



MAKERERE UNIVERSITY



**COLLEGE OF AGRICULTURAL AND
ENVIRONMENTAL SCIENCES (CAES)**

ANNUAL REPORT 2022





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Introduction	11
Schools & Departments	12
Teaching & Learning	17
Research & Innovations	33
College Activities	76
Research Institutes	91
CAES Publications 2022	113
Human Resources	130

CONTENTS



Acronyms

AfDB	African Development Bank
ARUA	African Research Universities Alliance
CAES	College of Agricultural and Environmental Sciences
DABE	Department of Agricultural and Bio-Systems Engineering
DANRE	Department of Natural Resource Economics
DAP	Department of Agricultural Production
DEIS	Department of Extension and Innovation Studies
DEM	Department of Environmental Management
DFTHN	Department of Food Technology and Human Nutrition
DGGCS	Department of Geography, Geo-informatics and Climatic Sciences
DRGT	Directorate of Research and Graduate Training
FBT	Department of Forestry, Biodiversity and Tourism
FTBIC	Food Technology and Business Incubation Centre
MAK	Makerere University
MaRCCI	Makerere University Regional Centre for Crop Improvement
MUARIK	Makerere University Research Institute Kabanyolo
MUBFS	Makerere University Biological Field Station
NBDB	National Biodiversity Data Bank
NFC	Nyabyeya Forestry College
SAS	School of Agricultural Sciences
SFECS	School of Forestry, Environmental and Geographical Sciences
SFTNB	School of Food Technology, Nutrition and Bioengineering

COLLEGE LEADERSHIP



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Foreword



The College of Agricultural and Environmental Sciences (CAES) continued to deliver on its mandate of undertaking basic, strategic and applied research and development in the broader areas of agriculture, food technology and nutrition, forest management and environment, and natural resources management. In agriculture, research and development programmes have focused on enhancing farmer centred approaches, climate smart agricultural systems, value chain improvement for the achievement of food and nutritional security, livelihood improvement and overall rural development. The College continues to pioneer R&D in biotechnology, integrated pest and disease management, linking producers to markets as well as incubation of innovation for market products.

My term of service as Principal CAES commenced in February 2022. I take this opportunity to appreciate Makerere University Management for entrusting me with this responsibility for the next 4 years. My heartfelt appreciation to all staff and students of CAES for the warm welcome, support and cooperation rendered, and your commitment to co-creating a journey to a CAES that shall make all of us proud.

The year 2022 has been a remarkable year at CAES because leaders and all members of staff committed to pursuing the "Innovation Intentional @CAES" agenda enshrined in the Transformational Pact, which was formulated through a participatory process. The Transformational Change Pact that was signed by all leaders of schools and departments in the CAES, manifesting a clear testimony that we have a shared purpose for the direction and future of our college.

supportive infrastructure and highly motivated staff. We reiterated our commitment to productively engage with stakeholders to enable us produce skilled, entrepreneurial, innovative and work-oriented graduates, able to innovatively respond to challenges, needs, and aspirations in the Agricultural and Environmental sectors". This is the lens through which progress of the college ought to be evaluated as we move into 2023 and beyond. I, therefore, implore all of us to be fully committed and responsive in our quest to fulfill this goal.

I thank all members of staff for the service-above-self attitude that you have exhibited in 2022. Some of the milestones registered in 2022 include:-

- Establishing a "Transformation Pact" via 'grassroots' departmental engagement (rather than top-down agenda) for entire college to spur innovation

- Established new College Mantra - "Innovation Intentional @CAES"
- Curriculum for about 15 programmes have been revised and are undergoing approval processes. The curriculum for some of the programmes were reviewed to be innovation intentional, with enhanced content that skills for entrepreneurial green economies and incorporated learner-centered and gender-responsive delivery modes.
- Started testing a pilot department model that reduces teaching loads and allocates additional faculty time for creative outreach efforts (e.g., creating industry internships)
- Revitalized staff motivation engagements toward building a more cohesive team at CAES.
- The Research and Ethics Committee (REC) at CAES approved and launched by National Council for Science and Technology.
- The Journal of Agricultural & Environmental Sciences (MUJAES) revitalized to raise our visibility with respect to research dissemination.
- The 30 acre SFEQS Botanical Garden for in-situ conservation of indigenous tree species at MUARIK launched. Several Academic national and international conferences held to facilitate information exchange, increasing the visibility of CAES and networking.
- Revitalizing MUARIK to improve research and farm production for commercialisation, among others.

For 2023, we shall continue to be intentional on meaningfully and significantly contributing to National and Regional Development. This we shall be able to achieve by doing the following:

- Build synergies and strategically leverage our Private-Public-Partnerships in providing innovative solutions to National and Regional Challenges.
- Leverage the innovations at CAES, to provide products and services.
- Continue to re-tool faculty for the delivery of Innovation-Intentional, learner-centred, and Gender-responsive curricula.
- Implement practical learning at MUARIK for all 8 Departments with respect to internships, in-semester practicals, recess, and students' research projects; and fully operationalize and commercialise the university farm.
- Begin institutionalising Student-Faculty, Faculty-Faculty and Student-Student innovation mentorship pairs
- Generate internal resources to supplement funds from government subventions.
- Develop and implement an internal reward system for exceptional performance.

Let us all continue to embrace our uniqueness and diversity as we strive to successfully deliver on our mandates. Success can only be achieved if there is collective consciousness on the shared mission in an organisation. This was emphasised by George Washington who said "The Honor and Success of the army, depends upon harmony and good agreement with each other". As we embark on our mission, let us be inspired by Mark Zuckerberg who said "We are here to build something for the long-term. Anything else is a distraction".

As we build for the future, For God and my Country.



Gorettie N. Nabanoga
Principal CAES



Strategic Goals

In pursuit of our mandate, we are guided by the four core goals of Makerere University listed below:

- Goal 1 –** To transform Makerere into a research-led university, responding to national, regional and global development challenges, as well as contributing to global knowledge generation.
- Goal 2 –** Innovation in teaching and learning: In her quest to provide the desired human capital, the University is committed to creating the appropriate environment and support to students to meet their academic and professional aspirations. Teaching and learning will be all-inclusive integrating gender and special needs requirements.
- Goal 3 –** A professionally managed, equitable, inclusive and gender mainstreamed institution.
- Goal 4 –** An engaged University with enhanced partnerships with industry, the community and international institutions.



01

Introduction



CAES AT A GLANCE

Makerere University College of Agricultural and Environmental Sciences (CAES) is one of the 10 Constituent Colleges of Makerere University. The College was formed through a merger of the former: (i) Faculty of Agriculture, (ii) Faculty of Forestry and Nature Conservation, (iii) Makerere University Institute of Environment and Natural Resources; and (iv) the Department of Geography. The College is made up of three schools: School of Agricultural Sciences (SAS), School of Food Technology, Nutrition and Bioengineering (SFTNB), and the School of Forestry, Environmental and Geographical Sciences (SFECS), which together have eight Departments. In addition, CAES has two research institutes namely: Makerere University Agricultural Research Institute Kabanyolo (MUARIK) and Makerere University Biological Field Station (MUBFS). The College also has 14 centres that serve as a base for knowledge transfer and partnerships, these are complemented by facilities located at Nyabyeya Forest College and Budongo Conservation Field Station that cater for Forestry students. The College human resource consists of 400 employees, 170 Academic staff of whom 140 are PhD holders at ratio of 20% female, with 19 staff at the rank of professor and 31 at the rank of Associate Professor. It has over 2,922 students. Of these 2,758 (94.4%) are undergraduate students and 164 (5.6%) are graduate students (Masters and PhD). CAES is offering 15 undergraduate programmes, 19 master's programmes, 11 PhD programmes and three post graduate diplomas in the broad areas of agriculture, food science and nutrition, forestry, environmental and geographical sciences. To support its mandate, CAES has eight libraries, 19 research laboratories, six computer laboratories, and one GIS laboratory. The College continues to rank high in excellence in innovative teaching, research and innovations contributing to the realisation of Makerere University's strategic direction which is oriented on addressing national and global development priorities. Over the years, the faculty at CAES have produced cutting-edge research and innovations that have greatly uplifted the ranking and position of Makerere University. Last Academic Year, our faculty produced over 300 publications which we believe was the highest number by any college at Makerere University. We also continue to produce a reasonably higher number of PhD graduates in line with Makerere University's priorities.



02

**Schools,
Departments
and Centres**

The college has three schools and eight departments.

2.1. School of Agricultural Sciences (SAS). SAS comprises of three Departments, namely:

- ▶ Department of Agricultural Production (DAP)
- ▶ Department of Agribusiness and Natural Resource Economics (DANRE)
- ▶ Department of Extension and Innovation Studies (DEIS)

2.2. School of Forestry, Environmental and Geographical Sciences (SFECS). SFECS has the following departments;

- ▶ Department of Forestry, Biodiversity and Tourism (FBT)
- ▶ Department of Environmental Management (DEM)
- ▶ Department of Geography, Geo Informatics and Climatic Sciences (GGCS)

2.3. School of Food Technology, Nutrition and Bioengineering (SFTNB). SFTNB is constituted of two departments, namely:

- ▶ Department of Agricultural and Biosystems Engineering (DABE)
- ▶ Department of Food Technology and Nutrition (FTHN)

The SFTNB also hosts the Food Technology and Business incubation Centre (FTBIC)

2.4. Research Centers and Institutes

The college also has a number of institutes and centres, which address more specific research or training issues. The current institutes and centres are listed in the table below.

TABLE 1: Research Centres and Institutes

No	Name Of Research Institute / Centre	Purpose	Legal Status College Centre/company
1	Makerere University Agricultural Research Institute Kabanyolo (MUARIK)	<ul style="list-style-type: none"> ▶ A multi-disciplinary facility for training, research, outreach and production. ▶ Interface with the National Agricultural research system (NARS). ▶ Currently has 28 cows, 1,240 broilers, 15,000 layers and 33 pigs. 	College Centre in Wakiso
2	The Makerere University Biological Field Station (MUBFS)	Conduct research and host short international courses in tropical biology, ecological and behavioural research on taxonomy, and socio economic studies.	College Centre in Kabarole and Kamwenge districts
3	The Food Technology and Business Incubation Centre (FTBIC)	Conduct research in agro-processing and value addition, Train students, staff and the general community in entrepreneurship, Nurture research ideas into Business enterprises and commercial products, Carry out skills training (short courses) using the installed equipment for potential entrepreneurs in food value addition.	College Centre on main campus

4	Makerere University Regional Centre for Crop Improvement (MaRCCI)	<ul style="list-style-type: none"> ▶ Expand, strengthen and transform the PhD Plant Breeding programme following the pattern of the highly successful MSc in Plant Breeding and Seed Systems. ▶ Provide the nations of Eastern and Southern Africa (ESA) with industry-ready plant breeders who are equipped to use cutting edge science to develop and deliver new varieties of food crops. 	College Centre at MUARIK
5	Makerere University Centre of Excellence in Waste Management	<ul style="list-style-type: none"> ▶ To become a centre of innovative research and technology development utilizing bio waste (agricultural/ organic wastes) in enhancing sustainable agricultural production and a healthy environment. ▶ Optimise and promote composting of biodegradable waste for improved agricultural production. ▶ Develop livestock feed protocols based on market crop waste. ▶ Develop biogas technologies for use by small scale households. ▶ Offer training, knowledge sharing and advisory services in waste management and create linkages with the private sector in technology development. ▶ Promote the adoption and diffusion of viable waste utilisation technologies and products. ▶ Promote regional and international research collaborations and linkages and create community awareness and training through linkages. 	College Centre at MUARIK
6	Makerere University Centre for Climate Change Research and Innovations (MUCCRI)	<ul style="list-style-type: none"> ▶ Promote awareness on climate change. ▶ Conduct research on climate change science, climate change mitigation and adaptation in all sectors and disseminate the generated information. ▶ Generate and disseminate innovations for climate change mitigation and adaptation in agricultural sciences and natural resources sectors. 	College Centre on main campus

		<ul style="list-style-type: none"> ▶ Advocate and influence climate change and development policy to enable Uganda address climate change challenges. 	
7	The Makerere University Centre for Soybean Improvement and Development (MakCSID)	<ul style="list-style-type: none"> ▶ Develop superior soybean genotypes with high yield, broad adaptation, and traits most desired by end-users. Enhance availability and access of the improved soybean varieties through a sustainable seed delivery mechanism. ▶ Develop new soybean products for human food, animal feeds, and industrial uses. Establish agro-business initiatives using soybean as base. ▶ Improve awareness for increased adoption of soybean technologies for farmers and other end-users. ▶ Equip students with hands-on skills that are relevant to plant breeding, seed systems and value addition. 	College Centre at MUARIK
8	The National Biodiversity Data Bank (NBDB) – Uganda	<ul style="list-style-type: none"> ▶ Avail data and information regarding the country's biodiversity to aid in research, conservation and informing the decision making process. ▶ Act as a central repository for biodiversity information within Uganda. ▶ Monitor the national biological resources. ▶ Provide consultancy services to the government and other organisations in Uganda in different fields of environment and natural resources, assessment and monitoring of environment and natural resources. 	College Centre on main campus
9	Uganda Forestry Resources and Institutions Centre (UFRIC), Makerere University	<ul style="list-style-type: none"> ▶ Promote sustainable management of global commons including forests. ▶ Address global challenging questions such as the impact of institutions on forest sustainability. ▶ Collect forest inventory and socio-economic data from several parts of the globe through its Collaborating Research Centres (CRCs). 	College Centre on main campus

		<ul style="list-style-type: none"> ▶ Monitor forest resources and institutions. 	
10	Continuing Agricultural Education Centre (CAEC)	<ul style="list-style-type: none"> ▶ Operate outreach programmes for various stakeholders. ▶ Host refresher and specialised short courses to meet the demands as they arise in agriculture and environment. 	College Centre at MUARIK
11	A consortium for Enhancing University Responsiveness to Agribusiness Development (CURAD)	<ul style="list-style-type: none"> ▶ Promote entrepreneurship by students and graduates of Makerere University in business incubation especially those working with agribusiness or farming. 	Company at MUARIK
12	Centre for Mountain Resources and Disaster Management	<ul style="list-style-type: none"> ▶ Offer a specialised course on Highland and mountain resource management. ▶ Spearhead, conduct and coordinate issues concerning mountains and sustainable development in Uganda and beyond. ▶ Engage in research and outreach, organise and hold local and international conferences, thus contributing to documentation and sharing of knowledge on mountains. 	College Centre on main campus
13	Agricultural Policy Research Centre	Handles interface with the policy processes.	College Centre anchored in DANRE, main Campus
14	Makerere University Tissue Culture Laboratory (MAKTCLAB)	<ul style="list-style-type: none"> ▶ Contributes to food security, income generation and livelihood improvement through commercialising quality tissue culture planting material in Uganda. The Laboratory affords quick production of clones identical to the source plant in large numbers that are often free from pests and diseases 	College Centre at MUARIK
15	Centre for Environment and Development	<ul style="list-style-type: none"> ▶ Deals with issues at the interface of the Environment and development objectives. 	Co-hosted with COBAMS. The Director is from COBAMS



03

Teaching and Learning

In responding to Makerere's strategic goal 2 (Innovation in teaching and learning that respond to the changing environment), we took on a task of re-evaluating our curricula and research activities in order to improve the innovation culture among students and faculty which would facilitate the production of students that are competent and more competitive in the global market of jobs and entrepreneurship. We noted the lack of adequate curricula to stimulate innovativeness within students and faculty. Further, despite the talented and creative faculty, overbearing workloads and other factors often hinder dynamic classroom teaching that embeds and inspires innovation for learners. We have embarked on reviewing all our curricula to make them innovation intentional, with enhanced content that skills for entrepreneurial green economies and incorporate learner-centred and gender-responsive delivery modes. To date, Curriculum for about 15 programmes have been revised and are undergoing approval processes. The curriculum for some of the programmes were reviewed to be innovation intentional, with enhanced content that skills for entrepreneurial green economies and incorporated learner-centred and gender-responsive delivery modes. We continue to equip our faculty with various skills to deliver curricula that is practical-oriented and fosters critical thinking as well as entrepreneurship. We thank the University Council for considering and reinstating three of the programmes that had been suspended. These include Bachelor of Science in Horticulture and Bachelor of Science in Meteorology.

The academic programmes offered at CAES listed by school include the following:

Table 2: Undergraduate and graduate programmes

No	School	Programmes Undergraduate	Code	Duration	Fees Structure	
					East Africans & Refugees	International Students
1	School of Agricultural Sciences	Undergraduate				
		Bachelor of Science in Agriculture	AGR	4 Years	2,044,056/=	3,406,760/=
		Bachelor of Agricultural and Rural Innovation (Internal)	BAR	3 Years	2,129,225/=	4,301,035/=
		Bachelor of Agricultural and Rural Innovation (External)		4 Years	988,569 /=	2,570,279/=
		Bachelor of Science in Agricultural Land Use & Management (under reconsideration)	BAM	3 Years	1,277,535/=	1,916,303/=
		Bachelor of Science in Horticulture	HOT	3 Years	1,490,458 /=	2,235,686/=
		Bachelor of Agribusiness Management	AGM	3 Years	1,171,074 /=	1,756,611/=
		Graduate (Masters & PhD)				
		Master of Science in Agricultural Extension		2 Years	5,000,000/=	8,000,000/=
		Master of Science in Crop Science		2 Years	5,000,000/=	8,000,000/=
		Master of Science in Animal Science		2 Years	5,000,000/=	8,000,000/=

2		Master of Science in Soil Science		2 Years	5,000,000/=	8,000,000/=
		Master of Science in Plant Breeding and Seed Systems		2 Years	5,000,000/=	10,338,360/=
		Master of Science in Agricultural and Applied Economics		2 Years	5,500,000/=	7,200,000/=
		Ph.D. Plant Breeding and Biotechnology (Coursework & Dissertation)		3 Years	7,000,000/=	10,338,360/=
		Regional PhD program in Agricultural and Applied Economics		3 Years		
		Ph.D. Agricultural and Rural Innovations (Coursework & Dissertation)		3 Years	7,000,000/=	13,000,000/=
	School of Forestry, Environmental & Geographical Sciences	Undergraduate programmes				
		Bachelor of Science in Forestry	BOF	4 Years	1,454,750/=	3,967,500/=
		Bachelor of Science in Tourism and Hospitality Management	BTH	3 Years	1,454,750/=	3,967,500/=
		Bachelor of Geographical Sciences	BGS	3 Years	1,454,750/=	3,967,500/=
		Bachelor of Science in Meteorology	BMT	3 Years	1,368,788/=	1,825,050/=
		Bachelor of Environmental Science	BVS	3 Years	1,277,535/=	1,596,919/=
		Post graduate programmes				
		Post Graduate Diploma in Environmental Impact Assessment		1 Year	5,000,000/=	8,000,000/=
		Master of Science in Forestry and Biodiversity Management		2 Years	5,600,000/=	8,985,600/=
		Master of Science in Disaster and Risk Management		2 Years	5,000,000/=	7,200,000/=
		Master of Landuse and Regional Development Planning		2 Years	5,000,000/=	7,200,000/=

		Master of Science in Agroforestry and Community Development		2 Years	5,600,000/=	8,985,600/=
		Master of Geographical Sciences		2 Years	5,000,000/=	7,200,000/=
		Master of Science in Environment and Natural Resources		2 Years	5,060,000/=	9,345,600/=
		Master of Science in Applied Meteorology		2 Years	5,000,000/=	7,200,000/=
		Master of Science in Climate Change and Sustainable Development				
3	School of Food Technology, Nutrition & Bioengineering	Undergraduate programmes				
		Bachelor of Science in Food Science and Technology		4 Years	2,044,056 / =	3,406,760/=
		Bachelor of Science in Agricultural Engineering	AGE	4 Years	2,044,056 / =	3,406,760/=
		Bachelor of Science in Human Nutrition		3 Years	1,825,050 / =	3,379,384/=
		Bachelor of Science in Water and Irrigation Engineering	BWE	4 Years	2,005,600/=	3,036,000/=
		Bachelor of Science in Bioprocessing Engineering Graduate (Masters)		4 Years	2,300,000/=	3,737,500/=
		Master of Science in Agricultural Engineering		2 Years	5,000,000/=	8,000,000/=
		Master of Science in Food Science and Technology		2 Years	5,000,000/=	8,000,000/=
		Master of Science in Applied Human Nutrition		2 Years	5,000,000/=	9,090,000/=
		Master of Science in Food Safety and Quality Management		2 Years	5,200,000/=	8,900,000/=
Doctoral Degrees by research only						
1	PhD degrees tenable in the School of Agricultural Sciences				7,000,000/=	9,000,000/=
2	PhD degrees tenable in the School of Forestry, Environmental & Geographical Sciences				7,000,000/=	9,000,000/=
3	PhD degrees tenable in the School of Food Technology, Nutrition and Bio-Engineering				7,000,000/=	9,000,000/=

ii) Proposed/Approved Programmes

A number of programmes, listed below, have been identified and are in the process of being developed to address the current and future national and global agricultural development and sustainable environment and natural resources management needs of the country.

- ▶ Bachelor of Science in Animal Science and Husbandry
- ▶ Bachelor of Science in Agricultural Economics
- ▶ Bachelor of Rural Economy and Cooperative Management
- ▶ Master of Science in Integrated Animal Production Systems
- ▶ Master of Science in Horticulture
- ▶ Master of Science in Natural Resource Economics

iii) Student enrolment and graduation

As at December 2022, CAES had a total of 2,922 students. Of these 2,758 (94.4%) are undergraduate students and 164 (5.6%) are graduate students (Masters and PhD). 2013 Students enrolled for the Academic Year 2022/2023 as indicated in the table below.

Table 3: Statistics of registered students 2022/2023 Academic Year

CAES Enrollments 2022-2023					
Programme, name, and gender	Year 1	Year 2	Year 3	Year 4	Grand total
Bachelor of Agribusiness Management	42	92	100		234
Female	13	38	43		94
Male	29	54	57		140
Bachelor of Agricultural and Rural Innovation	29	94	75		198
Female	10	33	33		76
Male	19	61	42		122
Bachelor of Agricultural and Rural Innovation EXT	7	47	35	40	129
Female	2	7	5	6	20
Male	5	40	30	34	109
Bachelor of Conservation Forestry and Products Tecnology				1	1
Male				1	1
Bachelor of Environmental Science		1	83		84
Female		1	26		27
Male			57		57
Bachelor of Geographical Sciences	11	23	21		55
Female	2	13	11		26
Male	9	10	10		29
Bachelor of Science in Agricultural Engineering	17	28	33	24	102
Female	2	15	10	12	39
Male	15	13	23	12	63
Bachelor of Science in Agricultural Land Use and Mgt		5	15	41	20
Female		1	8	8	9
Male		4	7	33	11

Bachelor of Science in Agriculture	41	51	43	37	172
Female	8	17	20	8	53
Male	33	34	23	29	119
Bachelor of Science in Bioprocessing Engineering	5	21	14	5	45
Female		11	6	2	19
Male	5	10	8	3	26
Bachelor of Science in Food Science and Technology	27	23	23	22	95
Female	8	12	8	7	35
Male	19	11	15	15	60
Bachelor of Science in Forestry	27	59	46	45	177
Female	4	24	15	23	66
Male	23	35	31	22	111
Bachelor of Science in Horticulture		1	6		7
Female		1	3		4
Male			3		3
Bachelor of Science in Human Nutrition	32	25	18		75
Female	11	13	7		31
Male	21	12	11		44
Bachelor of Science in Meteorology		2	30		32
Female			14		14
Male		2	16		18
Bachelor of Science in Tourism and Hospitality Management	25	56	49		130
Female	10	31	26		67
Male	15	25	23		63
Bachelor of Science in Water and Irrigation Engineering	20	21	23	24	88
Female	4	9	8	11	32
Male	16	12	15	13	56
Doctor of Philosophy in Plant Breeding and Biotechnology	13	3	1		17
Female	6	1			7
Male	7	2	1		10
Doctor of Philosophy (School of Agricultural Sciences)	4	1	1		6
Female	1				1
Male	3	1	1		5
Doctor of Philosophy (School of Forestry, Environmental and Geographical Studies)	5				5
Female	1				1
Male	4				4
Doctor of Philosophy (School of Food Technology, Nutrition and Bio-engineering)	2	4			6
Female		2			2
Male	2	2			4
Master of Agribusiness Management	10	6			16
Female	3	2			5
Male	7	4			11
Master of Climate Change and Development	1				1
Male	1				1
Master of Geographical Sciences	6	5			11
Female	3	1			4
Male	3	4			7

Master of Science in Agricultural and Applied Economics	16	10			26
Female	5	3			8
Male	11	7			18
Master of Science in Agricultural Engineering	13	5			18
Female	1	1			2
Male	12	4			16
Master of Science in Agricultural Extension Education	11	3			14
Female	4				4
Male	7	3			10
Master of Science in Animal Science	12	1			13
Female	2				2
Male	10	1			11
Master of Science in Applied Human Nutrition	5	1			6
Female	2				2
Male	3	1			4
Master of Science in Applied Meteorology	1	2			3
Male	1	2			3
Master of Science in Climate Change and Development	28				28
Female	9				9
Male	19				19
Master of Science in Crop Science	13	15			28
Female	6	5			11
Male	7	10			17
Master of Science in Disaster Risk Management	2	5			7
Female	2	3			5
Male		2			2
Master of Science in Environment and Natural Resources	31	32			63
Female	11	12			23
Male	20	20			40
Master of Science in Food Safety and Quality Management	17	6			23
Female	6				6
Male	11	6			17
Master of Science in Food Science and Technology	12	5			17
Female	4	3			7
Male	8	2			10
Master of Science in Forestry and Biodiversity Management	6	1			7
Female	1				1
Male	5	1			6
Master of Science in Plant Breeding and Seed Systems	14	4			18
Female	4	3			7
Male	10	1			11
Master of Science in Soil Science	1	4			5
Female	1	3			4
Male		1			1
Master of Science in Tourism and Hospitality Management	5				5
Female	3				3
Male	2				2
MSc Environment and Natural Resources (Environmental Governance and Policy)	1				1
Male	1				1

MSc Environment and Natural Resources (Environmental Pollution and Waste Management)	2				2
Male	2				2
MSc Environment and Natural Resources (Natural Resources Management)	3				3
Male	3				3
PhD in Agricultural and Applied Economics	6				6
Female	2				2
Male	4				4
PhD in Agriculture and Rural Innovation	9		2		11
Female	5				5
Male	4		2		6
Postgraduate Diploma in Environmental Impact Assessment	3				3
Male	3				3
Grand total	535	662	618	198	2013

3.1 72nd Graduation Ceremony

3.1.1 2022 Graduation statistics

The CAES Management led by the Principal, Prof. Gorettie N. Nabanoga presented 650 graduands. Of these, 17 graduated with PhDs, 104 (38 female, 66 male) with Masters, 7 (2 female, 5 male) with a Postgraduate Diploma in Environmental Impact Assessment, and 522 (193 female, 329 male) with Bachelor's degrees. A total of 19 students (7 female, 12 male) attained first class degrees. The College of Agricultural and Environmental Sciences (CAES) presented the best student in the Sciences during the second session of the 72 graduation ceremony held on 24th May 2022. Mr. Nuwagira Albert scored a CGPA of 4.82 in the Bachelor of Food Science and Technology. In recognition of his excellent Performance, the Chancellor, Prof. Ezra Suruma presented to him the University Convocation Award which includes a cash prize of UGX1 million. During the 72nd graduation ceremony, a total of 12,474 graduands received degrees and diplomas of Makerere University. Of these, 100 graduated with PhDs, 1,236 with Masters degrees, 10,998 with Bachelor's degrees and 140 with undergraduate and postgraduate diplomas. 52 % of the graduands were female and 48 % were male. Forty of the 100 PhD graduands and 492 of the 1,236 Masters graduands were female, representing 40% in each category.

