities, so we can share knowledge and resources. It encourages us even in a war-torn environment to forge ahead. The opportunity to be affiliated with the e-learning platform RUFORUM is trying to build will help to fill in those areas where we do not have expertise among all the State universities in Cameroon. Students can do the online courses and it will give us more opportunities in science, technology and innovation for development. All of this contributes towards sustainable development.

Many of our students in agriculture have graduated and started enterprises. You'll be amazed at what these students can do. That is what gives us the encouragement to make sure we give them the education that they need.'

Meanwhile, from the earliest days of RUFORUM, food security was at the core of its mission. It remains so today, while the complex dynamics of food security have only multiplied – including a pandemic, oil prices and war. Growth in the agricultural sector is two to four times more effective than growth in any other sector in reducing poverty¹⁷⁴. However, efforts to reduce African and global food insecurity over the last decade have been disappointing, and the triple burden of malnutrition continues to worsen as rising poverty affects peoples' diets. Dependencies on imported food have been rising, along with the trends of urbanisation. A graphic from *The Economist* showed that Africans are projected in 2023 to be spending a third of their income on food¹⁷⁵.

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'The mission and vision of RUFORUM is actually the future of Africa', declares Prof. Ophelia Weeks, former President of the University of Liberia. 'Agriculture means food. Food means survival. There is a Liberian saying: 'an empty bag cannot stand'. If we are going to build the Africa We Want, we need to ensure that we have the people who can ensure that we have the food, so that we Africans can do the work. It's not a trivial thing.'

¹⁷⁴ Patrick Okori, addressing the Vice Chancellors online dialogue in preparation for the UN Food Systems Summit, May 2021.

¹⁷⁵ <https://twitter.com/maxlawsontin/status/1502624650391658504/photo/1>, March 2022 (Sources: Rabobank, World Bank)

Food and nutrition security have direct, profound, and well-documented impacts on mental and physical wellbeing, on brain development, work capacity and the capacity to think. Inadequate food and nutrition lead to stunting in children and impacts their physical and intellectual development and their lifelong potential. As the renewed emphasis of the SDGs on food security (SDG 2) and education (SDG 4) has underscored, these are key foundations of societal health.

A neuroscientist, Ophelia serves on RUFORUM's International Advisory Panel, and is also the Executive Director of the Ellen Johnson Sirleaf Presidential Centre for Women and Development in Monrovia. She noted that Liberia's higher education system, once the pride of west Africa, had been hollowed out by the war. RUFORUM's support has aided post-war reconstruction at the university and has helped bring the country back in step with universities across Africa and the world. She reflects:



Ophelia Weeks

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'Liberia went through 14 years of civil war, during which time just about everything was destroyed. The University of Liberia used to be a beacon of higher education, but during the war everything was destroyed. The university was left in such a state that the mere fact that we are able to continue is testament to peoples' resolve. Liberians felt that if at any point the university actually closed down, it might never be reopened, so people personally kept the doors open. When I was at the University in the College of Agriculture, I could count on one hand the number of lecturers who had more than a master's degree. Maybe I'm being liberal with that. Faculty members needed to get advanced degrees, and RUFORUM has made that possible. We now have about ten faculty members in different parts of Africa working on their PhDs. Now the question of what does it mean: it's priceless.'

As a neuroscientist who is passionate about Liberia's post-war development, Ophelia says she values RUFORUM's approach of collaborating across disciplines and harnessing technology to create rich and relevant experiential learning for students who are eager to gain skills and contribute to development. She asserts:

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'It makes sense to look at a more interdisciplinary way of doing things. Agriculture is science. Agriculture is technology. Agriculture is biotechnology. When you start utilising these tools, that's when innovative ways of doing things and thinking kicks in.'

Another female Vice-Chancellor, Prof. Maud Kamatenesi Mugisha of Bishop Stuart University in western Uganda, has been pushing the frontiers of entrepreneurship and ethnobiological research. Since the young university joined RUFORUM in 2016, it has grown by leaps and bounds. Twelve staff members are currently training for their PhDs at other centres of excellence in the network through the GTA programme. With RUFORUM support, the university has established innovative programmes in agribusiness and ethnobiology, attracting local and international partners through its practical initiatives. The university has established gardens and facilities to produce essential oils from indigenous plants. This has attracted partnerships with institutions from the Netherlands, NARO and elsewhere. Maud says, with a laugh:

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'Our youth must learn to use their hands. They transmit the knowledge from the brain to the hands. To be a leader and champion development in Africa, we must have innovators who are hands-on. They must learn to treasure agriculture and treasure the environment. Western Uganda is the food basket of the nation. It is the land of milk and honey, the land of milk and bananas!'

Maud continues:

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'Agriculture is a core skills area. We are going to see many youths being trained in this country and beyond. The Mastercard approach is co-creation. You bring all your ideas and innovations together, discuss them, see which ones will work and step it to another level. We have gone to the communities and refugee camps and recorded the youth voices. We know what they want, and we know what we can do for them.'

We believe we are going to see the youth being transformed, innovations stepped up and the refugees having the life that they want to live with dignity, also working on employability and conflict resolution through skills, work and the generation of money and a focus on how we can best live together. I can tell you it is an excellent approach and I believe it is going to work. In Uganda we are the number one host of refugees in the world. It means a lot. I have gone to these refugee camps. We have refugee camps in town. Some of the refugees are students studying in the university. If you give them skills and jobs, they will contribute to building the country. The youth are energetic, and they want something to do. Even now I am recruiting some to come and teach French in this university.'

A dynamic network

For many, the pandemic has only underscored the interdependencies of global problems and solutions. It has also underscored the key contributions of science and research, enabled by international collaboration, towards building healthy societies. Prof. Lindiwe Sibanda, the Director and Chair of the ARUA Centre of Excellence in Sustainable Food Systems at the University of Pretoria in South Africa, observes that RUFORUM's leading role at the intersection of higher education, agriculture, capacity building and policy has been transformative. She observes:

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'Through RUFORUM we have seen the power of networking, the power of lobbying and advocacy to show that investments in higher education yield results. The beauty of RUFORUM is that they have gone beyond engagements with the Ministers of Agriculture to the Inter-Ministerial spaces and even to the Presidents who are now knowledgeable about what it takes to invest in agricultural development and in cutting edge agricultural research.'

Judith Francis observes:

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'I think COVID has taught us that we need science, technology, and the capacity to understand as well as do the science. We need to be able to interpret and use it for our protection and growth and development. This provides an important opportunity for universities to reconfigure and reposition themselves to get the resources they need to deliver on that promise.

I truly believe that what RUFORUM has created, there is nothing that can take its place right now. They have developed from a disbanded group of universities to a more united front that still operates with some form of unity. They are looking at online and blended learning, and at how to continue to improve their research outputs, their research processes and their impacts. This is what we need the network to continue to engage on.'

RUFORUM has followed an evolutionary path – today different visions of the future Africa We Want continue to shape this evolutionary journey.

In December 2021, the first triennial event held in west Africa gathered new and old friends and set an historic precedent. For the first time, the gathering was held in a West African, French-speaking country. Many of the conversations revolved around how to consolidate RUFORUM's presence and impact in those regions where its footprint remains shallow. Given limited resources, this remains part of the network's Unfinished Business.

The voices in this book have argued for new visions of African higher education, bolstered by the unrivalled power of a network playing the role of innovator, thought leader and catalyst. The context of higher education, agriculture and development has changed radically in the past two decades. Today the universities are being called on to play their part in unlocking the potential of food systems for wealth creation and inclusivity, in ways that could scarcely have been imagined a decade or two ago. RUFORUM has built up a wealth of experience in innovation and learning from its many and diverse programmes. And it has built a powerful network for sharing these experiences. A number of islands of success have been created through these efforts. Now RUFORUM must find ways to learn, share and innovate further and faster, to ensure that existing islands of success can develop into strong and lasting wider sea changes. Just as PhD level training in Africa was once a distant dream realised through vision and hard work, the universities now have the opportunity to play a decisive role on the development stage, through fuelling job creation and rapid innovation in food systems and harnessing the energy of young people towards building inclusive and prosperous societies.