Table 4: Graduation statistics

SCHOOL	PROGRAMME	FEMALE	MALE	TOTAL
School of Agricultural Sciences	Undergraduate			
	Bachelor of Science in Agriculture	9	10	19
	Bachelor of Agricultural and Rural Innovation	19	72	91
	Bachelor of Science in Agricultural Land Use & Management	14	15	29
	Bachelor of Science in Horticulture		6	6
	Bachelor of Agribusiness Management	22	24	46
	Total	64	127	191
	Postgraduate			

	Master of Science in Agricultural Extension			
	Master of Science in Crop Science	3	12	15
	Master of Science in Animal Science			2
	Master of Science in Soil Science	1	2	4
	Master of Science in Integrated Watershed Management		3 3	3
	Master of Agribusiness Management	1	1	2
	Master of Science in Plant Breeding and Seed Systems	5	1	6
	Master of Science in Agricultural and Applied Economics	1	1	2
	Master of Science in Agricultural Economics	1	3	4
	Total	12	26	38
School of Forestry, Environmental and Geographical Sciences	Undergraduate			
	Bachelor of Science in Forestry	1	13	14
	Bachelor of Science in Tourism and Hospitality Management	8	8	16
	Bachelor of Geographical Sciences	7	11	18
	Bachelor of Science in Meteorology	11	15	26
	Bachelor of Environmental Science	19	28	47
	Total	46	75	121
	Postgraduate			
	Post Graduate Diploma in Environmental Impact Assessment	2	5	7
	Master of Science in Forestry and Biodiversity Management		1	1
	Master of Science in Forestry		2	2
	Master of Science in Disaster and Risk Management	1	2	3
	Master of Landuse and Regional Development Planning	1	3	4
	Master of Science in Agroforestry		1	1
	Master of Science in Geographical Sciences	2		2
	Master of Science in Environmental and Natural Resources	12	24	36
	Master of Science in Applied Meteorology			
	Total	18	38	56
School of Food Technology, Nutrition and Bioengineering	Undergraduate			
	Bachelor of Science in Food Science and Technology	10	15	25
	Bachelor of Science in Agricultural Engineering	8	12	20
	Bachelor of Science in Human Nutrition	9	5	14

	Total	27	32	59
	Postgraduate			
	Master of Science in Agricultural Engineering	1	4	5
	Master of Science in Food Science and Technology	3	1	4
	Master of Science in Applied Human Nutrition	6	2	8
	Master of Science in Food Safety and Quality Management	1		1
	Total	11	7	18

Table 5: First Class Degrees during the 72nd graduation

Bachelor of Conservation Forestry and Product Technology			
1	Amaitem Joshua Elukut	M	4.48
Bachelor of Environmental Science			
2	Kenneth Lukyamuzi	M	4.41
3	Molly Ayoo	F	4.56
4	Joseph Ddegeya	M	4.58
Bachelor of Science in Food Science and Technology			
5	Alum Jenipher	F	4.4
6	Bijabiwe Mariam	F	4.4
7	Nassolo Teddy	F	4.48
8	Buwembo James	M	4.59
9	Kajura Hannington	M	4.59
10	Mutenyo Joan	F	4.65
11	Kayaga Josephine	F	4.71
12	Nuwagira Albert	M	4.82
Bachelor of Science in Human Nutrition			
13	Ssebulime John	M	4.63
14	Mwakha Ali	M	4.78
Bachelor of Science in Agriculture			
15	Paliyo Felix	M	4.42
16	Kanyesigye Cissy	F	4.44
17	Mitala Yekosan	M	4.46
18	Kemigisha Kukundakwe	F	4.6
Bachelor of Agribusiness Management			
19	Reagan Suubi	M	4.42
20	Samuel Ssemakula	M	4.59

CAES 2022 PhD graduates and the overall best performing student in the Sciences

Overall, CAES presented 17 of the 100 PhD graduands at the 72nd graduation ceremony. The College also presented the best student in the Sciences. Mr. Nuwagira Albert scored a CGPA of 4.82 in the Bachelor of Food Science and Technology.



The CAES PhD graduates at the 72nd graduation ceremony of Makerere University



Mr. Nuwagira Albert the best Science student in the 72nd Graduation Ceremony of Makerere University

3.2 Orientation of First Year Students

In a bid to enable students settle in well, Colleges, Schools and Departments organise orientations for all newly admitted students, both undergraduate and graduate. On 2nd February 2022, the College of Agricultural and Environmental Sciences (CAES) held an orientation for all First Year students, where academic and administrative leaders headed by the Principal, Prof. Bernard Bashaasha briefed students about the College and the University in general. A similar orientation was held for First Year students under the 2022/2023 intake on 19th October 2022.



The former and current Principals of CAES addressing the students at the orientation held on 2nd February 2022



Prof. Fred Babweteera, Dean School of Forestry, Environmental and Geographical Sciences represented the Principal at the second orientation held on 19th October 2022

3.3 Short Course Training



The Vice Chancellor, Prof. Barnabas Nawangwe (L) receives a souvenir from Prof. Dr. Meryem Tuncel, Rector Çukurova University (R) after their meeting on 7th July 2021, Adana, Turkey

As part of the Agreement on Education Cooperation between Cukurova University (Adana, Turkey) and Makerere University (Kampala, Uganda), two (2) Professors from Turkey gave lectures on "General Aspect of Rural Development" and "Irrigation Science and Technology" from 7th to 11th February 2022 at the School of Food Technology, Nutrition and Bio-Engineering Conference Room at the College of Agricultural and Environmental Sciences.

3.4 Research Seminar - Finding the Silver Piglet

The College of Agricultural and Environmental Sciences (CAES) represented by Dr. Donald Kugonza, an Associate Professor in the Department of Agricultural Production, in March 2022 held a Seminar on "FINDING THE SILVER PIGLET".

Hybrid Seminar

Zoom ID;
342 064 0067



Venue; School
Of Agriculture
Conference
Room



Christina Pfeiffer
A National



Host;
Donald
Kugonza



Johann Sölkner
Genome-wide
Association and

3.5 CAES, FAO Uganda training on Digital Soil Mapping

The Department of Agricultural Production, College of Agricultural and Environmental Sciences (CAES), Makerere University in collaboration with FAO Uganda conducted a five-day training on digital soil mapping. The training organised under the framework of the project – Capacity Development on Sustainable Soil Management for Africa, took place at Makerere University from 13th-17th June 2022. It was officially opened by Mr. Anping Ye, Director, Office of South-South and Triangular Cooperation Division, FAO. The opening ceremony was graced by Dr. Querido Antonio, the Food and Agriculture Organisation Country Representative for Uganda; Dr Lui Zhongwei, Senior Programme Officer, Resource Mobilization and Private Sector Partnerships Division, FAO Rome; and Prof. Yazidhi Bamutaze, Deputy Principal, CAES.



Participants at the Digital Soil Mapping training

The two-year project (July 2020-June 2022) financed by the China International Centre for Economic and Technical Exchange (CICETE), Ministry of Commerce, People's Republic of China aimed to develop capacity in sustainable soil management through South-South cooperation, within the framework of Global Soil Laboratory Network (GLOSOLAN) and the International Code of Conduct for Sustainable Use and Management of Fertilisers (the Fertilizer Code), with special focus on balanced fertilisation. The project is part of FAO's efforts to strengthen the capacity of public and private institutions and communities to sustainably manage natural resources, restore

degraded land and protect vital ecosystems. Partners on the project include Makerere University; FAO Uganda; the Ministry of Agriculture, Animal Industry and Fisheries; the Institute of Agricultural Resources and Regional Planning – Chinese Academy of Agricultural Sciences; Busitema University; China Aid; Global Soil Partnership; National Semi-Arid Resources Research Institute – Serere, and the National Agricultural Research Laboratories – Kawanda. At Makerere, the project is coordinated by Dr Patrick Musinguzi



Participants at the Digital Soil Mapping training

3.6 Agrostudies Internship in Israel

The Government of Uganda currently holds bilateral cooperation with Israel, encompassing: agriculture, post-harvest technologies, animal husbandry, water management, health and land security. The cordial relationship resulted into the Israel Agrostudies Apprenticeship Programme, which has incredibly benefited many Ugandan students since 2013. The programme started in 2013 but was institutionalised in 2021. The Agrostudies Institute in Israel, which is the international centre for agricultural interns, coordinates the programme. The Agrostudies opportunity comes with a lot of practical agricultural skills training and international cultural exposure. Makerere University on 21st September 2022 flagged off 50 male students to Israel for a one-year paid internship. Ten (10) of these were from Busitema University while 40 were from Makerere. The students were flagged off by the Vice Chancellor of Makerere University, Prof. Banarbas Nawangwe, who was represented by the Principal, College of Agricultural and Environmental Sciences (CAES), Prof. Gorretie Nabanoga.



Some of the 50 students sent for internship in Israel

3.7 Review of programmes at the Department of Geography, Geo-informatics & Climatic Sciences

In a bid to align its programmes to the national and global development agenda, the Department of Geography, Geo-informatics and Climatic Sciences, College of Agricultural and Environmental Sciences (CAES), Makerere University conducts periodical reviews in consultation with different stakeholders. The Department is currently reviewing five programmes namely: Master of Land Use and Regional Development Planning, MSc Disaster Risk Management, Master of Geographical Sciences, Bachelor of Geographical Sciences, and BSc Meteorology. Besides aligning the programmes to the national and global development agenda, the review processes is intended to improve marketability and innovativeness of the programmes, address industry needs and contemporary challenges, improve practical training and interdisciplinarity, and to strengthen analytical skills amongst students. Since 2017, the department has been engaging different stakeholders including individual staff members, students, alumni and industry actors who have provided enriching contributions. The reviewed programmes will be rolled out in the Academic Year 2023/2024. To further enrich the programmes, the Department held a two-day stakeholder engagement to receive feedback on the proposed amendments. The activity held on 3rd-4th August 2022 at the School of Forestry, Environmental and Geographical Sciences and coordinated by the Head of Department, Prof. Frank Mugagga and Dr Paul Mukwaya was attended by academics from Makerere University College of Engineering, Design, Art and Technology (CEDAT); College of Education and External Studies (CEES); College of Natural Sciences (CoNAS); and the College of Computing and Information Sciences (CoCIS). It was also attended by representatives from Uganda National Meteorological Authority (UNMA); Ministry of Lands, Housing and Urban Development; National Planning Authority; and USAID.



Participants at the stakeholder engagement held at the School of Forestry, Environmental and Geographical Sciences



Some of the participants at the curriculum review workshop

PATENTS



04

**Research
and Innovations**

In responding to Makerere's strategic goal 1 (Aspiring to be a Research - Led University responding to National, Regional and Global development challenges), we are intentional on co-creating processes aimed at invigorating the innovation culture at CAES through re-orienting an innovative mindset of students and faculty. Despite CAES' high potential to generate innovative research projects and products, very few innovative outputs are currently generated and commercialised due to lack of institutionalised support systems for innovators and innovations. To address this challenge, we engaged students, faculty, industry and external stakeholders via the Human Centred Design (HCD) approach to first, better understand barriers to deliver courses that cultivate young entrepreneurs, connect research to industry and create innovations from the prior two. New practices that would contribute to faculty and students' development and success as CAES innovators were identified. We continue to build synergies and strategically leverage our Private-Public-Partnerships in providing innovative solutions to National and Regional Challenges as we leverage the innovations at CAES, to provide products and services.

4.1 Research projects

Table 5: Ongoing Research Projects

No.	Project title	Principal Investigator	Amount	Funder	Timeframe
1.	Makerere University and Cukurova University Research collaboration	Prof. Isa Kabenge	USD 2,000,000 per year for three years	Government of Uganda and Turkey	July 2019-July 2022
2.	ARUA Water Centre of Excellence	Prof. Isa Kabenge	USD250,000	Rhodes University and ARUA-UKRI GCRF Partnership Programme	May2019-May 2024
3.	Making Potato Value Chain Enhance Productivity and Incomes in Uganda	Prof. Johnny Mugisha	USD 350,000	MasterCard Foundation through RUFO-RUM	2018-2022
4.	Policy and Regulatory reform options for seed market development: Expanding the empirical evidence base in Uganda	Dr Fredrick Bagamba Co-PI	Euros 28,325	NOW-WOTRO	2019-2022
5.	Combating Arthropod Pests for better Health, Food and Climate Resilience	Dr Rosemary Isoto Emegu Co-PI	USD 22,211	ICIPE	2019-2023
6.	Implementation of Annual Agriculture and Market Support Household surveys in the framework of WFP CSP UG 01	Prof. Bernard Bashaasha	USD 100,000	WFP	2020-2024
7.	Market-assisted Breeding of Selected Native Chickens in Mozambique and Uganda (MAB-Chicken Project)	Dr Donald Kugonza Rugira	USD 1,248,326	African Union AURG-II/2/2018	2019-2022

8.	Improving Pig Productivity and Incomes through an Environmentally Sustainable and Gender Inclusive Integrated Intervention Package (More Pork Project),	Dr Donald Kugonza Rugira		International Livestock Research Institute (ILRI) - CRP001113	
9.	Genetic Characterization of Cattle Populations for Optimised Performance in African Ecosystems (OPTI-BOV)	Dr Donald Kugonza Rugira		European Union (EU) & Ministry of Science, Technology & Innovation (MoSTI) - LEAP-AGRI-326	
10.	Participatory Pathways to Sustainable Intensification (PASUSI)	Dr John Baptist Tumuhairwe	USD 228,000	EU/Government of Uganda under LEAP-agri-consortium	2019-2023
11.	Partnership for Training Scientists in Crop Improvement for Food Security in Africa (SCIFSA)	Dr Thomas Odong Lapaka	Euros 1,398,975	European Commission Grant	2017-2022
12.	Regional academic exchange for enhanced skills in fragile ecosystems management in Africa (REFORM)	Dr Frank Kansiime Co-PI	Euros 44,439.6		2017-2022
13.	Speciation Clock	Dr Gerald Eilu - Collaborator	USD2,400	Research Council of Norway	2018-2022
14.	ANTENNA: Norwegian-African network for training a new generation of entomologists in DNA-based molecular methods	Dr Gerald Eilu - Partner	USD700,000	SIU/DIKU (Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education)	2019-2023
15.	Making Potato value chain enhance productivity and incomes in Uganda	Dr Abel Atukwase Co-PI	USD 350,000	MasterCard Foundation	2018-2022

16	Unlocking the Potential of Smallholders for Urban Food System Resilience in Uganda. A joint Project between the Department of Geography, Geoinformatics and Climatic Sciences – Makerere University and the Department of Human Geography, Lund University, Sweden	Dr Frank Mugagga	\$130,000	SIDA under Phase II of AgriFoSe2030 Programme	2021-2023
17	Capacity Building for Social-ly Just and Sustainable Energy Transitions. A joint Project between the Department of Geography, Geoinformatics and Climatic Sciences – Makerere University, NTNU - Norway, University of Juba - South Sudan and University of Nairobi - Kenya	Dr Frank Mugagga Co-PI	NOK20M	Funded by NORAD under NORHED II Programme (Energy Sub programme)	2021 – 2026
18	Explaining inclusive lower-level urbanisation in Tanzania and Uganda. The project is jointly implemented with the Department of Human Geography, Lund University - Sweden, University of Dar es Salaam, Tanzania; University of Ghana and Internationell Centrum för Lokal Demokrati, Sweden	Dr Frank Mugagga Co-PI	\$120,000	Funded by SIDA, Sweden	2021-2023
19	National Research and Innovation Program (NRIP). The objectives of the project: "Soil Moisture Sensing for improved Water Use Efficiencies and Crop productivity among micro-scale irrigation systems in Uganda" are (i) to introduce a system of IoT and soil moisture monitoring	Dr Emmanuel Opolot	USD 75,000	Government of Uganda, through the Ministry of Science, Technology and Innovation	2021-2022

	using sensors in irrigation scheduling, management and monitoring of irrigation system operations for increasing water use efficiency and productivity and (ii) develop a Smart-phone based irrigation tool for automated irrigation scheduling in micro-scale irrigation systems for improved water use efficiencies and crop yields				
20	Future Leaders African Independent (FLAIR) Research Fellow. This research aims at improving access to soil information by smallholder farmers for sustainable soil, water and nutrient management, and consequently increased crop yields and incomes. The main deliverables will include soil water budgets, irrigation scheduling charts, nutrient use efficiencies and fertiliser recommendations for five irrigation schemes in Uganda	Dr Emmanuel Opolot	£288,333	This fellowship is supported by the Royal Society in collaboration with the African Academy of Sciences	2020-2022
21	Gender Research Capacity Building/ Gender Responsive Researches Equipped for Agricultural Transformation (great ii)	Dr Margaret Najjingo Mangheni	\$ 876,345	Bill and Melinda Gates Foundation (BMGF) through International Livestock Research Institute	May 2021 – Dec 2022
22	Borlaug Higher Education for Research and Development (BHEARD) – College of Agricultural and Environmental Sciences Innovation Scholars Programme – MSU – CAES ISP Project	Dr Jackline Bonabana	USD 384,014	United States Agency for International Development (USAID)	2020 - 2022
23	Partnership for Training Scientists in Crop Improvement for Food Security in Africa – SCIFSA	Dr. Odong Thomas	Eur 1,398,975	European Union	2018 -2023

24	Improving Essential Oil Feed-stocks and High-value Products from Mentha Spp to benefit Local Uganda Economies (MENUE)	Dr. Ivan Mukisa Muzira	£ 79,099	Cardiff University from BBSRC-GCRF-IBBE UKRI	2020 - 2023
25	Foodland	Dr. Isa Kabenge	Eur 6 999 086.75	European Commission	2020 - 2024
26	Locally-driven Co-development of Plant-based Value Chains Towards More Sustainable African Food System with Healthier Diets and Export Potential - InnoFood Africa	Dr. Yusuf Byaruhanga	Eur 280000	European Commission	Sept 2020 – Sept 2025
27	Fruits & Vegetables for All Seasons (FRUVASE)	Prof. Archileo Kaaya	Eur 143,374.91	Federal Ministry of Food & Agriculture, Germany	Oct 2018 – Dec 2022
28	IGAD - GMES & Africa /ICPAC Project	Prof. Bernard Bashaasha	Eur 120,000.00	IGAD Climate Predictions & Applications Centre	Aug 2019 – Dec 2022
29	Water Spoutt Royal College	Prof. Muyanja Charles	EUR 200,000.00	Horizon 2020	June 2016 – June 2022
30	Evaluation of the Strategic Intervention for Animal Genetic Improvement Project (SAGIP)	Prof. Johnny Mugisha	UGX 534,980,000	National Animal Genetic Resource and Data Bank of Uganda	Nov 2020 – October 2023
31	ILRI - Makerere University - Community Based Artificial Insemination – CBAI Pilot Project	Dr Donald Kugonza	USD 84,534	International Livestock Research Institute	2021 - 2022
32	Achieving the SDGs in East African Drylands: drylands transform	Dr Denis Mpairwe	USD 97,969.08		
33	Improving Essential Oil Feedstocks and High-Value Products from Mentha SPP to Benefit Local Uganda Economies (MENUE)	Dr. Ivan Mukisa Muzira	USD 108,088.51	Cardiff University from BBSRC - GCRF - IBBE UKRI	
34	Sustainable Off grid Solutions for Pharmacies & Hospitals in Africa – SoPHIA Project	Dr. Nicholas Kiggundu	EUR 421,187.5	European Climate, Infrastructure and Environment Executive Agency (CINEA)	1st Oct 2021 – 30th Sept 2025

	Participatory analysis of the conventional-agroecological intensification continuum for increased productivity and sustainability in the coffee-banana systems of the Mt Elgon region of Uganda -	Dr Jeninah Karungi		A research grant to Makerere university from SIDA via AgriFoSe 2030 (Agriculture for Food Security 2030) programme coordinated by the Swedish University of Agriculture (SLU Global).	
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Table 6: New Research projects

No	Project title	Principal Investigator	Amount	Funder	Time frame
1	DESIRA (Development Smart Innovation through Research in Agriculture)	Prof. Samuel Kyamanywa	EUR 30,000	EU (France)	30th Oct, 2022 – Sept 30, 2025
2	CAES - MATS	Dr. Rosemary Isoto Emegu	EUR 30,000	EU (Netherlands)	1st July 2022- 30th August 2023
3	Refugee insect production for food and feed (REfiPRO)	Dr. Dorothy Nakimbugwe	EUR 136,285.25	IMPACT DESIGNS Denmark	1st July , 2022 – 30th August, 2026
4	PRACTICE	Dr. Nicholas Kiggundu	EUR 510587.10	EUROPEAN RESEARCH EXECUTIVE AGENCY -Germany	1st November 2022 –30th April, 2023
5	LOCUST 4 INDUSTRY	Dr. Dorothy Nakimbugwe	UGX 63,100,000	National Research Fund - Uganda	1st March 2022 - 28th Feb, 2025
6	Production scaleup and commercialization of the makerere smart solar-electric cooker: maksol cooker	Dr. Peter Tumutegyeize	UGX 175,000,000	Science, Technology, and Innovation Secretariat-Office of the President –Government of Uganda	1st July, 2022 -30th Nov 2023

7	Training farmers and DCA project staff in mobile massive open online course (mobimooocs) and extension message translation	Dr. Richard Miiro	UGX 30,050,000	DANCHURCHAID (DCA) Uganda	30th August, 2022 – 30th Nov, 2022
8	The egg value addition project	Dr. Hussein Kivumbi	UGX 83,141,000	Science, Technology, and Innovation Secretariat-Office of the President – Government of Uganda	30th Nov, 2022 – 30th Dec, 2022
9	FLYGENE	Dr. Nicholas Kiggundu	USD 3,264,795	DFC Centre - Denmark	1st April 2022 -30th March 2027
10	AFRICAN PLANT NUTRITION INSTITUTE - APNI	Dr. Patrick Musinguzi	USD 150,000	APNI MOROCCO	1st July 2022 –30th June, 2025
11	MERIT PROJECT	Assoc. Prof. Yazidhi Bamutaze	USD 601,541.34	NORHED II Norway	1st Oct 2022 – 30th Oct, 2026

Table 7: Projects won by CAES staff in Round 3 of Mak-RIF

No	Research topic	Principal Investigator
1	Building Soil Tolerance Thresholds to Reduce Degradation and Enhance Agricultural Productivity in Marginal Highland landscapes of Uganda	Dr Twaha A Basamba
2	Improving Livelihoods of Small-Scale Producers in Uganda Through Digital Advisory Services	Prof. Richard Edema
3	Estimating intake of cattle grazing heterogeneous pastures using Near Infrared Reflectance spectrophotometry (NIRS) for improved nutrition management and productivity of pasture-based systems (HEPANUT project)	Dr Idibu Joachine
4	Developing aquaculture systems for Mukene for increased food security and income	Dr Margaret Nabasiye
5	Towards improved coffee-farm yields by synchronising coffee tree flowering habit amidst a changing climate in Uganda	Dr Anthony Mwije
6	Harnessing chimpanzee ecotourism for enhanced conservation and improved livelihoods in Uganda	Dr Amos Ochieng
7	An innovative e-community governance model for monitoring implementation of catchment restoration and management interventions in River Rwizi sub catchment	Dr Patrick Musinguzi

8.	Reversing under-five child malnutrition: multidisciplinary innovations to improve free-range chicken production and consumption. GoU & Makerere University Research and Innovation Fund - MAK RIF2/CHUSS/015	Dr Donald Kugonza Rugira
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4.2 Research facilities per school

Table 8: School of Agricultural sciences (SAS) – laboratories

No	NAME OF THE LAB	STATE OF LAB (Good /poor)	CAPACITY (Number of users)
1	Soil Science East Laboratory	Poor	40
2	Soil Science Research Laboratory	Good	20
3	Soil Science General Laboratory	Poor	45
4	Crop Science Laboratory	Good	40
5	Animal Science Nutrition Laboratory	Good	30
6	Central Biotechnology Laboratory	Good	20
7	Soil Science BNF Laboratory	Good	05
8	Tissue Culture Laboratory MUARIK	Good	40
9	Biotechnology Laboratory MUARIK	Good	40
10	Gene bank, MUARIK	Good	-
11	SAS undergraduate computer Lab (with 10 computers)	Poor	40
12	SAS Graduate Computer Lab (with 09 computers)	Poor	20
13	Kabanyolo Computer Lab (with 05 computers)	Poor	36
14	GIS Lab (with 08 computers)	Good	10

Table 9: School of Forestry, Environmental and Geographical Sciences (SFEGS) - Laboratories

No	NAME OF THE LAB	STATE OF LAB (Good /poor)	CAPACITY (Number of users)
1	The Remote Sensing and GIS Laboratory	Poor	40
2	The Molecular Biology Laboratory	Poor	
3	The Water and wetlands research Laboratory	Very poor	03
4	Undergraduate students lab (with 15 computers)	Fair	25
5	Graduate lab without computers	Very poor	10
6	Geography lab (with 16 computers)	Poor	40
7	Modelling Lab (with 10 computers)	Very Good	10
8	Environment Computer lab(with 4 computers)	Poor	20

Table 10: School of Food Technology, Nutrition and Bioengineering (SFTNB) - Laboratories

No	NAME OF THE LAB	STATE OF LAB (Good /poor)	CAPACITY (Number of users)
1	Food Science Chemistry Lab	Good	30
2	Food Science MicroBiology Lab	Good	20
3	Food Science Nutrition Lab	Fair	10-15
4	Food Science undergraduate computer lab (with12 computers)	Fair	40

4.3 Research grants

4.3.1 Grant to Improve Waste Management in Uganda

Faecal sludge Management (FSM) and Solid Waste Management (SWM) are consistently recognized as being insufficient in many areas within Uganda and posing a health and environmental risk. Oftentimes, the management of these two categories of waste is organised separately and executed with insufficient resources, political will, and funding, yet they (faecal sludge and solid waste) present many opportunities for value chain creation and valorization of materials, micronutrients, and energy content, especially when considered together. With funding from the Austrian Partnership Programme in Higher Education and Research for Development (APPEAR), researchers from Makerere University led by Dr Jeninah Karungi, an Associate Professor in the Department of Agricultural Production, College of Agricultural and Environmental Sciences (CAES), together with partners from the Institute of Water Quality and Resource Management at Vienna University of Technology, the Department of Environmental and Livelihood Support Systems at Mbarara University of Science and Technology, and Uganda Red Cross Society embarked on a project aimed at improving faecal sludge and solid waste management in Uganda. The four-year project titled, "Clean and Prosperous Uganda – Faecal Sludge and Solid Waste Management for Improved Livelihoods" will explore circularity concepts, test a variety of techniques for utilizing dried faecal sludge, analyse plastic recovery from existing composting plants, and evaluate the social, economic viability of improved FSM and SWM and their influencing factors on regional communities. The project worth €518,823 aims to examine how best to optimise and integrate FSM and SWM in rural settings in Wakiso District, refugee settlements in Arua District, and Uganda in general.



Prof. Barnabas Nawangwe (2nd Right) hands a souvenir to Dr. Roswitha Kremser from Austrian Embassy during the APPEAR Grant Award Ceremony

4.3.2 Recognition of the DFTN Laboratories by the UNBS

The Department of Food Technology and Nutrition (DFTN) Laboratories were recognized by the Uganda National Bureau of Standards (UNBS). Recognition was effective from February 14th 2022 to February 13th 2025. The Laboratories were recognized for (Certificate No: UNBS/LRS/0028) for Chemistry and Microbiology Testing of Food Products in accordance with the recognized International Standard ISO/IEC 17025:2017. This recognition implies that results of analyses carried out for specified parameters in the DFTN Laboratories are recognized as being authentic by the UNBS and can thus be used by the food industry in getting product certification from the UNBS. The recognition of the DFTN labs was made possible by a partnership between the UNBS and the Private Sector Foundation (PSFU).

4.4 Research Activities/Dissemination

4.4.1 CAES staff sensitization on GAMSU

The Grants Administration and Management Support Unit (GAMSU) was established by Makerere University Council through the Makerere University Grants Administration and Management Policy on 17th December 2020. GAMSU is governed by a Steering Committee of 9 members, chaired by the Deputy Vice Chancellor in charge of Finance and Administration. The Steering Committee is supported by the Secretariat which is led by the Head, GAMSU, currently Prof. Sylvia A. Nannyonga Tamusuza, but previously headed by Prof. Grace Bantebya. The main purpose of GAMSU is to streamline the administration and management of grants and contracts within the various units of the University as well as provide a supportive eco-system for grants mobilisation and management. Specific objectives include; establishing a framework for grants mobilisation and management within the University; creating a platform to track and monitor grants within the University; establishing strategic global partnerships with other institutions with the intent to solicit funds for scholarships, research and infrastructure development; providing guidelines through which projects funded by grants link to existing laws, policies and regulations governing Makerere as a public University; and defining the roles of different University Officials in the mobilisation, management, and administration of grants at the University. On 28th April 2022, GAMSU Administrators held a meeting to sensitise CAES staff on the general roles of the Unit and grants financial management.



Prof. Grace Bantebya Kyomuhendo briefing CAES staff on the purpose of the Grants Administration and Management Support Unit (GAMSU)

4.4.2 International Workshop on Mainstreaming Gender in NORHED II Projects

Creating equal opportunities for men and women as well as boys and girls has long been an important priority for Norwegian development assistance. The 2030 Agenda and its 17 Sustainable Development Goals (SDGs) constitute the guiding frame for Norwegian development support. As such, the Norwegian Programme for Capacity Building in Higher Education and Research for Development (NORHED) has special focus on SDG 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), SDG 5 (Achieve gender equality and empower all women and girls), and SDG 17

(Strengthen the means of implementation and revitalise Global Partnerships for sustainable development). The Norwegian development policy mandates all Norwegian-supported institutions to integrate gender and equality as cross cutting issues in NORHED-funded Programmes. On 30th August 2022, beneficiaries of the NORHED II projects in Eastern Africa convened at Laico Lake Victoria Hotel, Entebbe to discuss and brainstorm on ways of mainstreaming gender in NORHED II Projects. Held under the theme: "Gender Mainstreaming: Beyond Binaries", the three-day workshop was attended by participants from Makerere University; Makerere University Business School (MUBS); Uganda Martyrs University; Technical University of Kenya (Nairobi); University of Juba (South Sudan); University of Dar es Salaam (Tanzania); University of Rwanda; Haramaya University, Dilla University, Hawassa University, and Bahir Dar University (Ethiopia); and the Norwegian University of Science and Technology (NTNU). The workshop was organised by Makerere University and NTNU in collaboration with partner institutions. It was coordinated by Prof. Frank Mugagga, Head, Department of Geography, Geo-informatics and Climatic Sciences at the College of Agricultural and Environmental Sciences (CAES), Makerere University, also coordinator, Capacity Building for Socially Just and Sustainable Energy Transitions (SET) project, as well as Charlotte Anne Nakakaawa-Jjunju from NTNU. The opening ceremony was presided over by Ms. Mary Mabweijano, Senior Programme Officer at the Royal Norwegian Embassy in Kampala. Highlighting the importance of mainstreaming gender in NORHED projects as part of the Norwegian Development Policy, Ms Mary Mabweijano-Senior Programme Officer at the Royal Norwegian Embassy in Kampala re-emphasized the need to incorporate gender perspectives in curriculum, teaching, research, and governance. She called for increased participation of female students at postgraduate level 'where gender imbalance is most significant'.



Left: Ms Mary Mabweijano (3rd L), Senior Programme Officer at the Royal Norwegian Embassy in Kampala with other participants at the workshop.

Right: Participants in a group discussion on mainstreaming gender in NORHED II projects














Participant's at the NORHED II stakeholders' engagement at Laico Lake Victoria Hotel in Entebbe

4.4.3 Advancing Nematology Education in Sub-Saharan Africa


To develop the research and educational capacity in Sub-Saharan Africa in the field of nematology, or the study of roundworms, a joint Erasmus+ KA2 project was launched. The Erasmus+ project, Capacity Building in Higher Education (CBHE): Nematology Education in Sub-Saharan Africa (NEMEDUSSA), is a joint effort by a consortium of Universities from Sub-Saharan Africa and Europe. This three-year project (2021-2023) is co-funded by the European Union (Erasmus+ KA2 CBHE) and VLIR-UOS, and is linked to the objectives of the Erasmus+ Programme. The aims are to encourage cooperation between the EU and Partner countries and support eligible Partner Countries in addressing challenges in the management and governance of their higher education institutions. Specifically, NEMEDUSSA aims to increase awareness of nematodes and expand educational and research capacities in higher education and other institutions in Sub-Saharan Africa in this field. Nematodes or roundworms cause significant damage and yield loss to a wide variety of crops often together with other pathogens. Unfortunately, nematodes are often overlooked or misdiagnosed, resulting in the unnecessary use of unhealthy agro-chemicals. Nematodes can also be used as bio-control agents against insect pests and/or as bio-control agents for environmental health and biodiversity. Despite the profound adverse impact plant-parasitic nematodes have on productivity worldwide, it is striking how concealed the discipline of nematology has remained, particularly in Sub-Saharan Africa. This project aims to address the need for increased capacity and specialised training in handling these pathogens, so that plant-parasitic nematodes are managed correctly and beneficial nematodes can be implemented as biocontrol organisms.


NEMATOLOGY EDUCATION IN SUB-SAHARA AFRICA

Erasmus+ Capacity Building in Higher Education project 2021-2023


NEMATODES	PARTNERS	OUR ACTIVITIES
 <p>What are nematodes? They are roundworms, occur in all eco-systems in large numbers, are mostly microscopic and highly diverse, only fraction is known and represent 80% of all multi-cellular life on earth!</p>  <p>Are all nematodes harmful? No, they are not. Some act as plant-parasitic nematodes attacking plants and devastating crops, but others act as biocontrol agents for other crop pests. At the same time, free-living nematodes can act as bio-indicators for environmental health.</p>  <p>Why plant-parasitic nematodes (PPNs) are a damaging threat to agriculture? When overlooked, misdiagnosed and unmanaged, PPNs cause up to 12% global food production loss, 50% in (sub)tropical region, which is estimated at est. 157 G USD economic damage per year.</p>  <p>Why is it essential to create awareness? Little awareness results in insufficient attention by policy makers, research projects and in educational programmes, especially BSc level, when compared to other plant pathogens.</p>  <p>What is the impact of nematology being a minor discipline? BSc Agriculture students enter the job market with insufficient knowledge about nematodes, resulting in inadequate knowledge transfer towards farmers, in the private and public sector</p>	<div style="display: flex; justify-content: space-between;"> <ul style="list-style-type: none"> University Abomey-Calavi, Benin University of Parakou, Benin Haramaya University, Ethiopia Jimma University, Ethiopia Kenyatta University, Kenya Moi University, Kenya Ahmadu Bello University, Nigeria University of Ibadan, Nigeria North West University, South Africa Stellenbosch University, South Africa <ul style="list-style-type: none"> Makerere University, Uganda Muni University, Uganda International Institute of Tropical Agriculture International Centre for Insect Physiology and Ecology University Côte d'Azur, France Ghent University, Belgium (coordinator) 36 associated partners from the public/private sector in SSA </div> <div style="text-align: center; margin-top: 20px;"> <p>NEMEDUSSA IN NUMBERS</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>16</p> <p>of which 14 partners from Sub-Saharan Africa and 2 from Europe</p> </div> <div style="text-align: center;"> <p>36</p> <p>associated partners from industry, public sector, high schools, NGOs... to participate in dissemination activities</p> </div> <div style="text-align: center;"> <p>6</p> <p>countries in Sub-Saharan Africa</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>1</p> <p>Pan-African Nematology Network, organising 2 workshops and hosting 39 webinars</p> </div> <div style="text-align: center;"> <p>6</p> <p>Farmer Field Schools and Plant Clinics with revised curriculum in Nematology</p> </div> <div style="text-align: center;"> <p>2</p> <p>BSc and MSc course modules in nematology to integrate in existing course programmes, supported by a Nematology Digital Learning Platform</p> </div> <div style="text-align: center;"> <p>108</p> <p>microscopes and other equipment to increase practical training in nematology</p> </div> <div style="text-align: center;"> <p>43</p> <p>staff members to get training in nematology to improve educational capacity</p> </div> </div> </div>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p>1 DEVELOP CURRICULA</p> <p>in nematology on BSc and MSc level for integration into existing educational programmes in English and French, for both lecturers and students.</p> </div> <div style="width: 45%;">  <p>2 STAFF TRAINING</p> <p>improve nematological expertise of academic and technical staff to enhance teaching capacity</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  <p>3 UPGRADE LAB FACILITIES</p> <p>increase the number of student microscopes, lab and demonstration equipment to augment hands-on training</p> </div> <div style="width: 45%;">  <p>4 NEMATOLOGY DIGITAL LEARNING PLATFORM</p> <p>open-access platform to share and disseminate nematological knowledge, developed curricular modules, knowledge clips, host webinars,...</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  <p>5 NEMATOLOGY NETWORK</p> <p>to agglutinate nematologists in Sub-Saharan Africa by providing networking tools, workshops on pending topics in nematology and sharing good practices in education, promoting collaboration with focus on young nematologists</p> </div> <div style="width: 45%;">  <p>6 AWARENESS CREATION</p> <p>by dissemination activities towards and involving a range of different stakeholders such as farmers, extension service workers, policy makers, students, private and public sector</p> </div> </div>

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Co-funded by the Erasmus+ Programme of the European Union



SHARING MINDS, CHANGING LIVES

4.4.4 GREAT Research Points Way towards More Inclusive Agricultural Systems

The Beijing Declaration in 1995 set the global development agenda for gender equality across sectors, including agriculture. Since then, gender training has been a central approach for gender integration in agricultural development. Yet in the decades since that time, scant research has gone into how training has improved gender equality and women's empowerment, and to what extent trainings may have or have not challenged the behaviours, attitudes and beliefs of trainees. New research reveals insights into ways capacity development can catalyse gender transformational change and produce more equitable food systems for women. In a special issue of the *Journal of Gender, Agriculture and Food Security*, four new studies explore lessons learned from the first five years of the Gender-responsive Researchers Equipped for Agricultural Transformation (GREAT) project. Launched in 2016, GREAT — led jointly by researchers at Cornell University in the United States and Makerere University in Uganda — developed a training model meant to disrupt the norms of crop improvement research. The studies take a comprehensive look at GREAT's model and the impact feminist-informed gender training has on research and researchers in the crop improvement sector. Along with Tufan and Mangheni, co-authors include Elizabeth Asimwe (GREAT), Brenda Boonabaana (Makerere's Department of Forestry, Biodiversity and Tourism), Elisabeth Garner (Cornell Global Development), Devon Jenkins (Cornell Global Development), Godfrey Kayobyo (Nkoola Institutional Development Associates), Peace Musiimenta (Makerere's School of Women and Gender Studies), Yvonne Pinto (Aline Impact Limited) and Cassidy Travis (Aline Impact Limited). <https://www.greatagriculture.org/content/news/blog/great-research-points-way-towards-more-inclusive-agricultural-systems>



4.4.5 Moving from theory to practice: Deepening gender responsive agricultural research skills on NARs in Sub-Saharan Africa

While training courses remain a central focus to the Gender-responsive Researchers Equipped for Agricultural Transformation (GREAT) program, towards the end of 2021 GREAT training courses were complemented by a call for research proposals for small grants. In addition to grant funding, GREAT provides mentorship to exemplary GREAT fellows to further deepen the capacity of agricultural researchers to conduct gender responsive and transformative research across Africa and beyond. Through this research opportunity, the teams are applying what they have learned through their participation in

GREAT introductory and advanced courses. The project team has instituted a robust MLE system to track the learnings in the research cluster set up. These will inform further refinement of the GREAT training model for effective gender responsive research skills development." GREAT Fellows were invited to develop research proposals in 2021, and five teams, or research clusters, were selected and awarded funding to conduct their research in Ghana, Uganda, Nigeria and Zimbabwe.

4.4.6 CAES Innovation Scholars Programme workshop

Inadequate curricula to stimulate innovativeness and entrepreneurship within learners and faculty and limited partnerships and collaborations are some of the major bottlenecks to innovativeness at the College of Agricultural and Environmental Sciences (CAES), Makerere University. The current programme design, sequencing and delivery inhibits critical thinking and innovation as it focuses more on theory than practice. Reviewing curricula to make it more learner-centered and entrepreneurial, reducing theory and creating more time for practical sessions can enhance the innovation culture at CAES. Through the Innovation Scholars Programme, CAES and Michigan State University's Borlaug Higher Education for Agriculture Research and Development (BHEARD) Program with the support of the MSU's Global Centre for Food Systems Innovation (GCFSI) are working together to advance the College toward its strategic vision – "to be a leading institution of academic excellence and innovations in Africa." The CAES Innovation Scholars Programme (CAESISP) offers an eighteen-month opportunity during which CAES academic staff work as interdisciplinary teams to solve problems in the food systems in Africa, while at the same time offering support to the entire CAES academic fraternity in the areas of design thinking, teaching and learning, community outreach, and communicating science. The CAESISP serves as a catalyst to support food system innovations that improve food security, and develop the current and next generation of entrepreneurial scientists at Makerere University and in the region. Under the programme, a number of academic staff at CAES have been coached to enhance their innovativeness to provide practical solutions to challenges affecting the agricultural sector. The researchers have also been equipped with various skills to deliver curricula that is practical-oriented and fosters critical thinking as well as entrepreneurship. At Makerere University, the Programme is headed by the Principal of CAES, Prof. Gorettie N. Nabanoga, and coordinated by Prof. Jackie Bonabana – Wabbi from the Department of Extension and Innovation Studies, CAES. The Michigan State University Coordinator is Dr John Bonnell, BHEARD Director. In the second week of August 2022, the College held a two-day workshop under the theme – "University Responsiveness to Innovation" to showcase some of the innovations that have resulted from the programme. The event held at Yusuf Lule Central Teaching Facility from 10th-11th August 2022 was graced by the Deputy USAID Mission Director in Uganda, Daniele Nyirandutiye and the Vice Chancellor of Makerere University represented by the Acting Deputy Vice Chancellor in charge of Finance and Administration, Prof. Henry Alinaitwe. Innovations showcased included the Kebera Organic App intended to detect contaminants in crops before they are put on market. The researchers also developed a tailor-made pasteurizer and fruit pulper for the Medium, Small & Micro Enterprises in the Food Processing Industry; and a Guide for Learner-Centered Processes at the Department of Environmental Management –CAES. They also developed two different audio-visual instruction materials for instructors and students to enhance e-learning at Makerere University; engaged various stakeholders to address challenges of poor seed quality in the horticulture industry; benchmarked approaches for improved delivery of Hands-on Practical Experiences for Business Management Courses at CAES, Makerere University; deployed a problem solving-centered teaching and learning approach using the Teach-Think-Pair-Share model for increased skilling among Agricultural students; and programmed a software platform with a matching algorithm to cross-reference student abilities with company profiles.



The Principal, Prof. Gorettie Nabanoga addressing participants at the workshop



Some of the scholars showcasing their innovations



Participants at the CAES Innovation Scholars Programme (CAES-ISP) workshop

4.4.7 Climate Smart Agriculture in Sub Saharan Africa (NoRHED II) Project

Food insecurity and malnutrition remain high in Sub-Saharan Africa where agriculture is predominantly rain-fed and 80% of the food produced by small-holder farmers. Addressing the challenge requires extensive research and extension support to improve the existing traditional tillage systems and farming practices. Climate Smart Agriculture in Sub Saharan Africa (NoRHED II), a collaborative project between Makerere University College of Agricultural and Environmental Sciences (CAES) and the Norwegian University of Life Sciences (NMBU), seeks to generate new knowledge and to contribute to capacity building with respect to food security and on-farm profitability in Sub-Saharan Africa through innovative and sustainable climate-smart technologies. The project sites in Uganda are in Alebtong and Mubende districts representing two distinct agro-ecological zones. The 5-year project (2021-2026) launched by Makerere University Deputy Vice Chancellor in charge of Finance and Administration, Prof. Henry Alinaitwe on 15th June 2022 will among other activities train farmers on Climate Smart Agriculture technologies, train Masters and PhD students and build research capacity at the participating institutions. Further capacity building is expected through the organization of three summer schools involving all partners, students from the five collaborating universities, as well as NGO and government representatives. Each summer school will involve one student from NMBU and two students from each of the partner institutions in the South leading to a total of 48 students trained in novel Climate Smart Agriculture (CSA) technologies. Partner institutions in Norway include the Norwegian Geotechnical Institute (NGI) and Menon Economics while in the South, partners include Gulu University's Faculty of Agriculture and Environment; Rural Enterprise Development Solutions (REDS); Hawassa University's Wondo Genet College of Forestry and Natural Resources; University of Zambia's School of Agricultural Sciences; and University of Juba's School of Natural Resources and Environmental Studies. Under the project, the research team intends to address issues related to crop production, soil water management, soil fertility management, and the socio-economic aspects in regard to climate smart technologies in agriculture.



The Ag. DVCFA, Prof. Henry Alinaitwe (L) officially launched the project on behalf of the Vice Chancellor

International Summer School participants attending a practical training session in the BNF lab at CAES

4.4.8 Boosting Food Security through Climate Smart Innovations

Food insecurity and malnutrition are on the rise in Sub-Saharan Africa (SSA). The slow progress towards food security is partly attributed to demographic pressure, soil quality deterioration, and climate change that have adversely affected agricultural productivity. To address the challenge, Makerere University College of Agricultural and Environmental Sciences (CAES) in collaboration with the Norwegian University of Life Sciences (NMBU) is implementing two 5-year (2021-2026) capacity building projects aimed at improving food security and livelihoods using climate smart agricultural technologies. The projects namely: "Climate-smart Innovations in Agriculture in Sub Saharan Africa: Improved food security, livelihoods, and soil carbon" (ClimSmart), and "Climate Smart Agriculture in Sub Saharan Africa" (NORHED II) are supported by the Norwegian Research Council (NRC) and the Norwegian Agency for Development Cooperation (NORAD). Partner institutions in Norway include the Norwegian Geotechnical Institute (NGI) and Menon Economics while in the South, partners include Gulu University's Faculty of Agriculture and Environment; Rural Enterprise Development Solutions (REDS); Hawassa University's Wondo Genet College of Forestry and Natural Resources; University of Zambia's School of Agricultural Sciences; and University of Juba's School of Natural Resources and Environmental Studies. The overall objective of the ClimSmart project is to contribute to increased food security, on-farm profitability, and entrepreneurship in communities of smallholder farms in Uganda, thus improving livelihoods through training and implementation of novel climate-smart practices in Agriculture. The overall objective of the NORHED II project is to generate and share new knowledge and to contribute to capacity building with respect to food security and on-farm profitability in Sub-Saharan Africa through innovative and sustainable climate-smart technologies. The project sites in Uganda are in Alebtong and Mubende districts representing two distinct agro-ecological zones. Broad activities under the projects' objectives include setting up, running, and monitoring controlled field experiments and pot experiments; setting up randomized control trials and conducting surveys; training farmers on Climate Smart Agriculture technologies; collecting and analyzing data for all experiments; and knowledge generation and transfer. Expected outputs under the NORHED II project include; 8 MSc students and 5 PhD students in the South; One PhD funded by NMBU -MINA; two post-doctoral scholarships; strengthening research capacity at the participating institutions; and about 30 peer reviewed joint scientific publications. Further capacity building is expected through the organization of three summer schools involving all partners, students from the five universities, as well as NGO's and government representatives. Overall, the project is expected to enhance agricultural productivity and income of smallholder farmers in Sub Saharan Africa. It is also expected to strengthen the quality and relevance of education and research programmes of the participating organizations, increase capacity and

competence of university staff and students, and improve stakeholder engagements. In a bid to streamline and strengthen the NORHED II project activities, Prof. Vegard Martinsen and Prof. Jan Mulder from the Norwegian University of Life Sciences visited Uganda on 2nd-11th March 2022 to engage their counterparts on a number of issues. On 4th March 2022, the two Professors met the project team in Uganda to deliberate on the implementation plan.



Left: The project team during a planning meeting at CAES.
Right is Prof. Samuel Kyamanywa, PI of NORHED II CSA

4.4.9 ICOPSEA Project Supports Production of Quality Sweet Potato Planting Material

Sweet potato is an important root crop in East African countries. In some communities, it is a vital staple crop. The crop plays a significant role in the farming and food systems in East African countries and has a number of health benefits. The Vitamin A orange-fleshed cultivars are important in alleviating Vitamin A deficiency in children and expectant mothers. The crop also has potential for increasing household income through selling of vines, fresh tubers, and processed products such as puree and flour that are used in confectioneries. Largely, the crop has potential to contribute to food and nutrition security, as well as wealth creation. However, sustainable production of sweet potato is limited, by among other factors, diseases particularly those of viral origin like the sweet potato virus disease. Worldwide, over 30 viruses infect the crop. Since 2006, a consortium of scientists from the Department of Agricultural Production, Makerere University; Uganda National Agricultural Research Organization, Jomo Kenyatta University of Agriculture and Technology (JKUAT); Tanzania Agricultural Research Institute Mikocheni (TARI-M), Addis Ababa University, and Rwanda Agricultural Board has been working to address the challenge with the aim of contributing to food security and economic development of the East African countries. Through a project titled; "Towards Sustainable Cassava and Sweet Potato Production in East Africa" funded by SIDA under the East African Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development known as BIO-EARN (2006-2010), the researchers set out to generate technologies as well as strengthen the human resource capacity to facilitate sweet potato genetic improvement and clean seed production. In 2011, the Consortium, through a SIDA- funded project titled; "Enhancing Food Security through Improved Seed Systems of Appropriate Varieties of Cassava, Potato and Sweet Potato Resilient to Climate Change", evaluated and deployed the elite varieties of sweet potato that are adapted to climate change in diverse agro-ecologies. They also developed and institutionalised efficient sweet potato seed multiplication and delivery systems. Through these two projects, the researchers identified appropriate

varieties of sweet potato seed, and developed disease diagnostic protocols and rapid multiplication techniques with the aim of promoting use of high quality sweet potato planting material. Following the achievements in the first two projects, SIDA through the BioInnovate Africa Programme in 2018 extended more funding to the Consortium to support the commercialization of the sweet potato seed value chain. The project titled; Integrating ICT in Commercial Production of Quality Sweet Potato Planting Material in East Africa (ICOPSEA) aimed to contribute to enhanced food and income security among smallholder farmers in East Africa. It also aimed to develop a sustainable private-sector-led sweet potato system in East Africa with enterprises developed along the seed value chain. The three-year project implemented between January 2018-June 2021 was headed by Prof. Samuel Kyamanywa from the Department of Agricultural Production, CAES. At the project closing meeting held on 7th April 2022 in the School of Food Technology, Nutrition and Bio-Engineering Conference Room at Makerere University, the researchers led by Prof. Kyamanywa highlighted the achievements registered including; identification of 24 varieties for commercial certified seed production; development of an institutionalised commercial sweet potato seed system in East Africa- involving Universities and National Agricultural Research Institutes as providers of clean seed to private companies that sell to vine multipliers; and involvement of Government phytosanitary and certifying agencies in ensuring high quality seed is available for the farmers. Other achievements included; the development of infrastructure to support seed production, a field-based disease diagnostic kit for detecting viruses and different varieties of purees and flour used in confectionary industries. The project also supported the training of five MSc students and one PhD in crop science, agricultural economics, rural development, and data communication and software engineering. The team also developed a web-based mobile app to facilitate access to information, seed inspection and monitoring of production and marketing of the sweet potato seed.