Like mycelium spores, the different stories of change catalysed through the network continue to spread and grow. We have seen stories of students becoming powerful and confident changemakers, tapping their own networks and resources as well as implementing their own personal visions for change while contributing to wider transformations. We have seen how continuous mentorship, particularly through postdocs and support of early career researchers, ensures continuity in the network as research systems are strengthened. We have seen how RUFORUM has responded to the changing needs of systems along the way, building bridges to work with the TVETs and developing the entrepreneurial capacities of people and institutions. We have seen the value of RUFORUM's roles as matchmaker and partnership-broker, with its birds-eye view that can match unique strengths, weaknesses, needs and opportunities across the continent, and with international partners. We have seen how RUFORUM has mobilised an entire continent

towards transforming the agricultural sector, and how this work continues through diverse interventions across different scales. And we have seen how this work carries on from one generation to the next – always an Unfinished Journey.

At the triennial meeting in Benin, Robert Kawuki, who had first helped with the development of the Maksoy 1N soybean variety in Uganda (as a FORUM grantee), was leading a workshop in scientific writing, as a research manager with NaCRRRI. He reflected on his career:

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'I'm shifting from being a pure scientist to being a research manager with NaCRRRI. The position I hold in NARO provides the opportunity to mentor, supervise, host research programmes, and review theses and proposals. That flexibility anchors us to RUFORUM, because we find synergies through research supervision and proposal reviews. It's always exciting to find new opportunities and extend my horizons.'

At this meeting, he is a mentor among a group of several postdoctoral candidates from Senegal, Ghana, and the Democratic Republic of Congo. Each person has a story to tell of their struggles to make ends meet while completing their PhDs, and of the support they received from RUFORUM to earn extra stipends or receive a boost to their funding, to connect with mentors and much-needed resources to complete their research and launch their careers.

For Dr Angela Ibanda, a lecturer at the University of Kisangani in the Democratic Republic of Congo, who completed her PhD in plant breeding and biotechnology at Makerere University, where she was also supervised by former FORUM grantee Prof. Jeninah Karungi, it was a struggle to make ends meet on her scholarship stipend from ICIPE. She recalls:

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'I had to save some money for research, which wasn't easy. Then the scholarship ended, and that is where RUFORUM helped me. They sponsored the last objective: I worked on soybean genetics, on resistance to leaf blight. RUFORUM sponsorship helped me to complete my studies. Also, I have been able to grow personally and professionally. As a French speaker, I didn't know English and I overcame the language barriers. Now I'm an inspiration for other scientists in my home university who want to reach my level. I've been able to build a scientific network through international conferences organised by RUFORUM, which is something I'm proud of. Now I'm affiliated with NaCRRRI and Robert Kawuki is my mentor. By the end of my postdoc I'll have a relationship with the national cassava breeding programme of Uganda. I'm helping students, and what they're discovering through their work I'll be able to take back to Congo. The idea of the postdoc is to train me on how to mentor students, so I can take this experience back to my home university. One of the challenges of higher education in Congo is that the universities are not well connected to the world. With all the knowledge I have acquired, I will be able to help connect my country to the outside world.'

Also attending the conference in Benin was Dr. Mayada Mahmoud Beshir, the Sudanese SCARDA student profiled earlier. She earned her PhD, with scholarship funding from Carnegie Corporation, and now contributes dynamically while holding a vision and cultivating relationships of being a prolific researcher contributing to development as well as a vocal advocate for women's equality and representation in science. The RUFORUM story in Sudan started with the ARC and the University of Kordofan – and has now grown to seven institutions. RUFORUM has been a lifeline to Sudan, helping to invigorate the institutions and develop the individual researchers within them so that they are passionate, hardworking, and proactive.

They participate in international publications and collaborations and continue to upskill themselves. Mayada reflects:

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'When I finished my PhD, I got the FAPA award and went to ICRISAT for nine months. My PhD was on the genetics of sorghum and how to develop foliar disease resistance, with Patrick Okori. This attracted the eyes of ICRISAT, so they said 'why not?' The project ended up with publishing more than six papers, and I attended two conferences and in both received the prize for research with impact with African farmers. Now that I'm back in Sudan with the ARC, the connections only grow as more Sudanese universities join RUFORUM and RUFORUM staff keep coming to visit Sudan for different initiatives. They always involve me. Now, the RUFORUM work continues through rice, and through ICRISAT. I've worked with people from Burkina Faso, Uganda and Kenya to match our genetic material and develop high quality sorghum.

I want to help the universities in Sudan change their curriculum – borrowing from the RUFORUM regional programmes. We have many students, political instability, and other issues like gender. We still need support for doing postgraduate studies. Alongside that, we need to prepare scientists for the market, for industry in Sudan. When a scientist finishes their training, they should be ready to give back to the community and serve industry. We need RUFORUM to coach us to do this, to build capacity in Sudan to produce ready change agent scientists.'