Dr Settumba Mukasa (2nd R) briefs the Commissioner in charge of Crop Inspection and Certification at the MAAIF, Mr Paul Mwambu (L) on some of the products developed

4.4.10 Commissioning of the Orange Fleshed Sweet Potato Puree Processing Unit

Makerere University College of Agricultural and Environmental Sciences (CAES) represented by Dr. Richard Miiro, from the Department of Extension and Innovation Studies on 6th April 2022 commissioned a Vitamin A rich Orange Fleshed Sweet Potato (OFSP) Puree Processing Unit at Lishe Products Limited in Kasangati, Wakiso District. With support from BioInnovate Africa Programme Phase II Initiative, the College received funding for a project titled, OFSP Puree for Bakery Applications in East Africa for Nutrition, Post-harvest Loss Management, and Youth & Women Economic Empowerment, to work with a private sector entity to operationalize a processing unit that makes bakery and fried foods ingredient from Vitamin A rich OFSP. Lishe Products Limited was the private sector partner selected to host the processing unit after competitive scrutiny, although Makerere University takes responsibility for the technical assistance, research and training components in the project. Partner companies/institutions included: Euro Ingredients Kenya – PI; International Potato Centre Kenya – Co-PI, Hawassa University Ethiopia, Makerere University – Uganda, and Women's Bakery – Rwanda.



Left: Official commissioning of the OFSP Puree at Lishe Products Ltd in Kasangati, Wakiso District. Right: Participants touring the OFSP Puree chapati stall

4.4.11 Stakeholder Engagement on Challenges Affecting the Horticulture Industry in Uganda

68% of Uganda's farming households are engaged in subsistence rain-fed agriculture that relies largely on home-saved seed of low quality resulting into low production. Farmers' reliance on home-saved seed is caused by insufficient availability of affordable high quality seed and lack of trust in the certified seed available in the market. Certified seed contributes only about 15% of seed requirement (mainly maize, some legumes). The remaining 85% is from the informal sector. Due to the inability of seed companies to supply required quantities of certified seed and the limited capacity in the regulatory system, an estimated 30-40% of seed traded in the market is counterfeit. In a bid to increase access to quality seed in the Horticulture Industry in Uganda, the College of Agricultural and Environmental Sciences (CAES), Makerere University through the Innovation Scholars Program (ISP) is engaging different stakeholders in the country to address the challenges in seed quality. Through a project titled, "Engaging Stakeholders and Policy to Address Challenges in Seed Quality in the Horticulture Industry of Uganda: A Case of Tomato and Pepper", researchers led by Dr Jeninah Karungi-Tumutegyeize, an Associate Professor in the Department of Agricultural Production at CAES, Makerere University seek to enhance the quantity and quality of horticultural crops produce, and to strategically position CAES in agricultural development in the country.

Other members on the project are; Prof. Samuel Kyamanywa, and Dr. Mildred Ochwo Ssemakula from the Department of Agricultural Production, Makerere University; Dr Gabriel Ddamulira (Head, Horticulture Programme, National Crops Resources Research Institute (NaCRRI); Mr Moses Erongu from the Department of Crop Inspection and Certification at the Ministry of Agriculture, Animal Industry and Fisheries; and Mr Daniel Kituzi, a farmer and entrepreneur. The project is supported by USAID and Michigan State University's Borlaug Higher Education for Agricultural Research and Development (BHEARD).

On 13th July 2022, the project team held a stakeholders' workshop to deliberate on the challenges in the seed value chain in the horticulture industry in Uganda and to explore avenues for supporting the operationalization of the National Seed Policy. The meeting held at Eureka Place Hotel in Ntinda, Kampala was attended by staff from the Department of Agricultural Production, CAES; representatives from MAAIF, NARO, and seed companies; as well as farmers and exporters.



*Left: The PI, Dr Jeninah Karungi-Tumutegyeize shares an overview of the project.
Right: Some members of staff from CAES who attended the workshop*



Mr Moses Erongu from the Department of Crop Inspection and Certification at the Ministry of Agriculture, Animal Industry and Fisheries chatting with CAES staff at the workshop

4.4.12 Training of extension workers in Northern and Eastern Uganda

While notable strides have been made to enhance household food and nutrition security, reduce poverty and improve household incomes through agriculture, Northern Uganda is still lagging behind due to the long-term insurgency that left many households disintegrated. Uganda's Vision 2040, the National Agricultural Extension Policy (NAEP), the National Agricultural Policy (NAP) and the National Agricultural Extension Strategy (NAES) strategically place agriculture as a key driver to achieve socio-economic transformation in the country. The Northern Uganda Region has immensely benefited from massive investments in agricultural infrastructure, but dismal efforts have been made to enhance actual service delivery. As a result, functional extension systems that efficiently and effectively respond to challenges that farmers experience along the value chain of key agricultural commodities have not been given adequate attention in the region. Consequently, the farmers continue to be constrained in terms of accessing inputs and advisory services on modern agronomic practices and market opportunities. Although the district and sub-county extension officers are expected to provide this service, they have inadequate knowledge and skills to enable them to render improved and relevant advisory and support services to farming communities. To address the challenge, Makerere University College of Agricultural and Environmental Sciences (CAES) was contracted by the Office of the Prime Minister under DINU to offer training services to extension workers. The trainings were conducted at Makerere University Agricultural Research Institute Kabanyolo (MUARIK). DINU is a Government of Uganda programme supported by the European Union (EU) and supervised by the Office of the Prime Minister. DINU is a multi-sectoral programme aimed at improving livelihoods in 41 districts in the five sub-regions of Acholi, Karamoja, Lango, Teso, and West Nile for a duration of six years (2017-2023). The 150.6 million Euro covers interventions in three interlinked sectors; (1) Food Security, Nutrition and Livelihoods; (2) Infrastructure (transport, logistics, water; and (3) Good governance. Through a programme titled; "Provision of Training Services to Technical Staff of Local Governments for improved Extension Service Delivery to Farmers in Northern Uganda", a total of 546 extension workers were trained in the areas of Integrated Pest and Disease Management, Climate Smart Agriculture and Postharvest Handling, Animal Feed Formulation and Dry Season Feeding, Fish Feed Formulation and Feeding, Animal Breed Improvement through Artificial Insemination, Fish Breeding and Hatchery Management, Apiculture (Queen rearing and breeding and value addition in honey), Farmer Institutional Capacity Development, Agribusiness and Market Linkages, and Financial Management.



*Left: The project team in the planning meeting at the Office of the Prime Minister.
Right: Dr Bernard Obaa the Project Leader at Makerere University*



Hon. Grace Freedom Kwiwucwiny (L), Minister for Northern Uganda Affairs hands over equipment donated by the Office of the Prime Minister to representatives of the extension workers at the closing ceremony of the training held at MUARIK

4.4.13 Enhancing Capacity of Young Scientists in Agricultural Policy Processes

Agriculture is a key economic sector in the East African Region and it is an important source of livelihood for households and communities, especially in rural areas. Efforts to achieve food security and desirable nutrition outcomes, as well as spur economic growth largely revolve around the agricultural and environmental sectors. The role of these two sectors in achieving the first and second Sustainable Development Goals (SDGs) that focus on ending poverty and hunger respectively has been recognised in many continental, regional and national agricultural initiatives. Yet identifying and implementing enabling policies and evaluating their impact remains a challenge to the development and protection of the two sectors in most African countries. Africa's continental framework for promotion of agricultural transformation, the Comprehensive Africa Agriculture Development Programme (CAADP), recognizes and emphasises the need to strengthen capabilities and the policy and institutional environment required to trigger agricultural transformation while protecting the environment. The process includes interventions to strengthen the capacity for evidence-based planning, implementation and review, and to increase the capacity to generate, analyse and use relevant information and innovations. Through a project titled "Enhancing the Capacity of Young Scientists to Engage in Agricultural and Food Security Policy Processes in East Africa", the Department of Agribusiness and Natural Resource Economics, College of Agricultural and environmental Sciences (CAES), Makerere University together with Kyambogo University, Busitema University, and the Department of Agricultural Economics at the University of Nairobi have mentored 13 PhD graduates – 8 in Uganda and 5 in Kenya. Supported by the Swedish University of Agricultural Sciences under the leadership of Prof. Bernard Bashaasha, the project aims to increase the capacity of scientists to synthesise, analyse and communicate science with different stakeholders; increase use of science-based knowledge in policies & practice; and improve connection between science, policy and practice. The mentees include; Dr Florence Lwiza from the Department of Agribusiness and Natural Resource Economics, CAES; Dr Betty Christine Nagawa from the Department of Forestry, Biodiversity and Tourism, CAES;

Dr Kanifa Kamatara from the Department of Agricultural Production, CAES; and Dr Kellen Aganyira from the College of Education and External Studies, Makerere University. Others are Dr Catherine Ndagire; Dr Margaret Namugwanya Misinde; and Dr Judith Nagasha from Kyambogo University. The mentors include; Prof. Bernard Bashaasha from Makerere University; Dr Peter Opio from Busitema University and Dr Faith Muyonga from Kyambogo University. On 2nd August 2022, the project partners held a workshop at Makerere University to discuss and receive feedback from policy analysts on 7 policy briefs developed by the mentees.



The mentees with the mentors after the workshop held at Makerere University on 2nd August 2022

4.4.14 Agriculture Sector Skills Needs Assessment

Makerere University College of Agricultural and Environmental Sciences (CAES), through the Makerere Regional Centre for Crop Improvement (MaRCCI), hosted a stakeholders' consultative workshop on – Capacity Skills Needs Assessment of the Agriculture Sector in Uganda. The event held on 8th and 9th August 2022 was a high level assignment by the Ministry of Education and Sports to profile the whole range of agriculture occupations through a comprehensive functional analysis with the aim of transforming the agricultural sector through human capital development. MaRCCI, together with stakeholders in the education sector carried out a Functional Analysis in order to identify and describe roles, duties, occupations and competencies that are required in performing the jobs in the sector. The intended goal was to lay the foundation for specification of occupation standards within the sector. The process was geared towards addressing the human capital needs in the number one sector, which has sustained Uganda's economy longest.



Left: The Director MaRCCI, Dr Richard Edema addressing participants at the workshop

4.4.15 Hybrid Seminar on Finding the Best Cattle Genetics for Africa (OPTIBOV project)

A large variety of local indigenous and commercial cattle breeds has been produced as a result of domestication and selection. This variety ensures the capability and adaptability of livestock to fulfil its role in food production under different circumstances, now and in the future. Local breeds exhibit unique adaptive features to harsh environments, which can be useful for adjusting mainstream breeds to climate change. Simply transferring high producing commercial animals to the African continent will not be the solution due to low performance and even low survival under these harsh environments (ecosystems). The aim of the OPTIBOV project is to improve production and survival of traditional/indigenous breeds adapted to the local environments in Africa. This will secure the future of these well adapted traditional/indigenous local breeds. With combined effort from partners across the globe, the OPTIBOV project will help maintain traditional cattle breeds, capture adaptation, use known variations in production, train, educate & involve stakeholders to perform optimal breeding. The project is coordinated in The Netherlands (Wageningen University and Research Centre). Participating institutions include; Makerere University, Uganda; Natural Resources Institute Finland; Agricultural Research Council Pretoria, South-Africa; University of Porto, Portugal; Cairo University, Egypt; and Taurus Foundation Netherlands. The project is supported by LEAP-Agri, a joint Europe Africa Research and Innovation (R&I) initiative related to Food and Nutrition Security and Sustainable Agriculture (FNSSA). On 25th April 2022, the project team met at the College of Agricultural and Environmental Sciences (CAES), Makerere University to share updates on activities in the respective countries. The hybrid seminar was hosted by Dr Donald Kugonza and Dr Morris Agaba.



The OPTIBOV project team during the seminar at CAES



The project team led by Dr Donald Kugonza met the Vice Chancellor, Prof. Barnabas Nawangwe

4.4.16 Study on gender dynamics and uptake of agricultural technologies

A study conducted by Makerere University researchers in Iganga and Bugiri districts indicates that disparities still exist regarding access and sustained use of improved crop varieties among women and men. The men still dominate decision making power which negatively impacts on the sustained use and uptake of improved crop varieties in the two districts. Gender transformative approaches that consider the interest and needs of both men and women, are deemed fit for the design and implementation of interventions and ensure voices and aspirations of men and women are considered. Between 2020–2022, researchers from Makerere University Department of Extension and Innovation Studies with support from Carnegie Corporation of New York under the Auspices of the Directorate of Graduate Research and Training programme of Supporting Early Career Academics through Post-Doctoral training at Makerere University (SECA) undertook a study titled, "Intra-household Gender Dynamics in Uptake of Agricultural Technologies for Sustained livelihoods in Uganda." The study was conducted in Nakigo and Nambaale sub-counties in Iganga and Buwunga and Nabukalu sub counties in Bugiri districts. The study areas were selected because of the intensity of interventions by

government and non-state agencies in the area aimed at enhancing resilience of the farming systems and increasing agricultural productivity. The study aimed to unravel the power dynamics at the household level that influence sustained use of new crop varieties for equitable and sustainable livelihoods in Uganda. The research therefore adopted a gender approach in examining decision making patterns, power relations and negotiation processes at household level and how these influence access to control over new technologies and ultimately sustained use. This was disclosed during the research dissemination workshops conducted on 6th and 7th October 2022 in the study areas. According to the Principal Investigator, Dr. Losira Nasirumbi Sanya, progress towards attaining food security remains a challenge partly due to low use of science and technological innovations developed over time. While sharing the study findings for validation, Dr. Losira explained that the overall objective of the research was to contribute towards promoting sustainable use of new agricultural technologies and innovations through better understanding of the gendered dynamics that enhance access and sustained use as a pathway to transformation of production systems and increasing productivity.



Left: Dr Florence Kyazze (Mentor) and Dr. Losira Nasirumbi (PI) meeting farmers at Nakigo Sub-county. Right: Dr Nasirumbi engaging a couple during the scoring game



Farmers from Buwunga Sub County with the research team after the meeting

4.4.17 Launch of CAES Botanical Gardens

The College of Agricultural and Environmental Sciences (CAES) through the School of Forestry, Environmental and Geographical Sciences on 6th December launched the first CAES Botanical Gardens at Makerere University Agricultural Research Institute Kabanyolo (MUARIK). The Botanical Gardens will cover 30 acres of MUARIK land. This is one of the College initiatives geared towards the protection, conservation and recreation of ecosystems. The gardens will also be used for teaching and research. During the launch, over 300 trees were donated to the Gardens.



Left-Right: Hon. Kaaya Christine Nakimwero, Woman Member of Parliament, Kiboga District and the Principal, CAES planting trees in the gardens

4.4.17 Mak Hosts 2nd African Conference on Precision Agriculture- (AfCPA) 2022

Makerere University College of Agricultural and Environmental Sciences (CAES) represented by Dr. Patrick Musinguzi, a Lecturer in the Department of Agricultural Production, hosted a satellite event of the 2nd African Conference on Precision Agriculture (AfCPA) on 7th-9th December 2022, at Protea Hotel in Kampala, Uganda. AfCPA is a biennial event and an initiative of the African Plant Nutrition Institute (APNI) in partnership with Mohammed VI Polytechnic University (UM6P), the International Society of Precision Agriculture (ISPA), and the African Association for Precision Agriculture (AAPA). The satellite event offered an opportunity for the local presenters and stakeholders to participate in the main conference held in Nairobi, Kenya, on issues of precision agriculture as a novel management approach for optimising soil/crop health and productivity. The mission of AfCPA is to build a forum dedicated to "connecting the science and practice needed to put precision agriculture in action for Africa." The conference was sponsored by OCP Africa, Global Phosphorus Institute, 4R Solution Global Affairs Canada, Digital Agriculture Convergence Laboratory, and Investiv. The conference aimed at strengthening and supporting the precision agriculture community within the African context. The conference engaged stakeholders including scientists, policy makers, extension staff, crop consultants and advisors, agronomists and service providers towards a common goal of building the capacity and resilience of African cropping systems.



Left: Dr. Patrick Musinguzi, Lecturer Department of Agricultural Production, CAES Makerere University, and organiser of the conference. Right: Participants during day one of the conference

4.4.18 Mak-CAES RWDT Project Registers Significant Achievements

Smallholder farmers in Uganda and Kenya produce a variety of fruits, traditional and exotic vegetables, spices, and herbs that have unique nutritional, nutraceutical and functional properties. However, the value derived from these crops is limited due to postharvest losses, seasonal production, limited value addition and market access problems. Developing and applying affordable food preservation technologies could reduce postharvest losses by up to 68%. Additionally, food preservation by drying not only prolongs shelf life, but it also minimises storage, transportation and packaging

costs. In 2017, Makerere University through the Department Agricultural and Biosystems Engineering at the College of Agricultural and Environmental Sciences (CAES) received funding under the BioInnovate Africa Programme Phase II to implement a project titled; "Adaptation and Promotion of Refractance Window Drying Technology (RWDT) for Production of High Quality Bio-products". The RWDT uses heat to dry fruits and vegetables, while maintaining the nutritive qualities. With RWDT, liquid foods, purees or slices are dried on one side of a thin plastic film, whose other side

is in close contact with hot water at temperatures below boiling point. The three-year project worth 750,000 USD had been scheduled to end in December 2020 but was extended to June 2021 due to the outbreak of COVID19 and the subsequent restrictions aimed at curbing the spread of the pandemic. The development objective of the project was to create new business opportunities in food value addition and agro-processing equipment fabrication. The project specifically aimed to develop a heat drying technology that is affordable yet yields high quality products, even from heat sensitive materials. It also aimed to; support local fabricators to make quality Refractance Window Drying equipment suitable for use by local agro-processors; improve the quality of products, mainly fruits, vegetables and herbs on the Ugandan & Kenyan markets; minimise post-harvest losses; increase the use of locally produced food ingredients derived from fruits, vegetables and herbs; and to enhance collaboration among farmers, agro-processors, researchers and support agencies. Other achievements registered under the project included; obtaining a Certificate of Grant of Utility Model from the Uganda Registration Services Bureau

patenting the Electric and Biomass Powered Refractance Window Drying Apparatus invented by the research team; training of farmers in the use of Refractance Window Drying Technology and the use of RWD products as ingredients, training of 16 fabricators, training of 6 graduate students (2 PhD & 4 M.Sc.), refurbishment of facilities at Makerere University Agricultural Research Institute Kabanyolo (MUARIK); and publication of 12 articles in internationally recognized journals. Working with various partners namely; Jomo Kenyatta University of Agriculture and Technology, Kenya Industrial Research and Development Institute (KIRDI), TONNET Agro-engineering Company Limited, East Africa Nutraceuticals Ltd (EAN), Food and Nutrition Solutions Ltd (FONUS) and the Ministry of Trade, Industry and Cooperatives, Uganda, Makerere University implemented several activities under the project. These included designing and fabrication of low-cost dryers, techno-economic evaluation of the dryers, evaluation of the refractance window dried products, assessment of the capacity of agro-processors and fabricators; training of farmers, agro-processors, and fabricators; and training of graduate students.



*Left: The Hybrid Refractance Window Drying Technology (RWDT)
Developed by BioInnovate Project Team. Right is the Project Leader, Prof. John Muyonga*



Some of the products produced using the refractance window drying technology

4.4.19 Launch of Edible Insect Products & Standards

Edible insects have the potential to fill the nutrition and income gaps in Uganda and Kenya. They are rich in protein and cheaper to manage. However, edible insect value chains are under-developed yet the demand is high. Business enterprises for rearing and processing quality insect food products do not exist and the business potential has not been evaluated. Through a project titled INSBIZ – "INSeCT-based agriBIZiness for Sustainable grasshopper and cricket production and processing for food in Kenya and in Uganda", researchers from the Department of Food Technology and Nutrition, College of Agricultural and Environmental Sciences (CAES), Makerere University in collaboration with partners from the International Centre of Insect Physiology and Ecology (ICIPE) set out to improve the profitability and nutritional benefits of edible insects. The development objective of the project was to contribute to improved food and nutritional security, job creation and income generation, and

reduction of the gender gap for the most vulnerable groups in East Africa in general and specifically in Kenya and Uganda through edible insects production and processing. Specific objectives included; (1) assessing the market size and testing the market performance of insect-based foods; (2) adapting and piloting of mass rearing protocols for crickets and grasshoppers; (3) developing, characterising and commercialising insect-enriched food products; and 4) creating a favourable (enabling environment for insect-based food through policy/standards, advocacy and awareness creation. The three-year project funded by the Swedish International Development Agency (SIDA) through the BioInnovate Africa Programme Phase II was headed by Dr Dorothy Nakimbugwe, an Associate Professor in the Department of Food Technology and Nutrition at CAES. Other members on the project included Dr. Geoffrey Ssepuuya from the same department, and Dr. Jackline

Bonabana-Wabbi from the Department of Agribusiness and Natural Resource Economics. During the project closing meeting held in the School of Food Technology, Nutrition and Bio-Engineering Conference Hall on 28th March 2022, Makerere University together with Uganda National Bureau of Standards (UNBS) launched edible insect products and standards for the enterprise. The event was presided over by Makerere University Vice Chancellor, Prof. Barnabas Nawangwe and Uganda National Bureau of Standards Executive Director, Mr. David Livingstone Ebiru. The products launched included shelf-stable, safe and well packaged grasshopper

products, cricket enriched flours, snacks, and cookies enriched with crickets. According to Dr Nakimbugwe, the products will largely reduce nutritional challenges. The project also sought to formalise the sector to make it more profitable. Other contributions included building capacity for research in this field. The project was able to train the farmers and harvesters on handling of insects. It also trained students from PhDs, to MAs, undergraduates, fellows and technicians.



The Executive Director of UNBS, Mr. David Livingstone Ebiru presenting the edible insects standards booklet to the Vice Chancellor of Makerere, Prof. Barnabas Nawangwe



Some of the products launched at the INSBIZ Project closing workshop

4.4.20 CONSORMIP Project Boosts Nutritional & Market Value of Sorghum and Millet

Sorghum and millet are key crops in Uganda's agricultural food systems and directly and indirectly support over 10 million livelihoods in the country. The two crops are tolerant to arid and dry environments. They are highly nutritious, not known to be allergenic, have low glycemic index (help lower the risk of conditions like type 2 diabetes and heart diseases), and contain phytochemicals beneficial to health. Despite their nutritional benefits, "the crops are increasingly disappearing from our diets". With support from SIDA through BioInnovate Africa, researchers from the Department of Food Technology and Nutrition at the College of Agricultural and Environmental Sciences (CAES), together with their counterparts from Sokoine University of Agriculture in Tanzania and Hawassa University in Ethiopia in 2018 set out to study and improve the nutritional and market value of the crops. Through a project titled; "Commercialization of New Sorghum and Millet Products for Improved Nutrition and Socio-Economic Gains in Eastern Africa (CONSORMIP)", the researchers including Prof. Yusuf Byaruhanga (Principal Investigator), Prof. Kyamuhangire William, and Dr Gaston Ampe Tumuhimbise, targeted to improve food and nutrition security, incomes and livelihoods of smallholder farmers and other stakeholders in the sorghum and millet value chains in Eastern Africa. The project specifically aimed to address the market gap – lack of value added, convenient sorghum and millet products, and to commercialise instant flour, snacks and complimentary feed made from sorghum and millet using lean business start-up and business incubation approaches. In the course of implementing the project, each partner country targeted to deliver at least one start-up enterprise commercialising one product and its attendant technology. On 4th May 2022 the research team led by Prof. Yusuf Byaruhanga held an end of project meeting at which they disseminated the findings and achievements registered. Some of the achievements included the development of novel value-added products including instant sorghum and millet flours, expanded snack food, complementary feed, and breakfast cereal products. Other achievements included processing protocols and formulations for the four product types; creating new business opportunities; and boosting capacity for research and development in the sorghum and millet value chains. The project trained three research fellows, one MSc research graduate, and several BSc research graduates. The project also developed and supported SMEs in each partner country as a vehicle for commercialization of the developed value-added products in the respective countries. It also trained four farmer groups in postharvest handling of grain foods.



The DVCAA, Prof. Umar Kakumba (2nd R) and the Principal of CAES, Prof. Gorettie N. Nabanoga (R) tour some of the products developed under the project

4.4.21 FLYGene Project

Makerere University College of Agriculture and Environmental Sciences (CAES), in partnership with AARHUS University, ICIPE, University of Nairobi, and Marula Proteen Limited, is undertaking a research project titled FLYGene (Sustainable and efficient insect production for livestock feed through selective breeding). FLYGene is a new project funded by the Danish Ministry of Foreign Affairs with the overall aim to enable the implementation of selective breeding of the Black Soldier Fly (BSF) for improved livestock feed availability in Kenya and Uganda by generating new knowledge of insect genetics, genomics and phenomics. The project team led by Prof. Dorothy Nakimbugwe from the School of Food Technology and Nutrition, CAES held the inception meeting on 22nd November 2022 at Makerere University.



The project team after the inception meeting

4.4.22 Alumni Dinner of the DFTN

The Department organized its first-ever alumni dinner on Saturday 10th September 2022 at Silver Springs Hotel Bugolobi under the theme "Memories, Connections and Prospects". The dinner was attended by Dr. Maggie Kigozi as guest of honour, Prof. Henry Alinitwe (the DVC F&A) who represented the Vice Chancellor, Prof. Gorretie Nabanoga (the Principal CAES), Ms. Prudence Ukonika (Managing Director K-Roma) and close to 200 alumni and some students. Outstanding alumni, staff and industry partners were recognized at this event and a steering committee of the alumni association was unveiled. At the same event the Uganda Food Science and Technology Association (UGAFOST) was launched.

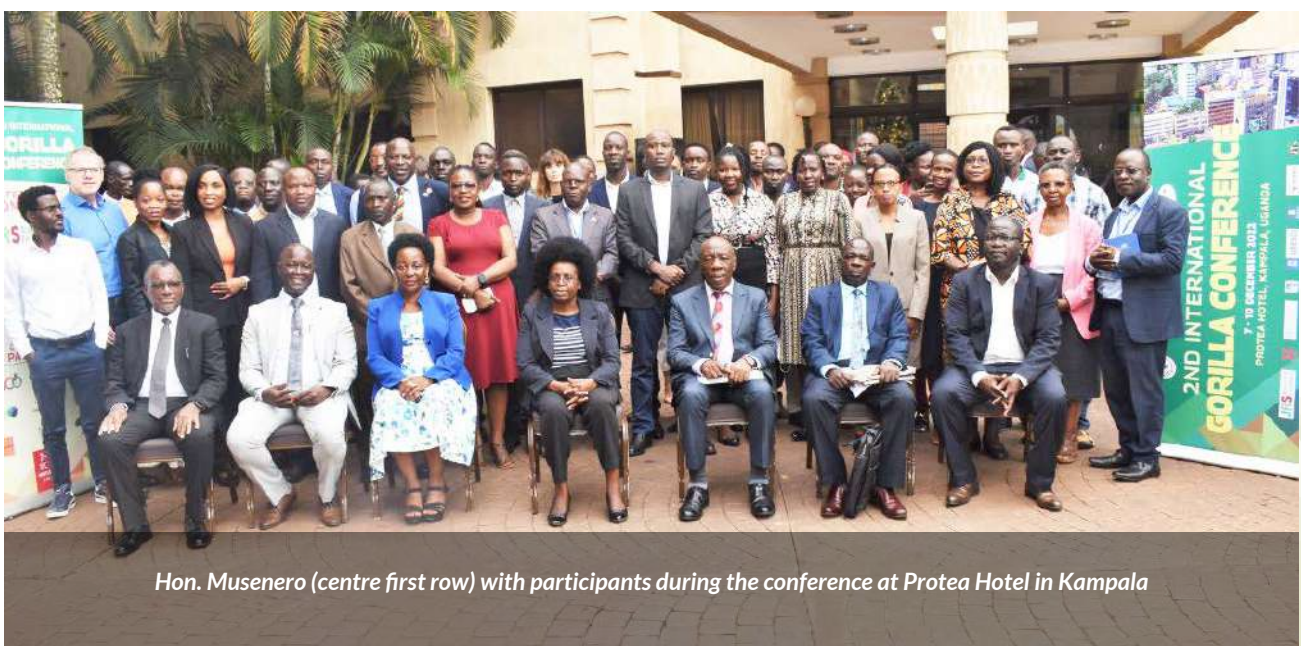


The Guest of Honour, Dr Maggie Kigozi touring the exhibition stall

4.4.23 The 2nd GORILLA Conference

The International Conference on Geographical Science for Resilient Communities, Ecosystems and Livelihoods Under Global Environmental Change (GORILLA) seeks to contribute to the realisation of the Global Development Agenda 2030 and the AU Agenda 2063. The 2nd GORILLA Conference organised by the College of Agricultural and Environmental Sciences (CAES), Makerere University, and the National Environment Management Authority (NEMA) sought to make a contribution to the realisation of the Global Development Agenda 2030 and the AU Agenda 2063 by addressing two fundamental questions; (1) "how science, research and the academia can contribute to the expedited achievement of global targets and resolve societal challenges? (2) how local, regional and international partnerships as well as interactions between science, policy and practice can enhance the delivery and achievement of the global development targets? The conference held on 8th-9th December 2022 at Protea Hotel in Kampala was coordinated by Prof. Yazidhi Bamutaze, Associate Professor in the Department of Geography, Geoinformatics and Climatic Sciences, also Deputy Principal, CAES (Chair), and Dr Jerome S. Lugumira, Natural Resources Manager (Soil and Land Use), NEMA (Co-Chair).

Sponsored by UNESCO, Biodiversity Foundation, the Food and Agriculture Organization of the United Nations, NORAD, UK Research and Innovation, BRAC Uganda, ARUA Water Centre of Excellence (CoE), and the Regional Centre for Mapping Resources for Development (RCMRD), the conference was attended by eminent scholars, researchers, representatives from the government and civil society organisations, and policy makers. It was presided over by the Minister of Science, Technology and Innovation, Hon. Dr. Monica Musenero Masanza, and graced by the Vice Chancellor of Makerere University represented by the Deputy Vice Chancellor in charge of Finance and Administration, Prof. Henry Alinaitwe; the representative of the Executive Director, NEMA, Dr Daniel Babikwa; the Principal of CAES, Prof. Gorettie Nabanoga; and the Dean, School of Forestry, Environmental and Geographical Sciences, Prof. Fred Babweteera. The conference featured a number of keynote speeches and presentations in relation to nature-based systems in mitigating Hydro-Meteorological hazards and disasters; climate smart agriculture for sustainable resilience; land degradation; migration and displacement; water management; biogeography, biodiversity and ecosystem conservation; and the future of smart cities and urban systems in Sub-Saharan Africa.



Hon. Musenero (centre first row) with participants during the conference at Protea Hotel in Kampala



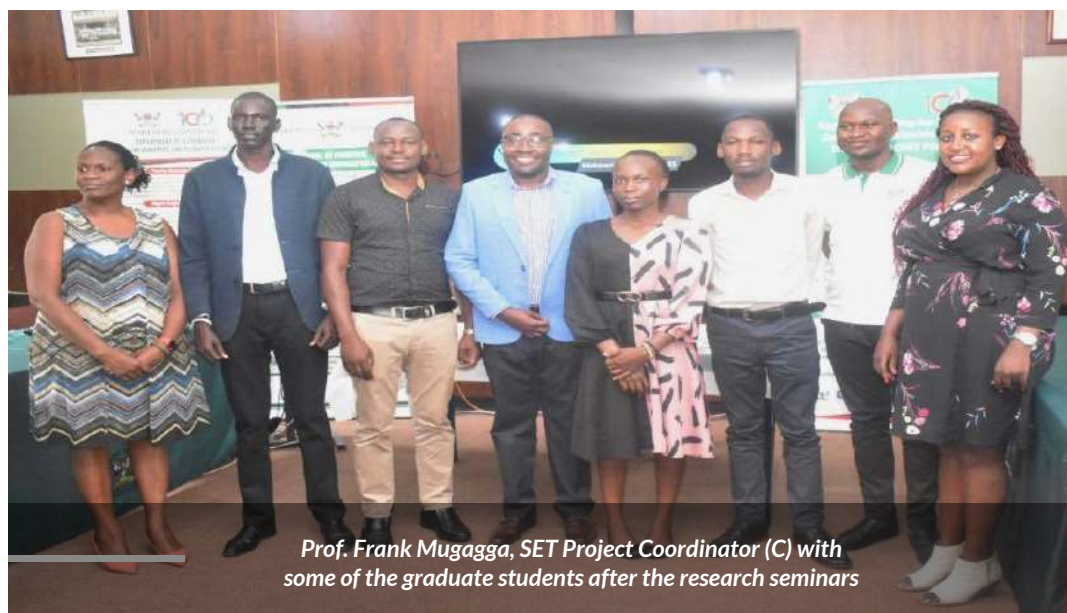
The Conference Conveners, Prof. Yazidhi Bamutaze (C) and Dr Lugumira Jerome (2nd L) with some SDS of the keynote speakers, Prof. Tonny Oyana (2nd R), Dr Joy Obando (R), and Prof. Jan Ketil.
Right: Some of the participants in the conference room

4.4.24 Research Seminar for SET Project supported graduate students

The East African region has embraced the global drive to transition to low carbon economies and clean energy. However, a key challenge is the persistent lack of knowledge, capacity and skilled personnel to support the transition. In 2021, the Department of Geography, Geo-informatics and Climatic Sciences at the College of Agricultural and Environmental Sciences (CAES), Makerere University received funding under NORHED II to improve research and knowledge on energy transitions. The six-year project titled, "Capacity Building for Socially Just and Sustainable Energy Transitions (SET)" aims to build capacity and competence through education, research and outreach to secure a workforce in the East African region with relevant skills and knowledge to implement and demand for a just and sustainable low carbon energy transition agenda. Specific objectives of the project include; i) developing capacity in social sciences, humanities and environmental management education programs to address emerging challenges and harness opportunities presented by the transition to low carbon energy economies in new oil and gas frontiers in East Africa; ii) improving competence and capacity of staff and students to undertake teaching and research on energy transitions from social sciences and humanities perspectives; iii) producing more and better research on energy transitions in East Africa through joint interdisciplinary research conducted by graduate students and Senior researchers at the partner institutions, and ultimately contribute to national and regional policy and practice in energy transitions; and 4) establishment of a Norway-East Africa (NOREAC) partnership and strengthening existing national and regional partnerships between academia, public sector, private sector and civil society to improve the relevance of graduate programmes and ultimately enhance employability of graduate students. Partner institutions include; Makerere University, Makerere University Business School (MUBS), Norwegian University of Science and Technology (NTNU), University of Stavanger (UiS) and TUK University of Juba. The project is supporting 3 PhDs, 7 MAs and 2 Postdoc students from the partner institutions. On 11th October 2022, the Department of Geography, Geo-informatics and Climatic Sciences held a research seminar at which the students presented their concept papers to get input/buy in from sector players and other stakeholders regarding the relevance of the planned research. The workshop was also intended to receive guidance from stakeholders on the best course of action on how the intended research can be structured to inform policy and practice.



Dr Maria Nantongo presenting her concept paper



Prof. Frank Mugagga, SET Project Coordinator (C) with some of the graduate students after the research seminars

4.4.25 Outreach activity on COVID-19

The College of Agricultural and Environmental Sciences, UrbanActionLab, Department of Geography, Geo-Informatics and Climatic Sciences, Makerere University, in collaboration with ACTTOGETHER Uganda, University of Manchester, UK and Kampala Capital City Authority, on 15th March 2022 organised an outreach activity on "On Covid-19 Effects, Experiences and Responses

from the British people




On Covid-19 Effects, Experiences and Responses Study in Informal Settlements and Commercial Zones of Kampala – Uganda

OUTREACH ACTIVITY

15th MARCH 2022 [Makerere University Kampala – Uganda]



The University of Manchester





4.4.26 Researchers Invent Shield to Curb Spread of COVID19

The College of Agricultural and Environmental Sciences (CAES) in collaboration with the College of Engineering, Design, Art and Technology (CEDAT), Makerere University hosted a hybrid virtual and physical symposium on Transport and Covid-19. The symposium held on 22nd February 2022 at the College of Computing and Information Sciences' Conference Room was aimed at disseminating research findings from a project titled: Modelling the Exposure Risk Trade-off between Public Transit and Private Paratransit for Transport Decision making in the era of Covid-19". The overall objective of the project was to provide a science-based answer for transport policymakers in developing countries in relation to the safest publicly available transport mode to move people during the pandemic, and making travelling in paratransit modes-especially motorcycle taxis safer. The project also aimed to address issues related to changes in travel choices and preferences during the pandemic. It was funded by UK Research and Innovation as part of the Global Challenges Research Fund (GCRF) and Newton Fund Agile Response Call to Respond to Covid-19. The project started in 2020 and ended in December 2021. It was carried out in four countries with twelve (12) researchers involved in three (3) case study cities of Nigeria (Owerri), Uganda (Kampala) and Bangladesh (Hakara). The project was a collaboration between five universities including: Makerere University, University of Leeds, Bangladesh University of Engineering and Technology, University of Asia Pacific and Federal University of Technology Owerri. Makerere University was represented by Dr. Paul Mukwaya from the Department of Geography, Geo-Informatics and Climatic Sciences, CAES, and Dr. Andrew Bwambale from the Department of Civil Engineering, CEDAT. Through quantitative and qualitative modelling of the exposure of COVID-19 virus inside different types of publicly available transport means- motorcycles and buses using Computational Fluid Dynamics model, it was discovered that motorcycle taxi infection risk was lower compared to that in buses hence making it the safest mode of transport. In line with the findings, the research team invented a paratransit shield to mitigate exposure to the virus. The shield completely eliminates airborne exposure of the passenger to the droplets coming from the drivers' cough..



*Left: Researchers during the dissemination seminar.
Right: The Motorcycle Shield invented by the Research Team*

4.4.27 International Symposium on Covid-19 Effects and Responses

Globally, economies and societal sectors have been negatively affected by COVID-19 pandemic and its associated containment measures. In Uganda, lockdowns were put in place especially in Kampala as a way of containing spreader events. Makerere University represented by the Urban Action Lab in the Department of Geography, Geo-Informatics and Climatic Sciences, College of Agricultural and Environmental Sciences (CAES), in collaboration with the University of Manchester Global Development Institute and ACTTOGETHER-Uganda undertook a study titled, "Covid-19 Effects, Experiences and Responses in Informal Settlements and Commercial Zones of Kampala-Uganda". The results of the study were presented by the team members during the International Symposium on Covid-19 Effects, Experiences and Responses in Informal Settlements and Commercial Zones of Kampala-Uganda held on 15th March 2022 at the College of Computing and Information Sciences. The project was guided by three (3) main objectives including: (1) Understanding how the COVID-19 measures had amplified health, economic, occupational, and social risks, (2) Understanding the impact of lockdown measures with the increasing cases of COVID-19 infections, and (3) Exploring the experiences and consequences of the enforcement of measures in public places, the governance of these measures, the partnerships, and power-related tensions. The study analysed collaborative coalitions that emerged as a response to handling the COVID-19 crisis in Kampala city. Makerere University College of Agricultural and Environmental Sciences' researchers led by Dr. Paul Mukwaya discovered that it was impossible and financially unmanageable to implement comprehensive rescue packages in urban areas during the pandemic. Lockdowns and physical distancing were highly impractical for densely populated settlements and informal enterprises. The researchers called for harnessment of the local intelligence of communities to address the long-term challenges faced by slum dwellers. They also called for improved coordination of communication, planning, decision-making, and operations across a wide range of stakeholders in cities for future response.



Participants during the Symposium on the Effects of Covid-19

4.4.28 Formation of Mbale City Food Systems Platform

Smallholder farmers in Mbale City have for long grappled with poor methods of farming, limited markets for their produce, poor preservation methods, prolonged drought, poor quality of seeds, pests and diseases and the fake agro chemical inputs that have greatly affected their production levels. The need to develop a more resilient food system for sustainable food production for Mbale City raised concern hence the intervention by RUFs Uganda. In April 2022, the 'Unlocking the Potential of Smallholder Farmers Urban Food Systems Resilience in Uganda Agriculture Food Security (RUFs Uganda) Project' team organised a two-day capacity building workshop for Mbale City smallholder farmers. The workshop held at Mbale City Northern Division Offices was a follow up on the Needs Assessment workshop at which a range of issues including the need to organise farmers into groups, need for training on sustainable land management practices, and access to financial resources were identified and prioritised for action, in a bid to empower smallholder farmers with skills on sustainable agriculture. The implementation of the RUFs_Uganda project is guided by three (3) main objectives including: assessing key vulnerabilities to urban food systems; facilitating a process of coming to agreement on the key priority areas and policies or actions, and supporting decision makers to develop evidence-based policies and activities. In line with these objectives, RUFs Uganda in a participatory way, initiated the formation of Mbale City Food Systems Platform (MCFSP), with an aim of bringing together all relevant players and stakeholders to the City's food shed. The platform will be key in mobilising different interest groups towards a common goal.



Makerere University team led by Prof. Frank Mugagga (RUFs_Uganda Project head) and Mbale City smallholder farmers touring Modern Urban agriculture facilities

4.4.29 Resilient Urban Food Systems Project Capacity Building Workshop in Kasese Municipality

The Resilient Urban Food Systems (RUFs_Uganda) Project team organised a two-day workshop on capacity building of smallholder farmers in Kasese Municipality. The event was held on Monday, 16th and 17th May 2022 at Uhuru Hotel in Kasese Municipality and was attended by representatives from: AgriFoSe2030 programme, the media, technical personnel, politicians,

Operation Wealth Creation, farmers, and agro-input dealers. The workshop was aimed at: Sharing knowledge and experiences of different farming measures like local inputs, materials used in production; sensitising and guiding farmers on the need to form farmer groups and initiating a process of actualization of the stakeholders' platform which brings together all the players. The capacity building initiative comes after the previous engagements with smallholder farmers in Kasese Municipality during which a number of issues were brought forward including: River Nyamwamba floods, drought, pests, theft, all affecting smallholder farmers' crop yields. During the workshop, smallholder farmers were skilled on a range of issues including; group formation and dynamics, financial accessibility and record keeping.



Participants during and after the RUFU Uganda workshop

4.4.30 SDSN Uganda Consultation meeting

The realisation of the Sustainable Development Goals (SDGs) has been undermined by severe financing constraints facing developing countries. This has been aggravated by the COVID-19 pandemic and the war in Ukraine. According to Dr. Faustin Gasheja, Sustainable Development Solutions Network (SDSN) Project Manager, Africa, the key to achieving the SDGs, besides preserving peace and lowering geopolitical tensions, is having a plan to finance them. Disseminating the Global SDG report 2022 at the SDSN Uganda Consultation meeting held at Golden Tulip Canaan Hotel in Kampala on 30th June 2022, Dr. Gasheja outlined six investment priorities which require major transformation if the SDGs are to be achieved. These include; 1) Education and social protection to achieve universal secondary education (SDG 4) and poverty reduction (SDG 1); 2) Health systems to end the pandemic and to achieve Universal Health Coverage (SDG 3); 3) Zero-carbon energy and circular economy to decarbonize and slash pollution (SDG 7, SDG 12, SDG 13); 4) Sustainable food, land use, and protection of biodiversity and ecosystems (SDG 2, SDG 13, SDG 15); 5) Sustainable urban infrastructure, including housing, public transport, water, and sewerage (SDG 11); and 6) Universal digital services (SDG 9) to support all other SDG investments, including online education, telemedicine, e-payments, e-financing, and e-government services. The SDSN Uganda workshop convened by Dr. Revocatus Twinomuhangi, a Senior Lecturer in the Department of Geography, Geo-Informatics & Climatic Sciences at Makerere University, and Coordinator of the Makerere University Centre for Climate Change Research and Innovation (MUCCRI) was intended to consult stakeholders on the preparation of the Sustainable Development Report (SDR) for Makerere University, disseminate the 2022 SDG report, with specific focus on Africa region and Uganda's progress on achieving the SDGs, and discuss the operationalization of SDSN youth network in Uganda. SDSN Uganda is led by Dr. Twinomuhangi and is hosted by the MUCCRI at the College of Agricultural and Environmental Sciences (CAES). The Network was formally launched at Makerere University on 21st April 2021. The major aim of the network is to mobilise state and non-state actors to identify and implement transformative solutions to achieve Sustainable Development Goals (SDGs).



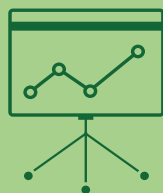
Dr. Revocatus Twinomuhangi, a Senior Lecturer in the Department of Geography, Geo-Informatics & Climatic Sciences at Makerere University, and Coordinator of the Makerere University Centre for Climate Change Research and Innovation (MUCCRI)

4.4.31 Landscape Ecology Summer School 2022

The College of Agricultural and Environmental Sciences, Makerere University hosted the 2022 Landscape Ecology Summer School, held 21st to 28th July, 2022. The summer school was attended by participants from twenty (20) countries including: Uganda, Kenya, Congo – Kinshasa, Ghana, Nigeria, Germany, the US, Eswatini, Ethiopia, Benin, Rwanda etc. The summer school was very intensive with a series of activities including several presentations, and visits to three (03) informal settlements in Kampala including Kisenyi, Bwaise and Acholi Quarters. In Jinja, participants visited two (02) informal settlements including Kibuga – Mbaata, Rippon and the source of the Nile. Participants were hosted to a dinner in Jinja and cultural night at the Ndere Cultural Centre in Kampala. The school started with a theoretical and conceptual overview of urban ecologies of Kampala and Jinja cities at Makerere University. This was followed by a tour of Kampala city and the above selected informal settlements to gain valuable insights into their complex urban ecologies. During the visits, participants had the opportunity to engage with community leaders from the informal settlements as a way of gaining a deeper understanding into the motivations and logics behind the visions of communities living in unequal and precarious environments. Held under the theme “Cities and Urban Ecological Resilience”, the focus of the school was to “Understand Landscapes, Issues and Co-creation of Knowledge and Solutions” at relevant scales as well as addressing sustainability issues. The objectives of the Summer School included: Providing insights in recent conceptual, theoretical and technological developments in landscape ecology that enhance the UN Global Development Agenda 2030 and the African Union Agenda 2063; building a network of knowledgeable, skilled and competent multidisciplinary scientists with competencies to resolve complex issues; facilitating deepening of beneficial science-practice-policy interfaces along ecological sustainability and livelihood thriving in the midst of increasing stressors; and increasing north-south and south-south networking, collaboration and partnership for increased knowledge creation and scholarship. The landscape ecology network was initiated mainly to address contemporary issues that will lead to the actualization of agenda 2030 and more specifically, SDGs 1 (No poverty), 10 (Reduced inequality), 11 (Sustainable cities and communities), 13 (Climate Action) and their related targets.



Landscape Ecology Summer School Participants at Bugolobi Royal Suites



05

College Activities

5.1 Handover ceremony for CAES Principal

Makerere University Chancellor, Prof. Ezra Suruma appointed Prof. Gorettie N. Nabanoga as the next Principal of the College of Agricultural and Environmental Sciences (CAES), Makerere University effective 1st February 2022. She is the first female Principal of CAES and will hold the position for a period of four years as stipulated in the Universities and Other Tertiary Institutions (Management of Constituent Colleges of Makerere University) Statute, 2012. Dr Nabanoga who was Deputy Principal, CAES took over from Prof. Bernard Bashaasha who served in the position since August 2013. On 15th February 2022, Prof. Bernard Bashaasha handed over to Prof. Nabanoga at a ceremony witnessed by the Representative of the University Secretary, Ms. Consolata Komugisha; the Director Internal Audit, Mr. Walter Yorac Nono; as well as the Deans and Heads of Academic and Administrative Units at the College.



Prof. Bashaasha handing over to Prof. Nabanoga (L)

Makerere University Chancellor, Prof. Ezra Suruma appointed Dr Yazidhi Bamutaze Deputy Principal, College of Agricultural and Environmental Sciences (CAES) effective 1st April 2022. Dr Bamutaze who is an Associate Professor in the Department of Geography, Geo-Informatics and Climatic Sciences at CAES took over from Dr Gorettie N. Nabanoga, the current Principal of CAES.



Prof. Bamutaze (C) receiving some of the office instruments as Deputy Principal from Prof. Nabanoga

5.3 CAES Principal's Inaugural Speech

The Principal, College of Agricultural and Environmental Sciences (CAES), Makerere University, Prof. Gorettie N. Nabanoga delivered her inaugural speech to the College community on 4th March 2022, highlighting the achievements, challenges and strategies for improving the College. In a bid to improve research and innovations at the College, Prof. Nabanoga called for the revitalization of relationships with former and new development partners with a global research focus. On graduate training programmes that are currently experiencing low enrolment, at 6% as opposed to the 40% desired in the University's Strategic Plan 2020-2030, Prof. Nabanoga said the College through the Office of the Deputy Principal would work on developing a strategy to market graduate programmes. In order to improve the graduate students' constraint of funding innovative research, she committed to provide support to schools and departments to develop research proposals with a provision of research funds for graduate students. She also committed to foster continuous improvement in the graduate supervision and examination processes,



Prof. Nabanoga delivering her inaugural speech.

which shall improve the current graduate completion rate from 75% to 90%. On resource mobilisation, Prof. Nabanoga noted that together with all staff, she would work towards exploring and fully utilizing MUARIK and other Institutes and Centres of Excellence at the College. She emphasised the need for inclusivity at all levels of operation, committing that she would support schools and department to form engendered working committees to address their unique challenges. The Principal acknowledged the transformative leadership of the outgoing Principal, Prof. Bernard Bashaasha. She also recognized the former deans and Heads of Department for the excellent service to CAES and Makerere University in general. These included; Prof. Johnny Mugisha, Dean School of Agricultural Sciences (2013-2021); Prof. Jacob Agea who served as Head

Department of Extension and Innovation Studies (2015-2019); Prof. Paul Kibwika, Head Department of Extension and Innovation Studies (2011-2015); Prof. ArchileoKaaya, Head Department of Food Technology and Human Nutrition (2011-2019); Prof. Phillip Nyeko, Head Department of Forestry, Biodiversity and Tourism (2011-2019); Dr Denis Mpaiwe, Head Department of Agricultural Production (2011-2019); and Dr Yazidhi Bamutaze, Head Department of Geography, Geoinformatics and Climatic Sciences (2015-2019). Prof. Nabanoga recognized the unique services of administrative and other non-teaching staff at the College.