Meanwhile, new generations of 'Mayada's' – committed and confident changemakers – continue to be born through the network. So far more than 2,500 students have been trained. RUFORUM recently launched an Alumni Network to bring RUFORUM alumni together and gather future support for the network through its graduates. Through the initiative, younger TAGDev graduates can tap the experiences of more senior graduates. Emmanuel Okalany says:

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*'We believe that if this great force comes together as a coordinated movement, they will change the agricultural sector in Africa. We believe the students we have trained feel greatly indebted to the network and want more young people to benefit from such support, so they are very willing to give back.'*¹⁷⁶

In Benin, students from TAGDev, the CARP projects and the entrepreneurially-focused RECAP programme enthusiastically described their accomplishments and their visions for the future. Juliana Gos, a former master's student in nutrition and food science, had worked with Prof. Flora Chadare to develop porridge fortified with baobab and moringa leaves and test its effects on the nutritional status of women.

From this work, she was inspired to become an entrepreneur and develop new products to address the nutritional status of children in Benin. Most children have iron and zinc deficiencies which can limit their lifelong potential, she says. She has become a passionate advocate of entrepreneurship to address such challenges. After graduation she was awarded a FAPA grant which enabled her to deepen her work with communities. Now, she has started a mushroom business, a pioneering enterprise in Benin. She is passionate about her ability to make a difference and bring about positive change for Benin and Africa. Juliana says:

¹⁷⁶ RUFORUM Alumni Network (Video): <https://ruforumimpact.org/project/ruforum-alumni-network/>

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'The next generation will feel the impact of RUFORUM. We want them to support more entrepreneurs who are fighting against malnutrition using local natural resources. There are so many nutritious local food resources that need to be developed.'

Unfinished business

Today, with the launch of this book towards the end of 2022, RUFORUM can look back on its many accomplishments with pride. Yet it is also important to reflect briefly on the network's Unfinished Business, and the next steps. Professor Umezuruike Linus Opara, from Stellenbosch University, one of Africa's most-cited researchers, highlighted this in Benin:

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'I think this is the time for us to start taking action on the continent. The time has come for us to take stock and ask ourselves the hard questions: how have we fared with our commitments – as individuals, institutions, countries and even as a continent? Where is the evidence that we have done those things we committed to do? What do I do in my lab to build the capacity of young African scientists – especially women? In terms of research for impact, what problems are we addressing to achieve building the Africa We Want by 2063, and towards meeting the United Nations' Sustainable Development Goals by 2030? This is the time for action.'

RUFORUM's most pressing needs are financial. As Emmanuel Okalany says, this is *'a matter of life and death.'*

Cameroonian Technical Advisory Committee member Emmanuel Tanyi reflects on how funding constraints continue to limit the scope of what RUFORUM can achieve:

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'It is a difficult balancing act, because resources are limited. TAGDev, for example, is a good programme, but the resources are limited. We would like to do more within the TAGDev programme. If you have 35 scholarships to give, you have to spread these very thinly to cover all of Africa. We never have enough resources to do everything that we want to do.'

To some, RUFORUM needs to be more direct and strategic in making sure the network benefits from the convening and facilitation roles it plays. Judith Francis notes:

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'To be brutally frank, networks like RUFORUM must not be window dressings. This is why I admire and respect the Vice-Chancellors and the role they play. They have a unique way of evaluating every situation and providing guidance to the Secretariat and to their members. Others gain legitimacy from having RUFORUM engage and mobilise on their behalf. But at the end of the day, RUFORUM must be able to say they have more financial resources to upgrade facilities, improve curricula, do more relevant research, and keep evolving as an institution.'

Currently RUFORUM raises around 10 per cent of its budget from the member universities' subscription fees and the remainder from its donors. For Moses Waswa, these figures should be reversed, so that RUFORUM is self-sustaining. As always, the perennial chase to secure funding commitment from African governments continues and has begun to bear fruit through initiatives to fund projects through the World Bank. However, this advocacy remains part of the Unfinished Business. Financial stability for RUFORUM remains the elusive golden key.