Some of the plaques presented to former and current CAES leaders during the ceremony

5.4 Assessment of Condition of College Facilities, Engagement of Staff on Challenges Affecting their Performance

In order to strategize and plan better, the Principal, College of Agricultural and Environmental Sciences (CAES), Prof Gorettie N. Nabanoga on 4th – 7th April 2022 visited various units to establish the condition of facilities and challenges faced by staff. At the School of Food Technology, Nutrition and Bio-Engineering, the Principal toured different facilities including the Food Technology and Business Incubation Centre, the laboratories, Food Technology and Business Incubation Centre Phase III Building under construction, the library and teaching spaces. She also toured the teaching and laboratory spaces, libraries, offices and washrooms at the School of Forestry, Environmental and Geographical Sciences and the School of Agricultural Sciences, as well as facilities at Makerere University Agricultural Research Institute Kabanyolo (MUARIK). During the meetings, both staff and students called for more investment into practical training, institutionalisation of knowledge transfer partnerships, transformation of MUARIK into a one stop centre for research and practical training, and a consistent system of staff recognition & promotions. The staff appealed for seed capital to support proposal development for research grants. Students called for support to student councils, noting that they are crucial in ensuring their welfare. Staff hinted on the need for an academic counsellor to manage students' psychosocial wellbeing. They also called for improvement of security on Campus and at MUARIK, and improvement of training facilities for graduate students.



Left: The Principal, Prof. Gorettie N. Nabanoga (R) after touring the Food Technology and Business Incubation Centre Phase III Building under construction. Right: The Principal touring the Food Technology and Business Incubation Centre



Left: The Principal in a meeting with staff from the Department of Environmental Management (DEM). Right: The Principal touring a library at the DEM

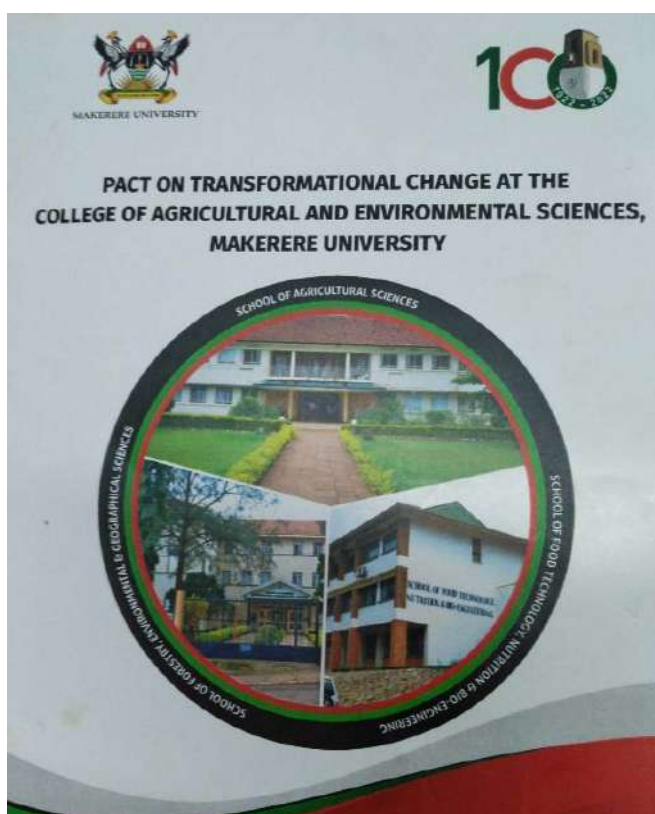


Left: The Principal touring the Animal Nutrition Lab at the School of Agricultural Sciences. Right: The Principal interacting with students in the Soil Science lab at the School of Agricultural Sciences

5.5 Unveiling the CAES Pact

Management of the College of Agricultural and Environmental Sciences (CAES), Makerere University on 9th August 2022 unveiled a Pact aimed at causing transformation at the College. The Pact presented by the Principal, Prof. Gorettie Nababanga at the College General Assembly held at the School of Food Technology, Nutrition and Bio-engineering Conference Hall intends to cause transformation in teaching and learning, research and innovation, as well as knowledge transfer partnerships.

<https://news.mak.ac.ug/2022/08/caes-management-unveils-pact-to-foster-transformative-change/>



The Principal with CAES staff after unveiling the Pact

5.6 CAES Principal visit to MAKCSID

Soybean research and development efforts in Uganda is led by Makerere University Centre for Soybean Improvement and Development (MAKCSID) in partnership with farmers, research institutes and technology verification centres in the major soybean growing areas. The major breeding objectives are to; i) Develop and release superior soybean varieties; ii) Improve awareness for increased adoption of released soybean varieties by farmers; iii) Enhance availability and access of improved varieties; and iv) Value addition for enhanced nutrition (soy flour, soybean milk, Yoghurt) using appropriate technologies. Since its establishment, the MAKCSID has registered significant achievements. The Centre has produced six high yielding varieties namely; Maksoy 1N, Maksoy 2N, Maksoy 3N, Maksoy 4N; Maksoy 5N, Maksoy 6N. Recent impact studies by researchers from the Centre led by Prof. Phinehas Tukamuhabwa showed that the new varieties developed by MAKCSID were the most planted and accounted for 93% of the soybean varieties grown by Ugandan farmers. Currently, Maksoy 1N is the most widely adopted variety by farmers, while Maksoy 3N has the largest quantities of foundation seed disseminated by the centre. The centre has also established a state-of-the-art seed storage facility for early generation seed (Breeders and Foundation seed) and soybean germplasm used for breeding other varieties. Other facilities are soybean processing equipment (soycow) and Soybean roaster that are used to add value to soybeans. On 6th July 2022, the Principal, College of Agricultural and Environmental Sciences (CAES), Prof. Gorettie Nabanoga visited MAKCSID at the Makerere University Agricultural Research Institute Kabanyolo (MUARIK) to chart ways of improving productivity of the Centre.



*Left: Prof. Nabanoga touring the soybean gene bank at MUARIK.
Right: The Principal in a meeting with the MAKCSID team*



5.7 Danish Ambassador Commissions New CURAD Incubation Hub

The Danish Ambassador to Uganda, H.E. Nicolaj H Petersen on 31st March 2022 commissioned the new CURAD Incubation Hub at the Namanve Business Park. The event was witnessed by the Principal, College of Agricultural and Environmental Sciences (CAES), Dr Gorettie N. Nabanoga and other members of staff from the College. The Consortium for enhancing University Responsiveness to agribusiness Development (CURAD) is a public-private partnership initiative promoted by Makerere University, the National Union of Coffee Agribusinesses and Farm Enterprises (NUCAFE), National Agricultural Research Organization (NARO) and NIRAS international. CURAD is one of the six agribusiness incubators in Africa supported by the Forum for Agricultural Research in Africa under the UniBRAIN facility with funding from DANIDA. It has in place a revolving fund to support incubatees to develop their agri-businesses to sustainable levels while paying back to CURAD to sustain its activities in a mutually beneficial arrangement.



The Food Processing and Packaging Lines at CURAD



5.8 Sensitization of Mak Administrators on the significance of Diversity and Inclusion

Makerere University in collaboration with Michigan Fellows Agribusiness Initiative (MFAI) on 5th May 2022 held a workshop to deliberate on diversity and inclusion as major factors in ensuring equity and safer home and work spaces across the globe. The meeting held at Grand Global Hotel in Kampala was attended by senior administrators from Makerere University, Kyambogo University, Michigan State University and MFAI. The Diversity and Inclusion in Leadership and Training project, funded by Michigan State University's Alliance for African Partnership (AAP), under the Transforming Institutions Strategic Funding is implemented by Michigan Fellows Agribusiness Initiative (MFAI), Makerere University (Mak), and Michigan State University (MSU)-African Studies Centre. The project features a series of training aimed at deepening the knowledge and sensitivities of participating administrators, faculty, staff and youth leaders on matters of diversity and inclusion. The overarching objective of the project is to increase the representation of categories of people typically marginalised from leadership and decision-making processes such as women, people living with disabilities and youth from low income earning families. The Department of Extension and Innovation Studies, College of Agricultural and Environmental Sciences (CAES), Makerere University on 28th July 2022 held the second workshop on diversity and inclusion for management and staff from participating institutions. The activity held at the Yusuf Lule Central Teaching Facility at Makerere University was graced by the Principal of CAES, Prof. Gorettie Nabanoga. It featured expert presentations on integrating diversity and inclusion in teaching, training and community engagement; exploration of inclusive teaching and research; as well as cultivation and nurturing diverse and inclusive environments.



Left: Some of the administrators at the D&I training at Makerere. The project is led by Prof. Nelson Turyahabwe.
Right: Dr Euzobia Baine Mugisha sharing views on nurturing and cultivating inclusive environments



5.9 CAES donates 514 native chickens for Women-led Farmer Groups in Apac and Kole Districts

Native chickens contribute significantly to the well-being of rural farming communities in low-income countries and particularly so in poverty-stricken regions of Mozambique and Uganda by providing protein and micronutrients. The majority of smallholder farmers raise native chickens for food and income as they do not require special management, require low investment, need limited pest control, and provide manure. Local chickens have a ready market, and are easily consumed by rural populations in case of food shortage, hence ensuring food and nutrition security and poverty alleviation in rural areas. The Native Chickens Project funded by the African Union (2019-2021) is a collaboration between institutions in two countries – Mozambique and Uganda with the project lead at Eduardo Mondlane University Mozambique. At Makerere University, the project is led by Dr. Donald Rugira Kugonza from the Department of Agricultural Production, College of Agricultural and Environmental Sciences (CAES). Partner Institutions in Uganda include; Makerere University,

Women of Uganda Network (WOUGNET), Gulu University, Chicken Masters, and Research and Education Agency. In Mozambique the partners are; International Rural Poultry Centre- Kyeema Foundation, Agricultural Research Institute of Mozambique, and the Directorate of Animal Sciences (DCA). The Native Chickens Project development objective is to increase the quantity and quality of chicken products that will result in better income and nutrition for farmers in Mozambique and Uganda (Northern Uganda). On 9th February 2022, the project team led by Dr Kugonza and the project advisor who is a Molecular Geneticist Dr Maurice Agaba dispatched 514 high quality native chickens from the breeding site at Makerere Institute of Agricultural Research Kabanyolo (MUARIK) to WOUGNET for distribution to Women-led Farmer Groups in Apac and Kole districts.



Dr Donald Kugonza (2nd R) and Dr Maurice Agaba supervise the loading of chicken for dispatch to Apac and Kole Districts



Some of the beneficiaries of the native chicken dispatched from MUARIK

5.10 Prof. Youngs Donates Artificial Insemination Equipment to CAES

The College of Agricultural and Environmental Sciences (CAES), Makerere University represented by Dr. Donald Kugonza from the Department of Agricultural Production, hosted Prof. Curtis Youngs from Iowa State University (ISU) on 11th February 2022. Prof. Curtis Youngs is an animal scientist at ISU in charge of the Kamuli Livestock Programme in Uganda. During his visit, Prof. Youngs toured facilities at Makerere University Agricultural Research Institute Kabanyolo (MUARIK) including, the Pig and Native Chicken Breeding projects, the Chicken Incubation Facility, Animal Laboratory and National Boar Stud. He also donated equipment to the College Animal Science Lab at MUARIK to aid pig semen analysis. The equipment included: a microscope, catheters for artificial insemination, temperature gun, conductivity tester, and heater.



5.11 Prof. Kugonza appointed Visiting Faculty at Chandigarh University

In July 2022, Prof. Donald Kugonza Rugira from the Department of Agricultural Production, CAES was invited as Visiting Faculty/Adjunct Professor of BioSciences, Chandigarh University, India. As a Visiting Faculty of the Chandigarh University, one can engage in multiple assignments from among the following: teaching Core/Elective subjects, co-Supervising Undergraduate, Graduate and Doctoral (Ph.D.) students, participate in externally funded projects as Co-Principal Investigator, write joint project proposals for International funding, and mentor undergraduate, postgraduate, Doctoral students.



5.12. Prof. Elly N. Sabiiti Delivers Valedictory Lecture to CAES Community, Recounts His 43-year Experience at Mak

After 43 years of dedicated service to Makerere University, Prof. Elly N. Sabiiti, a prolific researcher and internationally recognized scholar, currently working at Busitema University- Faculty of Natural Resources and Environmental Sciences, retired from university service in 2021. On 2nd September 2022, Prof. Sabiiti, in company of his wife Joy Sabiiti delivered a valedictory lecture to staff at the College of Agricultural and Environmental Sciences (CAES), Makerere University. The lecture organised by the Office of the Principal, CAES and held in the Conference Hall at the School of Food Technology, Nutrition and Bio-engineering focused on his experiences, achievements, challenges, and strategies that enabled CAES to evolve from a Faculty to one of the most celebrated Colleges at the University. Held under the theme; "My Inspirational Academic Track Service at Makerere University: A Case for CAES", Prof. Sabiiti specifically spoke about his career development in terms of teaching, research, graduate supervision, leadership, resource mobilisation, representation on professional bodies, and outreach services, before sharing his thoughts for CAES to grow to higher levels and excel in Agricultural and environmental Sciences. Prof. Sabiiti implored staff to remain united with a common vision for the College. "Focus on growing CAES into a University of Agricultural & Environmental Sciences".

Prof. Sabiiti's advice to members of staff

- ▶ While in service, work for the good of the institution and the good of others and you will be rewarded. "As a Professor at Makerere, I had a purpose to build human capital. As a Lecturer, you should always have a purpose as to why you are teaching and supervising. I came to Makerere to teach and build others. Learn to sacrifice for the good of others."
- ▶ Mentoring means being able to offer a helping hand to a fallen person or a person struggling with unseen challenges and you do it willingly without expecting rewards from that person. Your expectations are to make your mentee a better person.
- ▶ Makerere gives you the best environment to grow academically if you want to grow. Learn to love the institution and you will excel in whatever you do.
- ▶ To the academic leaders, there is a need to balance administration and academics. If you don't, you will be lost when you leave administration.



Left: Prof. Sabiiti delivering the Valedictory Lecture. Right: The Principal of CAES presents an award to Prof. Sabiiti in recognition of his distinguished service to Makerere



CAES staff with Prof. Elly Sabiiti after the lecture

Recognition of retired staff

During the Prof. Elly N. Sabiiti's valedictory Lecture, the Principal, CAES presented an award to him in recognition of his distinguished service to Makerere University. The Principal, together with the Deputy, also presented appreciation awards to other retired members of staff in recognition of their service to Makerere. These included; Prof. Bareeba Felix, Prof. Tenywa Moses, Prof. Hyuha Theodora, Prof. Ssembajjwe Gombya, Prof. William Kyamuhangire, Prof. Nabasiye Margaret, Prof. Mutetikka David, Prof. Tenywa John Stephen, Dr Matsiko Francis, Dr Okiror John James, Dr Nagadya Harriet, Dr Christine Magala Nyago, Dr Michael Iwadra, Ms. Nanziri Sarah, Ms. Kawooya Teddy Mary, Mr. Eugene Manda, Mr. Tibakuzira Arnest, Mr. Emmanuel Nabyama, Ms. Toepista Namayanja.



Retirees join the Principal and Deputy Principal CAES to cut cake in celebration of their service to Makerere



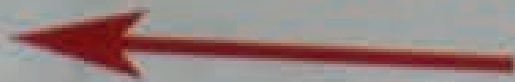
Retired members of staff after receiving their awards in recognition of their service to Makerere

MAKERERE UNIVERSITY



AGRICULTURAL RESEARCH INSTITUTE
KABANYOLO (MUARIK)

P.O BOX 7062 KAMPALA



06

**Research
Institutes**

6.1 Makerere University Agricultural Research Institute Kabanyolo (MUARIK)

6.1.1 Introduction

The Makerere University Agricultural Research Institute, Kabanyolo (MUARIK) started as a University Farm in 1953 and was later upgraded to a fully-fledged research institute in 1996. It is one of the institutes of the College of Agricultural and Environmental Sciences (CAES), whose role is to support CAES' teaching, research, outreach, and production mandates. The institute sits on about 230 hectares of land and is the arm of the Makerere University that interfaces with the National Agricultural Research System. MUARIK has the quadruple mandate of 1) research, 2) training, 3) production, and 4) outreach. The objectives are to;

- i) Mobilise and coordinate the human resource expertise especially on the critical needs for capacity and human resource development for agricultural modernization,
- ii) Design and implement short and medium term demand driven training programmes for the public and private sector employees in agriculture related organisations/businesses as well as farmers,
- iii) Enhance the technical capacity and leadership of public and private sector agriculture related organisations/businesses through mid-career professional training programmes, seminars, conferences, and workshops among other activities,
- iv) Appropriately package and produce information needed by extension staff, mid-career professionals and farmers to enhance their performance in delivery of services, and
- iv) Be the interface between Makerere University, the local governments, private sector including Non-Government Organisations, Community Based Organizations and the farming communities at large through collaborative implementation of training programmes and development of resource materials for various stakeholders in the agricultural sector.

6.1.2 General Structure of MUARIK

6.1.2.1 Functioning of MUARIK

As part of the National Agricultural Research System (NARS), MUARIK carries out research based on national priorities. These include biotechnology, tissue culture technology, plant breeding, development of improved farming techniques, agro-processing, marketing, and value addition. To facilitate research, the institute houses the graduate training and research laboratory, Continuing Agricultural Education Centre (CAEC), Makerere Regional Centre for Crop Improvement (MaRCCI), Centre of Excellence in Waste Management, Centre for Soybean Improvement and Development and the Consortium for enhancing University Responsiveness to Agribusiness Development Limited (CURAD). In addition, two KOICA funded projects i.e. modern layers production unit, and a modern climate controlled greenhouse for vegetables production are housed at MUARIK. All these centres/units are run as independent units. MUARIK also houses research units for the School of Agricultural Sciences (Biotechnology Laboratory, Tissue Culture Laboratory, experimental fields, Horticulture Unit, Livestock Unit, and the black soldier fly project), the School for Food Technology, Nutrition, and Bioengineering, and the School of Forestry, Environmental, and Geographical Sciences. Currently, there is ongoing research on edible insects, worms as alternative feed for livestock, agroforestry, horticulture, and food processing and value addition for value chain improvement among others. There is a strong research partnership with the Uganda Flowers Exporters Association.

Through this partnership, new flower species are being tested for commercial production in Uganda given the fact that the industry now has to move from the export single species (mainly roses) flower bunches to mixed species bouquets.

With regard to outreach, MUARIK offers on-spot technical advice to the farming community. Outreach activities mainly focus on schools and farmers. On average, over 600 primary, secondary, and tertiary schools with a total population of about 30,000 visit MUARIK annually. The institute also undertakes production of a wide range of crops and livestock. Although these units are primarily for commercial production, they are also used for teaching, research, and outreach activities. Other important units housed at MUARIK include, a health clinic under the University Hospital, student hostels headed by the Warden under the university Dean of Students, security unit under the university security unit, and a police post under the Uganda Police. The student hostels at MUARIK can accommodate over 70 undergraduate and about 20 postgraduate students who stay at the institute to gain practical experience in production and research under typical farming conditions. The postgraduate residents consists of students drawn from different countries in the East and Central Africa region such as the Democratic Republic of Congo, Rwanda, Zambia, Zimbabwe, Tanzania to mention a few.

6.1.3 Management of MUARIK

MUARIK policy committee is the body in charge of MUARIK management and reports to CAES management council. This committee is comprised of the following members:

- i) The Principal (Chairperson)
- ii) Director MUARIK (Secretary)
- iii) Prof. Jacobs Agea, SAS
- iv) Assoc. Prof. J. B. Tumuhairwe, SAS
- v) Alice Amoding
- vi) Dr. Bernard Obaa
- vii) Asso. Prof. Fred Babweteera
- viii) Dr. Ampe Gaston Tumuhimbse
- ix) The farm Manager

The day to day management of MUARIK is run by a management committee that reports to the Principal and MUARIK policy Committee. The members on this committee are:

- i) The Director (Chairperson)
- ii) The Farm Manager (Secretary)
- iii) Assist. Farm manager (Crops)
- iv) Training Coordinator
- v) Head Security
- vi) Head, Police Unit
- vii) Mechanisation and workshop unit head
- viii) Stores Assistant
- ix) General workers' supervisor
- x) Head of Dairy Value chain (DVC) Unit
- xi) The institute accountant

The dairy value chain (DVC) also has a steering committee with following membership:

- i) Principal, Chairperson
- ii) Director MUARIK, Secretary
- iii) DVC Coordinator,
- iv) Mrs Beatrice Byaruhanga, MAAIF
- v) Mr. Kanyike, Dairy farmer
- vi) Dr. Dennis Mpairwe
- vii) Dr. Justine Nambi
- viii) Representative from the Private Sector Foundation
- ix) Representative from Dairy Cooperation

6.1.4 Enterprises at MUARIK, their status and challenges

MUARIK is endowed with good soils, pasturelands, wetlands, woodlots (agroforestry, pine and eucalyptus), fish pond, stream, and a valley dam, all sitting on 230 hectares of land. A summary of the enterprises at MUARIK and brief notes about them is given in table 1 below:

Table 11: Enterprises at MUARIK

No	Enterprise	Status	Comment/Status/Challenge
1	Pastures	Active	<ul style="list-style-type: none"> ▶ A promising enterprise that is easy to manage and with low risk of theft from the surrounding community. ▶ Production is less than the market demand. ▶ The unit currently has positive margins and can be a good source of stable income. ▶ The area under production will be increased to at least 100 acres during season A of 2023. ▶ Biomass from the current pasture plots can be increased if manure/fertilisers are applied regularly.
2	Dairy	Active	<ul style="list-style-type: none"> ▶ This covers the whole dairy value chain from pasture/feed production to milk processing. ▶ There are currently 8 calves (3 male, 5 female) and 23 adults (1 male, 22 female). ▶ Milking and processing equipment was procured under the ADB HEST project. A milking parlour has been installed. A new generator was installed recently ▶ The unit has staffing challenges ▶ There is urgent need to replace the herd with better breeds.
3	Feed mill	Active	<ul style="list-style-type: none"> ▶ The feed mill was renovated and revamped under ADB HEST Project. ▶ It is currently being used by the KOICA/IBS for production of poultry feeds. ▶ This unit has very high potential for income generation but lacks investment capital
4	Silage production	Active	<ul style="list-style-type: none"> ▶ This unit has two large silage bankers and is occasionally used for production of silage for the Dairy Unit. ▶ There is high demand for silage and there are plans in place to plant an additional 8 acres of napier grass for silage production. ▶ The unit is generally underutilised due to limited funding to support additional pasture production.

5	Study tours and learning	Active	<ul style="list-style-type: none"> ▶ This is a potential high income generator for MUARIK. ▶ It had the highest annual income contribution to the institute before COVID 19 affected the visits. ▶ Agro tourism and short courses will be added to this unit soon.
6	Poultry	Active	<ul style="list-style-type: none"> ▶ The unit has a carrying capacity of about 10,000 birds. ▶ There are plans in place to revamp the unit to full capacity. ▶ There is more land within the unit that can be utilised to double the carrying capacity if funds become available. ▶ Existing poultry houses need significant renovation.
7	Piggery	Active	<ul style="list-style-type: none"> ▶ The piggery unit is one of the most potentially profitable units if investment and re-equipment is done. ▶ It has a potentially high and quick return on investment. ▶ It has been very difficult to run profitably due to lack of skilled labour, thefts and limited capital ▶ There is a need for more skilled labour and re-stocking with better breeds. ▶ The unit needs significant renovation.
8	Banana	Active	<ul style="list-style-type: none"> ▶ This plantation (10.5 acres) has been improved to a great extent ▶ There is high demand for bananas from the surrounding community. ▶ The main challenge for this enterprise is theft.
9	Annual crops	Active	<ul style="list-style-type: none"> ▶ Mainly maize (for livestock) and soybean (sold as seed to farmers) are grown. ▶ Yields are still low due to insufficient funding for fertiliser purchase. ▶ Low level of mechanisation of production and postharvest handling.
10	Horticulture	Active	<ul style="list-style-type: none"> ▶ There is an established mango fruit mother garden. ▶ The horticulture unit is being revived through collaboration with the Department of Agricultural Production. A trial unit has been established to test different species, varieties, and technologies prior to production on a large scale at the farm. This production will target the local market especially in Kampala.

11	Fish farming	Closed	<ul style="list-style-type: none"> ▶ This was also closed due to lack of staff and resources ▶ Two members of staff were recently allocated to this unit to help revive it.
12	Rabbit	Active	<ul style="list-style-type: none"> ▶ The unit was reactivated recently with the introduction of four breeds i.e. New Zealand White, Chinchilla, California White, and Flemish Giant.
13	Coffee	Active	<ul style="list-style-type: none"> ▶ About 7 acres of old (>30 years) plants are in production. ▶ All plants were cut back in 2021 and the plantation being revived. ▶ An additional 7 acres will be planted soon. ▶ There's a lack of adequate labour for maintenance. ▶ The unit needs support in procuring seedlings for planting during season A of 2023. Previous attempts to procure seedlings from UCDA over the last two seasons have not been successful.
14	Goat farming	Closed	<ul style="list-style-type: none"> ▶ Lack of staff was the main challenge.
15	Forestry	Active	<ul style="list-style-type: none"> ▶ About 4 acres of eucalyptus and 4 acres of pine trees were planted more than 20 years.