Beyond this, RUFORUM needs to lean deeper into new ways of doing business. The pandemic has introduced new ways of working and mobilising people and resources. The network has had to respond to shocks and position itself to take advantage of emerging new opportunities. Adipala advises:

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'We have tried to do things differently and maintain momentum while we rebuild and reorganise the network for a much wider African responsibility.'

For Emmanuel Kaunda and many others, mentorship and leadership remain key issues. Emmanuel reflects:

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'Most of the RUFORUM Board members are ageing now. If we do not have a strong leadership development programme, we may soon face a crisis. We need mentorship on governance, and training on how to govern universities in a changing world. A Vice-Chancellor today is in a very different position to a Vice-Chancellor five years ago. We need to be adaptive and move with the world. We need to participate in the Fourth Industrial Revolution and artificial intelligence issues. RUFORUM should be thinking very seriously about the future of education. The universities must be part of the science and technology revolution so we can innovate and adapt the solutions to our problems. The universities must remain relevant.'

Deeper thinking is now required for RUFORUM to adapt and transform to meet the challenges of the future. Foremost is the challenge of rethinking human capacity development, to ensure that universities are relevant, cost-effective, and fit for purpose. Given Africa's economic and employment challenges, this means broadening the network's focus beyond postgraduate-level training, and toward upskilling more young people at the bachelors, technical, and vocational levels. For each PhD holder, at least 16 TVET graduates are needed to drive and facilitate transformative, community-led agro-industrialisation on the ground. Anthony Egeru comments:

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'Most African governments have already provided the policy environment to move farmers from subsistence to agro-industrialisation. Where we are getting stuck is on how to get it done. With TAGDev, we have provided a proof of concept demonstrating that the universities can help unlock the power of our food sector. The universities must also work with the TVETs, whose trainees have the skills to apply essential knowledge and expertise with farmers at the grassroots level. This is the frontier for unlocking the value of the agrifood systems. That is how we are going to shift the narrative from one of smallholder farmers growing poverty, to one of smallholder farmers growing wealth.'

What kind of leadership is now needed from the network? What qualities of the network must be carried forward? What can be let go of? How can promising models such as TAGDev be scaled widely, effectively, appropriately, and rapidly to achieve transformation of the magnitude that is needed, when the resources are not in place? How does RUFORUM continue to build for inclusivity, and contribute towards building the Africa We Want? Former Mauritius President Dr Ameenah Gurib-Fakim sums it up:

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'RUFORUM to me is a symbol of success. The focus of RUFORUM is agriculture. There cannot be a theme which is as relevant to the continent as agriculture. Africa represents 60 per cent of arable land in the world. It is a one-trillion-dollar business. It is a sector that can provide jobs, and a sector where African youth can become entrepreneurs. It's a sector that can drive manufacturing. It's a sector that will drive down hidden hunger and ensure food security. It's a sector that can promote intra-African trade and move beyond the 20 per cent to target 60 per cent as it is in the European Union. It's a sector that has a lot of promise. RUFORUM is a network that has become what Adipala had started to think of and dream of many years ago.

It's high time that Africa takes higher education seriously. The transformation of Africa will happen through education and especially higher education. This week in Benin has been about how to connect education to development and especially agriculture. Focusing on education, higher education and agriculture can ensure that a lot of results coming out of the universities can cross the valley of death and encourage students to become entrepreneurs – because we need more entrepreneurs to become job creators and to just do it.'

Epilogue: a letter to the future

The RUFORUM family has travelled far in just a few short decades. Thousands of us both within and outside of Africa have been part of this journey to sow a seed for this continent based on its greatest resources: its people and its ingenuity. As Kuan Tzu said many years ago: *'If you are thinking a year ahead, sow a seed; if you are thinking ten years ahead, plant a tree; if you are thinking 100 years ahead, educate the people.'*

I was reminded of this saying yet again recently, when my colleague and former student Richard Edema wrote to inform several of our colleagues that an African seed company wishes to licence and distribute two varieties of cowpea that he and his colleagues at Makerere worked to develop. Richard has headed MaCCRI since 2016 when it was launched as a World Bank ACE programme, building on the strengths of our regional postgraduate programmes that he and Patrick Okori designed and initiated back in 2008.

I feel very proud to know that these new cowpea varieties, developed from traditional African knowledge and ingenuity by many hands through years of hard work, may now find the opportunity to nourish people across our continent and bolster our sources of nutrition, dietary diversity, and food security. As Richard writes,

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'This is a big milestone for MaCCRI as this is the first lot of seeds from our research programme to break into commercial level... Despite 'hills and valleys of growing up', MaCCRI is now a very viable and stronger entity than when we started in 2016. The future looks GREAT!'

As I look at the new generations of colleagues across the continent, including Richard and many others, who are taking up the baton and running their race, I feel certain that the next phase of RUFORUM's journey will be dynamic and prosperous. And that is even more reason to remain stubborn optimists, and to keep pushing for a better future.

We must remember that we cannot eat the seeds of an initiative – it is the continuous harvest that sustains and nourishes us. We still have work to do, if we are serious about harvesting the prosperity and development for Africa that we have all been working towards.

This is our focus, planning aeons ahead by educating our people to prepare and lead the continent to prosperity. Our seed was to create a platform, RUFORUM, to train and mentor the next generation of scientists and youth to drive change in our continent. The soil was prepared for what RUFORUM would become nearly 40 years ago, when many of our elders struggled to build cultures of quality, rigour, and teamwork in our institutions. Then the seed of RUFORUM was planted by the collective actions of African universities. That initiative took root and continues to grow. Our network is now 157 universities strong. Our focus on universities was led by the fact that by strengthening African universities, we chose to empower thousands of young people with a chance to succeed and a commitment and passion to foster development on the continent.

We were determined to take initiative, recognising the Mozambican saying introduced to us by Graça Machel: *your neighbour will never fill your granary*. Africa must fill its own granaries, and the African youth will be the ones to accomplish this. Young people will drive change and prosperity on the continent.

From our inception in 2004, our focus was to enhance agricultural productivity and the livelihoods of smallholder farmers across Africa with trained, skilled, and committed African youth driving the change. But development is an evolutionary process driven by new challenges and insights that look beyond today, and into an unknown future.

Development is also spurred by exploring opportunities and exploring into the unknown, just as current space exploration has demonstrated. Yes, we now have a vibrant network of universities working together to drive development processes. We have made a collective commitment to strengthen the continent's competitiveness. And indeed, our universities have generated thousands of technologies and innovations that are improving farmers' livelihoods across Africa and feeding into the continental industrialisation processes. Their voices are being heard across the continent and globally and they are beginning to influence policy direction as demonstrated during the UNFSS 2021 dialogue.

But this work remains unfinished and new challenges are emerging. In its next chapter, RUFORUM will need to deal with several key challenges. The fundamental issue is that the RUFORUM core mandate of strengthening human capital for Africa remains unfinished. The demand is even greater today than it was at our inception, and it will only continue to grow for the foreseeable future. We must prepare in earnest for the year 2050, when young Africans are expected to form one quarter of the entire global labour force.¹⁷⁷ I believe that our young people are stubborn optimists who are passionate about their own potential to shape the future – with as many as 60 per cent who were surveyed by the Global Entrepreneurship Monitor, for example, reporting that they believe they have the opportunities, skills, and knowledge to create a business¹⁷⁸. However, they cannot do this without robust and relevant support. The skill gaps are changing rapidly, requiring innovative approaches to respond. A mix of interventions will be needed.

These are some of the key actions that, from my perspective, will be needed:

- Building capacity for capacity development will remain key. African universities must reinvent themselves. They must infuse new insights, and new capabilities for training the new generation of scientists for Africa. They must creatively implement new agendas to ensure they remain relevant to development needs and emerging challenges. We have exploding demand for education, including at university level. Simultaneously, we have a remarkably diverse continent with some very well-resourced institutions and others very under-resourced. We also have those emerging out of conflict in fragile States, and it will require dedicated attention to build their capacity.
- We must train for development, recognising that global development has been driven by science. We must train science leaders for the continent that will develop initiatives to respond to these challenges, and to the emerging challenges of climate change, greenhouse gas emissions, flooding and challenges such as the increase in malnutrition.
- These challenges will not be addressed by universities alone. Universities must partner with others and support the strong development of the technical training institutions so that we build a cadre and train development practitioners. We must engage African universities to work with grassroots organisations to scale the influence of youth across the continent. In this regard we must look beyond merely training the students on their campuses. We also need to build the capacities and skills of key stakeholders including farming communities.
- RUFORUM must be at the forefront of developing capacities to respond to emerging challenges such as climate change. We must build capacity for managing post-harvest practices since we lose more than 60 per cent of our produce to post-harvest losses. We must recognise that the food demands and eating

¹⁷⁷ <https://www.ohchr.org/sites/default/files/Documents/Issues/Youth/UNEconomicCommissionAfrica.pdf>

¹⁷⁸ <https://www.weforum.org/agenda/2015/06/africas-young-people-entrepreneurship/>

habits of the population in Africa and globally has changed and will continue to change. The continent, with the support of institutions such as RUFORUM, must engage in developing food innovations to address nutritional needs and respond to changing dietary and market requirements.