6.1.5. Progress made

i) Increase in banana plantation acreage: MUARIK has expanded the banana plantation and planted seven additional acres of a new plantation. The total acreage now stands at about 10.5.

ii) Renovation activities: With facilitation from CAES, MUARIK basic renovation was conducted at the poultry and piggery units which had been closed due to the poor state of the buildings. The farm office and stores were also recently painted.

iii) Soybean production: MUARIK has partnered with the Makerere University Centre for Soybean Improvement and Development, to become one of its out-growers. The acreage of the soybean has increased from 14 acres in 2020 to 53 acres in 2022.

iv) Pasture gardens expansion: To increase income and ability to feed animals, MUARIK has planted 80 acres of Chloris gayana pasture and 5 acres of elephant grass. This commercial pasture growing has increased the farm revenue from both seed production and hay. Sales from hay and pasture seed, as well as feeding of the livestock have improved. At least 20 new acres of Chloris Gayana will be planted in season A of 2023.

v) Stores records: Records are in place and updated regularly. Requisition books, material transfer notebook, bin cards and registers have been put in place. Accountability has improved as a result of ensuring that funds advanced to users are spent appropriately and items bought are received, checked, recorded and issued following store management procedures. The MUARIK store is now an independent unit.

vi) Coffee plantation improvement efforts: Although the coffee plantation maintenance and quality of the crops is still a challenge, MUARIK has an arrangement for MUARIK workers to weed the whole coffee plantation and plant annual crops as they maintain the plantation.

vii) Elimination of illegal water connections: In the plumbing section, MUARIK has been able to discover and disconnect five long standing illegal water connections with heavy consumption (including a school) to establishments neighbouring MUARIK. This has helped to regularise the supply of water to MUARIK units. New water lines have also been extended to units.

viii) Hosting of schools and institutions: The training mandate of the institute has shown great potential, and before the COVID 19 pandemic, the training component was generating aver 40% of the institute's revenues. In 2021/2022, MUARIK hosted 225 schools, and raised about 32 million Uganda shillings from study tours and service learners. For study tours, MUARIK trained 8,068 students, while 153 service learners were trained.

ix) Machinery repair: With support from CAES, the manure spreader, weeder, two disc ploughs, planter, reciprocating mower, and compound mower have been fully repaired. Field activities are expected to improve significantly due to reduced reliance on manual labour.

x) Student and staff projects: MUARIK has also hosted several student and staff projects. The list below contains selected undergraduate student projects, while table 2 indicates graduate and staff research projects and the respective researchers.

List of undergraduate student projects conducted at MUARIK in 2022

- i) Growth and yield response of lettuce to different nutrient sources and organic mulch.
- ii) Hatching induction of cysts of *Globodera* species isolated from soil.
- iii) Growth and yield response of carrot to soil amendments and spacing.
- iv) Incidence of vegetable seedling damping off in soils extracted from different depth.
- v) Morphological and pathogenic characterization of fungi associated with berry necrosis on Robusta coffee in Uganda.
- vii) Comparing the effectiveness of black soldier fly frass and organic fertilisers on growth rate of leaf lettuce (*Lactuca sativa*).
- viii) Effects of glyphosate application and seed inoculation on the growth characteristics and yield performance of cowpea.
- ix) Phenotypic variation in *Amaranthus* species from West Nile, Central, and Western Uganda.
Phenotypic variation in *Hibiscus* spp from West Nile, Eastern, and Northern Uganda.
- x) Evaluation of phenotypic variation and agronomic trait performance of different jute genotypes (*Corchorus* species) from Northern, Western, and Eastern Uganda.
- xi) Phenotypic variation in Spider plant (*Cleome gynandra*) from Northern, West Nile, Central, and Eastern Uganda.
- xii) Assessment of variability in phenotypic traits and agronomic performance among contrasting Ethiopian eggplant (*Solanum aethiopicum*) genotypes in Central Uganda.

- xiii) The effect of pinching on yield and quality of *Veronica longifolia* cut flowers.
- xiv) Quality of selected summer flowers under protected and open field production.
- xv) Growth and development of *Carthamus tinctorius*, *Gomphrena haagaena*, and *Callistephus chinensis* under low irradiance.
- xvi) The effect of gibberellic acid on growth and development of *Veronica longifolia*.
- xvii) Evaluation of the phenotypic performance of novel *Rosa hybrida* genotypes

No	Name of researcher	Research area
1	Dr. Fred Kabi	<ul style="list-style-type: none"> ▶ Waste management ▶ Unearthing the potential of earthworms
2	Dr. B. C. Katongole	Waste management
3	Assoc. Prof. Isa Kabenge	<ul style="list-style-type: none"> ▶ Irrigation systems
4	Prof. Philip Nyeko	Grasshoppers
5	Mr. G. Kyeyune	<ul style="list-style-type: none"> ▶ Mushroom production
6	Dr. Edema Richard	Cereal/ legumes (sorghum and cowpeas)
7	Prof. Dorothy Nakimbugwe	<ul style="list-style-type: none"> ▶ Edible insects
8	Assoc. Prof. Donaold Kugonza	Artificial insemination of pigs Breeding of indigenous chicken
9	Prof. Phinehas Tukamuhabwa	<ul style="list-style-type: none"> ▶ Soybean
10	Dr. Tonny Obua	Soybean
11	Assoc. Prof. S. B. Mukasa	<ul style="list-style-type: none"> ▶ Banana tissue culture ▶ Cassava disease resistance ▶ Potato breeding
12	Dr. G. Tusiime	Tomato breeding
13	Prof. J. S. Tenywa	<ul style="list-style-type: none"> ▶ Fertilisers
14	Assoc. Prof. J. B. Tumuhairwe	Fertilisers
15	Dr. Peter Ebanyat	<ul style="list-style-type: none"> ▶ Carbon sequestration

16	Dr. Emmanuel Opolot	► Water use efficiency and remote regulation
17	Dr. R. C. O. Okello	► Summer flowers
18	Dr. Thomas Odong	► Groundnut seed systems
19	Dr. Mildred Ochwo-Ssemakula	► Mango
20	Dr. A. Mwijje	► Wine grapes
21	Dr. Tonny Obua Dr. E. Nuwamanya	► African Indigenous Vegetables

6.1.6 Partnerships

MUARIK has MOUs with several institutions. These include:

- i) Chonbuk National University International Agriculture Development and Cooperation Center
- ii) Moon Agriculture and Processing Co Ltd.
- iii) Consortium for enhancing University Responsiveness to Agribusiness Development Limited (CURAD)
- iv) The Hive Uganda
- v) Mbuye Farm, Sese institute.

Partnerships that are being pursued include:

- i) Grainpulse Ltd: MUARIK is exploring the possibility of demonstrations and off taker arrangements with this company in the areas of horticulture, coffee, maize, soybean, and pastures.
- ii) AVSI Project: This is a Dutch Embassy funded project that works on youth skilling. MUARIK is having discussions with this project to set up trials on climate smart agriculture.
- iii) Wageningen University and Research: There are ongoing discussions on setting up model production units to demonstrate Nature Intensive Agriculture and a prototype for Tropical Horticulture Resilience.
- iv) Uganda Flowers Exporters Association: There are ongoing trials on summer flowers through a project funded by the Makerere Research and Innovation Fund.

6.1.7 Staff at MUARIK

MUARIK currently employs a total of 69 workers. A list of the workers at MUARIK is shown in table 3 below:

Table 13. List of Staff working at MUARIK

No.	Name	Title	Status	Paid by
1	Dr. R.C.O. Okello	Acting Director	Permanent	University
2	Natamba Leo	Farm Manager	Contract	University
3	Mr. Banjwa H. Samuel	Asst. Foreman	Permanent	University
4	Kiwanuka Robert	Tractor driver	Permanent	University
5	Okello Richard	Carpenter	Permanent	University
6	Musisi Vincent	Sanitary Cleaner	Permanent	University
7	Ntongo Edith	Sanitary cleaner	Permanent	University
8	Mwanda John	General Farm Worker	Permanent	University
9	Mutungire Bowers	General Farm Worker	Permanent	University
10	Toko George	General Farm Worker	Permanent	University
11	Nabwire Immaculate	General Farm Worker	Permanent	University
12	Male Stuart	General Farm Worker	Permanent	University
13	Nambaziira Harriet	General Farm Worker	Permanent	University
14	Nambooze Joyce	General Farm Worker	Permanent	University
15	Ssentamu Godfrey	General Farm Worker	Permanent	University
16	Nabisubi Kasifa	General Farm Worker	Permanent	University
17	Nuwagaba Abias	General Farm Worker	Permanent	University
18	Ndezaho Godfrey	General Farm Worker	Permanent	University
19	Nandawula Margret	General Farm Worker	Permanent	University
20	Nanfuka Harriet	General Farm Worker	Permanent	University
21	Zaguma Godfrey	General Farm Worker	Permanent	University
22	Balyegusa Samuel	Sanitary Cleaner	Permanent	University
23	Owor Julius	Security	Permanent	University
24	Ambayo Bosco	Security	Permanent	University
25	Draluma Godfrey	Security	Permanent	University

26	Mugisa Davis	Security	Permanent	University
27	Candia Patrick Oleya	Security	Permanent	University
28	Kigundi Godffrey	Security	Permanent	University
29	Nandulya Masala Paul	Security	Permanent	University
30	Kasaja Peter	Security	Permanent	University
31	Nuwagira Saxson	Plumber	No contract	MUARIK
32	Awalo Mercy	Training Coordinator	No contract	MUARIK
33	Azizi Dara Charles	Assistant Foreman -	No contract	MUARIK
34	Samanya Alex	Machinery	No contract	MUARIK
35	Nuwagira Saxson	Tractor Operator/Driver	No contract	MUARIK
36	Agaba Issa	Plumber	No contract	MUARIK
37	Byaruhanga Richard	General Farm Worker –Herdsman Supervisor	No contract	MUARIK
38	Aruho Benon	General Farm Worker - Herdsman	No contract	MUARIK
39	Muhereza Baram	General Farm Worker - Herdsman	No contract	MUARIK
40	Nabakooza Mary Imelda	General Farm Worker - Herdsman	No contract	MUARIK
41	Kariisa Julius	General Farm Worker - Poultry Unit	No contract	MUARIK
42	Kalenzi Festo	General Farm Worker - Banana Plantation	No contract	MUARIK
43	Eimani Stella	General Farm Worker - Horticulture	No contract	MUARIK
44	Nalugoye Grace	General Farm Worker - Laboratory Cleaner	No contract	MUARIK
45	Bareba John	General Farm Worker - Laboratory Cleaner	No contract	MUARIK
46	Nakigozi Annet	General Farm Worker - Crops	No contract	MUARIK
47	Namwanje Robinah	General Farm Worker - Crops	No contract	MUARIK
48	Nanfuka Sarah	General Farm Worker - Crops	No contract	MUARIK
49	Ndenzyaho Dominic	General Farm Worker - Pastures	No contract	MUARIK
50	Musinguzi Julius	General Farm Worker - Pastures	No contract	MUARIK

51	Ajawo William	Security Guard	No contract	MUARIK
52	Lejoruku Benson	Security Guard	No contract	MUARIK
53	Magino Richard	Security Guard	No contract	MUARIK
54	Edelu Francis	Security Guard	No contract	MUARIK
55	Angutoko Marlon	Security Guard	No contract	MUARIK
56	Lejuruko Patrick	Clerical Officer - Accounts	No contract	MUARIK

6.1.8 Finances

The institute income is banked on the College account and later recorded on the MUARIK page in the College ledger. The Principal CAES is the Principal signatory to all MUARIK accounts.

Table 14 below is a statement of major revenue sources and expenditure items in the period running from July 2018 to December 2022.

Table 14: Income and Expenditure for MUARIK, from July 2018 to December 2022

ENTERPRISE Incomes	2018	2019	2020	2021	2022	Total
Training	41,242,500	62,931,000	5,236,000	21,158,600	152,082,000	282,650,100
Poultry	19,050,500	19,766,800		17,549,000	118,609,750	174,976,050
Rabbits				0	0	0
Piggery	185,000	1,100,000	5,600,000	9,993,000	10,950,000	27,828,000
Horticulture	743,000	174,000	1,000	9,271,500	422,500	10,612,000
Pastures	9,689,500	37,385,000	24,202,300	60,358,800	116,827,500	248,463,100
Crops				26,400,600	91,702,800	118,103,400
Bananas	5,371,200	7,608,100	5,664,600			18,643,900
Coffee	1,777,100	78,000	802,600			2,657,700
Machinery & Land	6,065,000	8,244,500	6,000,000	31,587,200	10,000,000	61,896,700
Annual Crops		1,740,000	5,779,000			7,519,000
OI&E		1,248,000	74,000	28,384,000	5,850,000	35,556,000
Plumbing						0
User fees & Fines						0
DVC	44,006,400	57,707,700	36,559,300	56,057,400	31,335,900	225,666,700
Total	128,130,200	197,983,100	89,918,800	260,760,100	537,780,450	1,214,572,650
ENTERPRISE Expenditure	2018	2019	2020	2021	2022	Total
Training	3,782,000	6,373,500	111,000	3,003,000	20,859,500	34,129,000
Poultry	27,312,300	20,348,400	5,156,500	35,229,900	121,385,300	209,432,400
Rabbits					1,190,000	1,190,000
Piggery	2,003,800	2,862,700	4,608,900	9,884,700	5,947,350	25,307,450
Horticulture	745,800	172,000	130,000	1,803,000	126,000	2,976,800
Pastures	2,427,400	8,367,200	9,231,200	10,729,000	19,139,400	49,894,200
Crops				13,746,950	33,001,100	46,748,050
Bananas	1,039,100	672,000				1,711,100
Coffee						0
Machinery & Land	14,479,000	26,447,700	13,025,100	29,488,700	23,860,500	107,301,000
Annual Crops		4,038,200	6,124,500			10,162,700
OI&E	4,473,500	8,362,700	5,648,200	26,601,580	58,584,940	103,670,920

Userfees & Fines						0
DVC	60,726,900	129,353,900	40,238,395	37,928,900	17,339,200	285,587,295
Compound						0
Acquaculture						0
Stores					13,020,100	13,020,100
Security						0
Office	2,373,500	3,997,000	2,662,700	6,594,700	13,362,500	28,990,400
Labour	19,071,500	40,762,600	23,060,000	96,985,000	145,608,400	325,487,500
Total	138,434,800	251,757,900	109,996,495	271,995,430	473,424,290	1,245,608,915
Profit Margin	-10,304,600	-53,774,800	-20,077,695	-11,235,330	64,356,160	-31,036,265

6.1.9 Challenges at MUARIK

i) Staffing

MUARIK's staffing challenges stem from both lack of sufficient numbers and lack of technical skills. For a long time, MUARIK's workers who retire or get transferred have not been replaced. This greatly contributes to low levels of production, and high levels of inefficiency including thefts. Thefts due to lack of sufficient security are mainly from without the farm. University property and resources are also liable to theft from within due to lack of enough staff to create checkpoints within the institute system. There is a need to re-equip the institute with skilled staff. To fill some of these gaps temporarily, MUARIK has resorted to hiring temporary staff, which is very expensive. Table 5 below shows the number of staff existing at MUARIK compared to the number required at the institute. At the moment; only 16% of the positions in the new MUARIK establishment are filled up and paid for by the University.

Table 15: Staffing needs at MUARIK

Position name	Old establishment	New establishment	Filled and on payroll	Vacant	Paid by MUARIK
Director	1	1	Acting		
Farm Manager	1	1	1		
Assistant Farm Manager	4	1		1	
Accounts Clerk	1				1
Secretary	1				1
Foreman	7	7		7	
Assistant Foreman	14	3	1	2	2
Headman	1				
Plumber	2				1
Electrician	2				
Poultry attendant	4				
General Farm Workers (GFW)	160	200	19	181	19
Security	11		8		6
Receptionist/Office	1				
Messenger	2				
Cleaners	2	2	2		
Sanitary Cleaners	2				
Stockman	1				
Messenger	2	1	1		
Driver	2	8	2	6	
Tractor Operator/Driver	1				
Turn Boy	2				
Recorder					

Store Keeper	2	1	1		
Mechanic	2				
Herdsmen	4				
Feed Mill Technician	1				
Training Coordinator	2				1
Carpenter		3	1	2	
Dairy Value Chain Coordinator					1
Total	235	228	37	199	32

ii) Poor financial status

MUARIK's financial status is challenging and derails all efforts to operate efficiently. The institute has no budget vote from the centre. Because of this, there is under-investment in units that would otherwise generate profits. These are currently underperforming, many in the negative as shown in table 5. Many of MUARIK's units are operating below break-even because of lack of resources to invest and upgrade the units. It is also not possible to maintain infrastructure due to limited resources. Maintenance, repair and servicing of equipment is also regularly affected by lack of funds. There is a need to have a budget for MUARIK from the centre to allow sufficient investment in units with high potential. Alternatively, all units need to be evaluated, levels of investment required established, and then financed accordingly, in order to support themselves.

iii) Unclear policies on use of MUARIK infrastructure

There is a need for clear guidelines to both MUARIK and sister departments on use of MUARIK facilities. Such can include rules on changes on buildings (e.g. renovations), fees to be paid for land use, cutting/planting of trees, planting of crops beyond one season, among others. For example, the School of Forestry, Environmental, and Geographical Sciences alone occupies 65 acres of MUARIK land (woodlot, bamboo, and botanic garden).

6.1.10 Opportunities at MUARIK

MUARIK presents numerous opportunities:

i) Land resources: The large acreage at MUARIK totaling 230 hectares (562.5 acres) has high potential for training students in a variety of crop, forestry and animal enterprises including development of skills using the existing wood and metal workshops.

ii) Proximity to urban area and to NaCRRI: MUARIK has excellent access to a ready market with good road connection to both Kampala city and NARO's National Crop Research Resources Institute at Namulonge.

ii) Academic and support staff: MUARIK has access to CAES's technical staff with much endowment of skills and knowledge in the fields of agriculture, food, forestry and environmental sciences. MUARIK has an excellent opportunity to use these skills by engaging in profitable enterprises for food production, value addition and environmental management to make a significant contribution towards food and nutritional security at Makerere University and the country.

iv) Outreach: The farm usually receives pupils and students interested in physical observation of machinery, tools, forage, weed, pests and diseases specimens that are covered in the school curriculum but not easily available in schools. The farm also receives farmers and other visitors interested in learning how to produce organic pigs, coffee and fruit tree seedlings, flowers, grafting, mixing feeds, produce hay bales, compost manure, and local/crossed chicken. Some companies promoting new crop varieties, agrochemicals are interested in establishing roadside demos.

v) Proposed short training courses: Due to high demand of short duration training in the field of general Agriculture, a training program focusing on holiday makers, school drop outs, farmers and general public interested in Agriculture can be started.

6.1.11 Critical areas for improvement

To keep MUARIK standards and expectations high, the following issues need to be urgently addressed:

i) Renovation of roads, bridges, and buildings, including improvement of all infrastructure, and internet access. Septic tanks in residential areas and student hostels present a major risk to the residents. Pit latrines in the labour quarters are in a sorry state. There is an urgent need to construct new pit latrines.

ii) Safeguarding of land borders: This is critical and urgent as the land boundaries are insecure on all sides

iii) Improved staffing with skilled labour: The number and skill levels of staff need to be improved. Recruitment should be very specific with the required skills in order to beef up the technical knowhow of the current workforce.

iv) Financing of units to required minimum capital. Units at the institute will only cover their running costs if intentional investments are done. There is a need to conduct investment analysis of the units. Under investment is leading to sinking of resources.

v) Inclusion of MUARIK on the university budget: MUARIK needs to be included in the university central budget in order to be able to run efficiently as a teaching and research institute.

vi) Prioritisation of the research arm of MUARIK: Currently the institute does not have core researchers but hosts research of staff and students from the main campus. Ongoing research in the Departments at CAES as well as all research projects running at the institute are largely delinked from crop and livestock production processes and activities at MUARIK. Deliberate efforts are being made to bring on board students who performed well at undergraduate level. There are two former BSc. Horticulture students working directly with the office of the Director in the area of Horticulture.

For MUARIK to take up and consolidate its position in agricultural research it will require recruitment of full time scientists dedicated to core research at MUARIK. Alternatively, academic staff should be identified and mandated to dedicate a percentage of their time to research at MUARIK.

Table 16: House occupants at MUARIK

House No.	Name of Occupant(s)	Designation	Department/Status
K1	Azizi Dara Charles	Agr. Engineer	Retired from MUARIK but still in house
K2	Mutalemwa Fred	Custodian	Dean of students
K3	Lubogo Frank	Library Assistant	Library
K4	Hajji Mubiru	Driver	CAES
K5	Okello Richard	Carpenter	MUARIK
K13	Ssevume Geoffrey	Library Assistant	Library
K14	Nabisibi Kasifa	GFW	CAES
K15	Taremwa Precious	Dairy Value Chain	MUARIK
K16	Kasaija Peter	Security	Security
K17	Bako Natalia	GFW	Retired but still in house CAES
K18	Karungi Stella	GFW	Retired but still in house MUARIK
K19	Emami Stella	Cleaner	CAES
K20	Wairagara B.	Driver	CAES
K21	Owor Julius	Security	Security
K22	Mugisha Davis	Security	Security
K23	Draluma Geoffrey	Security	Security
K24	Angala Luis	Security	Retired but still in house
K25	Philip Basasibwaki	Dairy Unit	MUARIK
K26	Ndezaho Geoffrey	GFW	MUARIK
K27	Nambazira Harriet	GFW/Recorder)	CAES
K28	Nandulya Paul	Security	Security
K30	Toko George	GFW	MUARIK
K31	Ogwanga Charles	Salesman	MUARIK
K32	Tibakuzira E	Technician	MUARIK
K33	Atiku Kennedy	Security	MUARIK
K34	Ajawo William	Security	MUARIK
A1	Candia Patrick	Security	Security
A2	Zaguma Godfrey	GFW	CAES
B1	Kariisa Julius & Mark	Dairy Value Chain	MUARIK
B2/7,8	Nuwagaba Abias	GFW	CAES
C1	Agaba issa	Dairy Value Chain	MUARIK
C2/11,12	Siliman Ibrahim	Security	Security
D1	Kalenzi Festo	GFW	MUARIK
D2	Namutebe Annet	GFW	CAES
E1	Samanya Alex	Tractor Operator	CAES
E2	Limbo Janet	None	Husband, a MUARIK worker died still in house
F1/29,30	Ntongo Judith	GFW	CAES
F2/31,32	Kitikyamuwogo	Electrician	CAES
G1/25,26	Emmanuel B. Ambayo Bosch	Security	Retired but still in the house, MUARIK Security

G2 /27,28	Nema Pasutho	None	Husband, a MUARIK worker, died. The wife still in house CAES
NKORE HOUSE	Candia Alice	Prog Assistant	MaRCCI, Agric. Production
PAPAYA HOUSE 01	Dr. Albert Chiteke	Senior Breeder	MaRCCI, Agric. Production
02	Dr. Dramadri Isaac	Cowpea Breeder	MaRCCI, Agric. Production
03	Badari Herbert	Technical	MaRCCI, Agric. Production
ARABICA HOUSE 1 and 2	Rock Security	Security, MARCCI	MaRCCI, Agric. Production
ROBUSTA HOUSE 01	Tusiime Richard	Graduation Fellow	MaRCCI, Agric. Production
02	Nalule Habibah	Lab Technician	MaRCCI, Agric. Production
NGANDA HOUSE	Students/MSC	MSC Students	MaRCCI, DAP
PAMPA HOUSE	Students	MSC/PHD	MaRCCI, DAP
CHAI HOUSE	Students	MSC/PHD	MaRCCI, DAP
ZEBU HOUSE	Students	MSC/PHD	MaRCCI, DAP

6.2 The Makerere University Biological Field Station (MUBFS)



Background

Makerere University Biological Field Station (MUBFS) is a unit of the College of Agricultural and Environmental Sciences (CAES) located in Kibale National Park, Kabarole district. The station has two research sites in Kibale National Park and is accessed through a Memorandum of Understanding between CAES and the Uganda Wildlife Authority. The current MoU covers ten (10 years) and was signed on the 11th of November 2015. The main research site is located at Kanyawara at the edge of Kibale National Park about 16 Kilometres from Fort Portal town while a smaller camp is located in the heart of the park at Ngogo. Both sites are easily accessible by road and users of the station facilities are charged fees as per the established structure (Appendix I). With the tremendous species diversity in Kibale National Park, the station offers endless research opportunities. It is mainly known the world over for its research track record on primates notably: chimpanzees (*Pan troglodytes*), the red colobus monkeys (*Procolobus rufomitratus*), Blue monkeys (*Cercopithecus mitis*), red tail monkeys (*Cercopithecus ascanius*), gray-cheeked mangabey (*Cercocebus albigena*), and black-and-white colobus (*Colobus guereza*). However, research interests have expanded beyond primates to include: (1) ecological and behavioural studies of other taxa including fish, birds, insects, and amphibians; (2) forest regeneration; (3) long-term ecological monitoring, including climatic monitoring, plant phenological patterns, swamp and river limnology, fish populations; and (4) socio-economic and socio-ecological studies, including studies of the effects of animal crop raiding and human-wildlife interactions.

► MUBFS Mission Statement

Makerere University Biological Field Station is committed to undertaking and providing opportunities for high quality, multi-disciplinary research and education in tropical ecosystems, with the underlying objective of contributing to the conservation and development needs of Kibale National Park and its surrounding ecological and human communities. The mission hence fits well in the Makerere University's strategic plan and long term desire of being a "Research Driven University Emphasising Knowledge Transfer Partnerships and Networking".

► Research activities at MUBFS

Research at MUBFS can be carried out with attachment to any of the two main study sites, but the MoU between Uganda Wildlife Authority and Makerere University allows MUBFS' researchers to conduct research outside these two designated sites.