- We must promote inclusivity and build on our efforts to build capacity in fragile States and emerging institutions to strengthen the participation of women in postgraduate and leadership positions in African universities. Achieving these goals will require realignment of the RUFORUM vision to ensure that we serve the wider network and focus on responding to diverse capacities and needs across the continent and worldwide, respecting national and regional priorities.
- The ongoing efforts to establish regional nodes in Africa, starting with the southern regional node in Malawi and the envisaged west African regional node in Benin will allow RUFORUM to give focused attention not only to national but also regional needs. It will enable the Secretariat to better serve this wider community.
- We must do everything to continue to strengthen our engagement with policy. Policy is central to everything we do because policies are responsible for setting the vision and direction of development. They are also responsible for resources. But to do that well they need guidance and foresight from the information that the universities and research institutions generate. In this regard RUFORUM and its network must build capacity for foresight and management of data to inform policy formulation.
- Africa has the largest (and growing) youth population. Our continent must work with other actors to ensure that these youth are made employable, they are made useful citizens of society, and that they are entrepreneurial, so that they are able to generate jobs and employ others.
- RUFORUM will need to build on its current efforts of strengthening the entrepreneurial skills of graduates and out-of-school youth and making sure that innovations generated from universities feed into industry.
- Finally, RUFORUM's success will hinge on the network's collective and connected efforts. We must leverage the African saying: *To walk fast, walk alone. But to travel far, go with others.*

Working together is what helped to grow RUFORUM, and it will be needed now more than ever before. But in this process, we must not leave anybody behind.

I believe RUFORUM has grown and is ready to take on new mantles with even greater vigour and vision. I wish the network and Africa great tidings. I see my continent as the new global leader. With more than 60 per cent of our population being youth – and of these, the majority being excluded – our future depends on our engaging this our greatest asset in a more inclusive manner. The seed we have sown through RUFORUM's inclusivity and diversity agenda must grow and remain a key focus for the present and future. All the current challenges and the challenges to come provide opportunities for innovation. RUFORUM is well positioned to build response capacity for the continent and to marshal collective action to develop the Africa We Want.

God bless you. I wish you all the best.

Prof. Adipala Ekwamu

Acknowledgments

We would like to acknowledge all people who were interviewed for this project:

Abigael Otinga
Achille Assogbadjo
Address Mulata
Adil Defeila
Adipala Ekwamu
Agnes Mwang'ombe
Ali Eissa
Alice Mtweetwa
Ameenah Fakim-Gurib
Angela Ibanda
Anthony Egeru
Anthony Mwinje
Brice Sinsin
Charles Mutisi
Daniel Sherrard
Emmanuel Kaunda
Emmanuel Okalany
Emmanuel Tanyi
Flora Chadare
Florence Nakayiwa
Francis Otto
Frans Swanepoel
George Kanyama-Phiri
Hatim Mohamed Ahmed Elamin
Hellen Kongai
Ibrahim El-Dukheri
Irene Akite
Jeninah Karungi Tumutegyereize
Jolyn Runyararo
John Lynam
John Ssebuwufu
Joyful Rugare
Jude Lubega
Judith Francis
Juliana Gos
Julius Ochuodho
Kay Muir Leresche
Lindiwe Sibanda
Luke Mumba
Malcolm Blackie
Mary Shawa
Maud Kamatenesi Mugisha
Mayada Mamoun Beshir
Micheline Inamahoro
Mick Mwala
Majaliwa Manjololo
Nada Musa
Ophelia Weeks
Patrick Okori
Patrick Rubahaiyo
Richard Edema
Robert Kawuki
Sokona Dagnoko
Sylvanus Mensah
Theopoline Itenge
Theresia Nkuo-Akenji
Umerzuruike Linus Opara
Valere Kolawole Salako
Vincent Saka
Yousuf Jemal

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