There are a number of on-going research projects by local and international scholars including research on:

- Ecological and Behavioural studies of various primate species
- Forest regeneration in logged and formerly encroached areas.
- Long-term ecological monitoring of Kibale National Park Ecosystems.
- Socio-Economic and ecological studies including crop raiding by park wildlife.
- Disease transmission among wildlife, domestic animal and humans
- The recovery of biodiversity in tropical rainforests following human-induced disturbance (Using insects as indicators)
- The nutrition of primates in Kibale National Park

► Human Resource

The establishment of MUBFS has 36 positions, but of these only 05 and 20 are filled on permanent and contract terms respectively as indicated in Table 1 below, with most being on contract terms and paid locally within the budget of MUBFS.

Table 17: Summary of the Human resource at MUBFS

No	Position	Name	Contract Type
1	Director	David Mwesigye Tumusiime	Permanent
2	Accountant	Herbert Tumukunde	Permanent
3	Librarian	Janet Tumushabe	Permanent
4	Clerk Of Works	Berunga Winifred	Permanent
5	Assist. Domestic Bursar	Kato Innocent Mwesige	Contract
6	Security Guard	Kasaija Ebenezer	Contract
7	Security Guard	Mugisa Expedito	Contract
8	Security Guard	Andrew Byaruhanga	Permanent

9	Trail Cutter	Rutenta Wilson	Contract
10	Trail Cutter	Bamukusa Francis	Contract
11	Trail Cutter	Nyakahuma Richard	Contract
12	Trail Cutter	Atuhaire Samuel	Contract
13	Trail Cutter	Birungi Charles	Contract
14	Trail Cutter	Katuramu Clovis	Contract
15	Trail Cutter	Kisembo Vicent	Contract
16	Headman	Kugonza Robert	Contract
17	Trail Cutter	Kusemererwa Charles	Contract
18	Driver	Kyalimpa Wilson	Contract
19	Trail Cutter	Tibeya Adolphus	Contract
20	Trail Cutter	Zahura James	Contract
21	Trail Cutter	Sabiiti Charles	4-Year Contract
22	Cook	Kakyo Malyamu	Contract
23	Driver	Sembatya Paul	Contract
24	Messenger	Tumusiime Yosinta	4-Year Contract
25	Store Man	Kemigisa Patience	Contract

► Achievements

The field station has progressively made several achievements and here below is a summary of some of the most recent ones.

► Continuation of long-term data collection

In line with its mission, MUBFS continues to collect data on a variety of aspects of the Kibale tropical ecosystem and its surrounding human community. These include:

a) Censuses of all primate and terrestrial mammal densities, including elephants. We have a 50+ year record of population dynamics of primates and a 30-year record for elephants. These results are extremely positive as the abundance of all of the populations that we have monitored have increased.

b) Monitored changing leaf, flowering, and fruiting patterns of tree species used by primates and terrestrial mammals, for which we have continuous data since 1970.

c) Monitoring of elephant movement through genetically identifying individuals by sampling DNA in the dung and by following track of groups after they leave a crop raiding site. We have been successful at getting DNA from elephant dung already (Omeja et al. 2017). Trials at following tracks have been successful at following crop raiding individuals for up to 3 km into the park.

d) Continuation of the collection of behavioural data on the Chimpanzee and Monkey communities at Kanyawara and Ngogo areas.

► Publications

Over 500 research papers and book chapters have been published from research conducted at MUBFS. These are all available in our library and can be accessed online.

► Improved online presence

The field station has obtained a domain from DICTS and created a website <https://bfs.mak.ac.ug/> which has improved online presence. This has been handy during the Covid-19 lockdown and improved visibility of the station. Given the contacts initiated through this medium, it is hoped that there will be more opportunities for collaborative activities in research, training, and community outreach in the near future.

► Improved relevance of the station to Mak

Over the years, the field station has improved its relevance to Mak through hosting field courses and internships for students from the Colleges of Agricultural and Environmental Sciences (CAES), Natural Sciences (CONAS), COVAB and CEES.

The field station is also a popular site for student research for MSc. and PhD studies.

Table 18: Land owned by MUBFS and covered by tree plantations

S/N	Description	Physical Location	Date of Acquisition	Acres
1	Tree Plantation-Parcel 1	MUBFS-Kanyawara (Kabarole District)	1994	9.306
2	Tree Plantation-Parcel 2	MUBFS-Kanyawara (Kabarole District)	1994	1.829
3	Tree Plantation-Parcel 3	MUBFS-Kanyawara (Kabarole District)	1994	2.182
4	Tree Plantation-Parcel 4	MUBFS-Kanyawara (Kabarole District)	1994	7.392
5	Tree Plantation-Parcel 5	MUBFS-Nkingo (Kamwenge District)	1994	18.82
6	Tree Plantation-Parcel 6	MUBFS-Nkingo (Kamwenge District)	1994	0.411
7	Tree Plantation-Parcel 7	MUBFS-Nkingo (Kamwenge District)	1994	0.3
				40.24

► Collaborations Initiated

MUBFS continues to expand collaborations with other national and international institutions. Some of the latest collaborations include:

MUBFS continues to expand collaborations with other national and international institutions. Some of the latest collaborations include:

i) Canada-South Africa trilateral Research Chair in climate change and human-wildlife interactions (2018 – 2023)

The collaboration, funded by The International Development Research Centre (IDRC – Canada), is a trilateral partnership between Makerere University, McGill University, and the University of KwaZulu-Natal in South Africa. It focuses on human-wildlife interactions, involving the rural poor people and how they are affected by climate change and aims to predict how climate change will exacerbate human-wildlife conflicts, and design and test measures to mitigate climate change impacts on the rural poor and wildlife. The collaboration has already been funded by MSc. Students and one on-going PhD study.

Within this collaboration, we have developed an elephant odor gun that can spray an aerosolized liquid into the air and the smell of that liquid spreads rapidly. The gun is made of locally available PVC pipe, and with the exception of a 25 cent washer, can all be bought and easily built in Uganda. With the aid of an Evolutionary Chemist at Ulm University in Germany we have developed a number of scents that elephants should not like (none would hurt the animals or children if they were exposed to them or sprayed in the eye). We have permission to test what chemical the elephants appear to find very disgusting and move away from for a captive group of rehabilitant elephants in South Africa.

ii) Max Planck Institute of Animal Behavior, Germany (2021-2023)

The collaboration seeks to further research programs for the study of the behavioural ecology of non-human primates in and around Kibale National Park and at Makerere University Biological Field Station. The collaboration is already nurturing one former student of the Department of Environmental Management, Mak, for long term field research of the red colobus monkey.

iii) Community-based design research – Washington University, St.Louis(2021-2024)

A community-based design research project is being undertaken in partnership with people who live near Kibale National Park and the goal is to craft messages and symbols that will reinforce positive and safe human-wildlife interactions.

► Challenges

Limited Human Resource

MUBFS has a number of vacant yet established positions and many of which are critical (Table 4). For example, the trail cutters are inadequate to maintain 8 acres of compounds, 25 km of access roads, 170 km trail system at Kanyawara, and 60 km trail system at Ngogo. It is important to note that this trail system must be maintained for easy and reliable access to the interior of the forest, which makes MUBFS a popular site for field courses and long term research activities. Many of these trails also serve as boundaries of long term plots for monitoring vegetation changes in the forest, some stretching as far back as 1975.



08 CAES PUBLICATIONS

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A P P E N D I X



07

HUMAN RESOURCES

7.1 Appointments, promotions and confirmations

The College human resource consists of 400 employees, 170 Academic staff of whom 140 are PhD holders at a ratio of 20% female, with 19 faculty at the rank of professor and 31 at the rank of Associate Professor. A number of staff were appointed and others promoted and confirmed into University service as per table below.

Table 19: Appointments, promotions, confirmations and resignations

No	Name	Department	Rank
1.	Dr Paul Mugabi	Forestry, Biodiversity and Tourism	Associate Professor
2.	Dr Grace Nakabonge	Forestry, Biodiversity and Tourism	Associate Professor
3.	Dr Justine Namaalwa	Environmental Management	Associate Professor
4.	Dr Nicholas Kiggundu	Agricultural and Biosystems Engineering	Associate Professor
5.	Dr David Mfitumukiza	Geography, Geoinformatics and Climatic Sciences	Associate Professor
6.	Dr Patrick Byakagaba	Environmental Management	Senior Lecturer
7.	Dr Rosemary Emegu Isoto	Agribusiness and Natural Resource Economics	Senior Lecturer
8.	Dr Alex Nimusiima	Geography, Geoinformatics and Climatic Sciences	Senior Lecturer
9.	Dr Gregon Olupot	Agricultural Production	Senior Lecturer
Fresh Appointments			
1	Mr. Denis Nsubuga	Agricultural and Biosystems Engineering	Assistant Lecturer
2	Ms. Asha Nalunga	Agribusiness and Natural Resource Economics	Assistant Lecturer
Ordinary contracts			
1	Mr. Sam Cherotich	Agricultural and Biosystems Engineering	Assistant Lecturer
2	Mr. Francis Okori	Agricultural and Biosystems Engineering	Assistant Lecturer
3	Ms. Elizabeth Ahikiriza	Agribusiness and Natural Resource Economics	Assistant Lecturer
4	Mr. Dickson Biryomumaisho	Extension and Innovation Studies	Assistant Lecturer
Confirmations			
1	Ms. Catherine Mulinde	Geography, Geoinformatics and Climatic Sciences	Lecturer
2	Mr. Samuel H. Banjwa	MUARIK	Assistant Foreman
3	Mr. Moses Musoma	MUARIK	Tractor Driver
4	Mr. Robert Kiwanuka	MUARIK	Tractor Driver
5	Mr. Vincent Musisi	MUARIK	Sanitary Cleaner
6	Mr. John Mwanda	MUARIK	General Farm Worker
7	Mr. Bowers Mutungire	MUARIK	General Farm Worker
8	Mr. Yusuf Kaaja	MUARIK	General Farm Worker
9	Ms. Immaculate Nabwire	MUARIK	General Farm Worker
10	Mr. Stuart Male	MUARIK	General Farm Worker
11	Ms. Harriet Nambaziira	MUARIK	General Farm Worker
12	Ms. Edith Ntogo	MUARIK	Sanitary Cleaner

13	Mr. George Toko	MUARIK	General Farm Worker
14	Mr. Abias Nuwagaba	MUARIK	General Farm Worker
15	Mr. Moses Twesigye	MUARIK	Store Keeper
16	Mr. Godfrey Ndezaho	MUARIK	General Farm Worker
17	Ms. Joyce Namboze	MUARIK	General Farm Worker
18	Mr. Godfrey Ssentamu	MUARIK	General Farm Worker
19	Ms. Kasifa Nabisubi	MUARIK	General Farm Worker
20	Ms. Margaret Nandawula	MUARIK	General Farm Worker
21	Ms. Harriet Nanfuka	MUARIK	General Farm Worker
22	Mr. Godfrey Zaguma	MUARIK	General Farm Worker
23	Mr. Godfrey Musisi	MUARIK	General Farm Worker
Post Retirement Contracts			
1	Dr Denis Mpairwe	Agricultural Production	Associate Professor
2	Professor Archileo Kaaya Natigo	Food Technology and Nutrition	Professor
3	Prof. Yabezi Banana Abwoli	Forestry, Biodiversity and Tourism	Professor
Resignations			
1	Ms. Benny Kaitesi	Food Technology and Nutrition	Sanitary Cleaner
2	Mr. Jude Muhairwe	Office of the Principal	Custodian

Table 20: Staff Establishment

College / Administrative Unit			
College of Agricultural and Environmental Sciences			
Name Of College Principal or Head Or Administrative Unit			
Prof. Gorettie Nabanoga			
S/N	Name Of Staff	Position	Gender
Administrative Staff			
1	Jofrina Kyohairwe	College Registrar	F
2	Tom Vok Elwana	Accountant/ Team Leader	M
3	Annet Naluyinda	Accountant	F
4	George William Opee	Accountant	M
5	Harriet Hawa Juma	Principal Human Resource Officer	F
6	Mary Nantale	Administrative Secretary 1	F
7	Christine Apolot Oditte	Senior Administrative Assistant	F
8	Grace Apili	Senior Administrative Assistant	F
9	Dan Kiganda	Assistant Registrar	M
10	Kabejja Hasifa	Principal Communications Officer	F
11	Kasemiire Mariam	Wed Administrator	F
Support Staff			
12	Hamba Loyce	Secretary	F

13	Anyaku Isaac	Custodian	M
14	Peter Walusimbi	Driver	M
15	Ntambi Jimmy	Driver	M
16	Magal Joseph	Security Guard	M
17	Kibirango Charles	Security Guard	M
18	Kidyani Paul	Security Guard	M
19	Kabanda Margaret	Library Assistant	F
20	Ms. Gorreti Aguttu	Principal Technician	F
21	Ms. Maria Nalukwago	Cleaner	F
22	Mr. Jonnes Sserugendo	Cleaner	M
23	Ms. Immaculate Nakafeero	Pool Stenographer	F
24	Dorothy Nabakabya	Senior Technician	F
25	Ambrose Atwine	Technician	M
26	Jessica Kaahwa	Copy Typist	F
27	Ponsiano Sendegeya	Lab Attendant	M
28	Kaitsei Benny	Sanitary Cleaner	M
29	Nasanga Juliet	Cleaner	F
30	Namubiru Justine	Cleaner	F
31	Namudu Sarah	Cleaner	F
32	Naggayi Teddy	Messenger/Cleaner	F
33	Ndagire Aidah	Sanitary Cleaner	F
34	Kisitu Daniel	Computer Technician	M
35	Nanteza Florence	Library Assistant	F
36	Tumwesigye Phoebe	Administrative Assistant II	F
37	Namirembe Goretti	Sanitary Cleaner	F
38	Nanziri Sarah	Administrative Secretary III	F
39	Nalwanga Shiffah	Messenger	F
40	Namazzi Mayanja Gorretti	Head Cleaner	F
41	Namukwaya Margaret	Cleaner	F
42	Kiggundu Habibu	Cleaner	M
43	Birungi Rose	Cleaner	F
44	Mwiyeretsi James	Sanitary Cleaner	M
45	Nassanga Costance	Sanitary Cleaner	F
46	Musaazi Matthias	Security Guard	M
47	Kato Tom	Driver	M
48	Buzimwa Muhammadi	Turn Boy	M
49	Wairagala Bonny	Turn Boy	M
50	Alelo Christine	Security Guard	F
51	Mutebi Emmanuel	Senior Technician	M
52	Mzee Patrick	Laboratory Assistant	M
53	Najjuma Christine	Technical Assistant	F
54	Nagaddya Harriet	Lab. Attendant	F
55	Kawooya Teddy Mary	Lab. Attendant	F
56	Nabimanya Deborah	Cleaner/Messenger	F
57	Kyobutungi Edith	Cleaner/Messenger	F
58	Kabonesa Grace	Cleaner	F

59	Bukenya Joseph	Labourer	M
60	Nanozi Margaret	Cleaner/Messenger	F
61	Muhereza Richard	General Farm Worker	M
62	Onyera Mary	Gardener	F
63	Nantale Agnes	General Farm Worker	F
64	Nakaana Peninah	Copy Typist	F
65	Mr. Andrew Otim	Technician	M
66	Mr. James Kaddu Makubuya	Technician II	M
67	John Tumwijukye	Ox-Man	M
68	Mr. Ronald Nsobya	Ox-Man	M
69	Nakalema Imelda	Messenger/Cleaner	F
70	Nanyonga Annet	Senior Copy Typist	F
71	Nambatya Ruth	Copy Typist	F
72	Kasujja Geoffrey	Lab. Assistant	M
73	Ndagire Deborah	Cleaner/Messenger	F
74	Naggayi Teddy	Messenger/Cleaner	F
75	Ndagire Aidah	Sanitary Cleaner	F
76	Nankunda Bennet	Custodian	F
77	Nakiyemba Consolata	Administrative Secretary II	F
78	Namukwaya Ruth	Lab. Attendant	F
79	Ssentomero Dan	Technician I	M
80	Kusemererwa Aggrey	Driver	M
81	Sombi Kella	Cleaner	M
82	Nagawa Maimuna	Sanitary Cleaner	F
83	Musoke Harriet	Cleaner	F
84	Namukwaya Margaret	Cleaner	F
85	Natamba Leo	Farm Manager	M
86	Mr. Banjwa H. Samuel	Asst. Foreman	M
87	Kiwanuka Robert	Tractor Driver	M
88	Okello Richard	Carpenter	M
89	Musoma Moses	Driver	M
90	Musisi Vincent	Sanitary Cleaner	M
91	Ntongo Edith	Sanitary Cleaner	F
92	Mutungire Bowers	General Farm Worker	M
93	Toko George	General Farm Worker	M
94	Kaaja Yusuf	General Farm Worker	M
95	Nabwire Immaculate	General Farm Worker	F
96	Male Stuart	General Farm Worker	M
97	Nambaziira Harriet	General Farm Worker	F
98	Musisi Godfrey	General Farm Worker	M
99	Nambooze Joyce	General Farm Worker	F
100	Ssentamu Godfrey	General Farm Worker	M
101	Nabisubi Kasifa	General Farm Worker	F
102	Nuwagaba Abias	General Farm Worker	M
103	Ndezaho Godfrey	General Farm Worker	M
104	Nandawula Margret	General Farm Worker	F
105	Nanfuka Harriet	General Farm Worker	F

106	Zaguma Godfrey	General Farm Worker	M
107	Balyejusa Samuel	General Farm Worker	M
108	Tumukunde Herbert	Clerical Officer - Accounts	M
109	Berunga Winfred	Clerk Of Works	F
110	Tumushabe Jannet	Library Assistant	F
111	Byaruhanga Andrew Simon	Security Guard	M
112	Tumusiime Yosinta	Office Messenger	M
113	Sabiiti Charles	Trail Cutter	M
Department of Agricultural Production			
118	Kyamanywa Samuel	Professor	M
119	Tukamuhabwa Phinehas	Professor	M
120	Basamba Ali Twaha Ateenyi	Associate Professor	M
121	Karungi Jeninah	Associate Professor	F
122	Talwana Herbert	Associate Professor	M
123	Kabi Fred	Associate Professor	M
124	Mukasa Settumba Blasio	Associate Professor	M
125	Kugonza Donald Rugira	Associate Professor	M
126	Mpairwe Denis R	Associate Professor	M
127	Tumuhairwe John Baptist	Associate Professor	M
128	Nambi-Kasozi Justine	Senior Lecturer	F
129	Tusiime Geofrey	Senior Lecturer	M
130	Edema Richard	Senior Lecturer	M
131	Ebanyat Peter	Senior Lecturer	M
132	Katongole Constantine Bakysa	Senior Lecturer	M
133	Bisikwa Jenipher	Senior Lecturer	F
134	Ochwo Ssemakula M K N	Senior Lecturer	F
135	Katuromunda Sylvester	Senior Lecturer	M
136	Odong Thomas Lapaka	Senior Lecturer	M
137	Wasswa Peter	Senior Lecturer	M
138	Tibayungwa Francis	Lecturer	M
139	Olupot Giregon	Lecturer	M
140	Walusimbi Sadhat	Lecturer	M
141	Zziwa Emmanuel	Lecturer	M
142	Ongom O Robert Cyrus	Lecturer	M
143	Opolot Emmanuel	Lecturer	M
144	Taulya Godfrey	Lecturer	M
145	Musinguzi Patrick	Lecturer	M
146	Nuwamanya Epraim	Lecturer	M
147	Alou Isaac Newton	Lecturer	M
148	Mwije Anthony	Lecturer	M
149	Tibezinda Mary	Assistant Lecturer	F
150	Kamatara Kanifa	Assistant Lecturer	F
151	Magala Henry	Assistant Lecturer	M
152	Idibu Joachine	Assistant Lecturer	M
153	Simon John Bright Habinshuti	Assistant Lecturer	M
154	Obua Tonny	Assistant Lecturer	M

155	Lutakome Pius	Assistant Lecturer	M
156	Nampijja Zainah	Assistant Lecturer	F
157	Nyamaizi Sylvia	Assistant Lecturer	F
158	Kyeyune Gerald	Chief Technician	M
159	Kiirya David	Chief Technician	M
160	Serunjoji Katende Steven	Principal Technician	M
161	Natumanya Robert	Principal Technician	M
162	Kakooza Lydia	Principal Technician	F
Department Of Agribusiness And Natural Resource Economics			
163	Gabriel Elepu	Senior Lecturer/Head	M
164	Bernard Bashaasha	Professor	M
165	Johnny Mugisha	Professor	M
166	Dick Sserunkuuma	Professor	M
167	Theodora.S. Hyuha	Assoc. Professor	M
168	Mukadasi Buyinza	Professor /Academic Registrar	M
169	Fredrick Bagamba	Senior Lecturer	M
170	Jackline Bonabana-Wabbi	Associate Professor	F
171	Gracious. Diiro	Senior Lecturer	M
172	Rosemary Isoto	Lecturer	F
173	Stephen Lwasa	Lecturer	M
174	Ilukor John	Lecturer	M
175	Alice Turinawe	Lecturer	F
176	Alex Tatwangire	Lecturer	M
177	Florence Lwiza Nsereko	Lecturer	F
178	George Omiat	Assistant Lecturer	M
179	Paul Aseete	Assistant Lecturer	M
180	Elizabeth. Ahikiriza	Assistant Lecturer	F
Department of Extension and Innovation Studies			
181	Turyahabwe Nelson	Professor	M
182	Agea Jacob Godfrey	Professor	M
183	Najjingo Mangheni M K	Associate Professor	F
184	Kibwika Paul	Associate Professor	M
185	Nabanoga Gorretie	Associate Professor	F
186	Miiro Richard	Senior Lecturer	M
187	Isubikalu Prossy	Senior Lecturer	F
188	Kyazze Florence Birungi	Senior Lecturer	F
189	Obaa Bernard Bonton	Senior Lecturer	M
190	Karuhanga Monica	Lecturer	F
191	Karubanga Gabriel	Lecturer	M
192	Mubangizi Narisi	Lecturer	M
193	Nasirumbi Losira	Lecturer	F
194	Akello Sarah	Lecturer	F
195	Orum Emuria Boniface	Lecturer	M
196	Okech Moses	Lecturer	M
197	Mulugo Lucy	Assistant Lecturer	F
198	Mawa Christopher	Assistant Lecturer	M

200	Biryomumaisho Dickson	Assistant Lecturer	M
201	Mukebezi Rebecca	Assistant Lecturer	F
Department of Agricultural and BioSystems Engineering			
202	Wanyama Joshua	Senior Lecturer	M
203	Isa Kabenge	Associate Professor	M
204	Allan John Komakech	Senior Lecturer	M
205	Ahamada Zziwa	Associate Professor	M
206	Ayaa Fildah	Asst. Lecturer	F
207	Peter Tumutegereize	Lecturer	M
208	Nicholas Kiggundu	Senior Lecturer	M
209	Robert Kyeyune Kambugu	Lecturer	M
210	Julia Kigozi	Senior Lecturer	F
211	Sam Cherotich	Assistant Lecturer	M
212	Prossie Nakawuka	Assistant Lecturer	F
213	Francis Okori	Assistant Lecturer	M
214	Peter Mulamba	Lecturer	M
215	John Bosco Kawongolo	Senior Lecturer	M
216	Kivumbi Hussein Balimunsi	Senior Lecturer	M
217	Erion Bwambale	Assistant Lecturer	M
Department of Food Technology and Nutrition			
218	John Muyonga	Professor	M
219	Archileo Kaaya	Professor	M
220	Charles Muanja	Professor	M
221	Yusuf Byenkya Byaruhanga	Assoc. Professor	M
222	Dorothy Nakimbugwe	Assoc. Professor	F
223	Ivan Muzira Mukisa	Assoc. Professor	M
224	Abel Atukwase	Senior Lecturer	M
225	Margaret Kabahenda	Senior Lecturer	F
226	Gaston Ampe Tumuhimbise	Senior Lecturer	M
227	Agnes Nabubuya	Senior Lecturer	F
228	Acham Hedwig	Senior Lecturer	M
229	Denis Male	Lecturer	M
230	Robert Fungo	Lecturer	M
231	Robert Mugabi	Lecturer	M
232	Florence Mary Turyashemererwa	Lecturer	F
233	Fred Brany Lukwago	Assistant Lecturer	M
234	Stellah Byakika	Assistant Lecturer	F
235	Joseph Balamaze	Chief Technician	M
236	Emmanuel Okalany	Principal Technician	M
Department of Environmental Management			
237	Frank Kansiime	Professor	M
238	John R.S Tabuti	Professor	M
239	David Tumusiime	Professor	M
240	Vincent Muwanika	Assoc. Professor	M
241	Justine Namaalwa	Assoc. Professor	F
242	Bob Nakileza	Senior Lecturer	M

243	Anthony Egeru	Assoc. Professor	M
244	Kenneth Nyombi	Senior Lecturer	M
245	Patrick Byakagaba	Senior Lecturer	M
246	Ellen Kayendeke	Lecturer	F
247	Kinobe Joel	Lecturer	M
248	Kenneth Balikoowa	Assistant Lecturer	M
249	Erima Godwin	Assistant Lecturer	M
250	Ezra Natumanya	Assistant Lecturer	M
251	Fred Yikii	Assistant Lecturer	M
252	Faridah Nalwanga	Assistant Lecturer	F
253	Paul Musali	Lecturer	M
Deoartment of Geography, Geo-Informatics and Climatic Sciences			
254	Tumwine Fredrick	Associate Professor	M
255	Bamutaze Yazidhi	Associate Professor	M
256	Mugagga Frank	Associate Professor	M
257	Twinomuhangi Revocatus	Senior Lecturer	M
258	Waiswa Daniel	Senior Lecturer	M
259	Isole Mukwaya Paul	Senior Lecturer	M
260	Mfitumukiza David	Senior Lecturer	M
261	Nimusiima Alex	Lecturer	M
262	Nanteza Jamiat	Lecturer	F
263	Twinorugyendo Penninah	Lecturer	F
264	Sabiiti Geoffrey	Lecturer	M
265	Musoke Semakula Henry	Lecturer	M
266	Ddumba Saul Daniel	Lecturer	M
267	Wasswa Hannington	Lecturer	M
268	Mugume Isaac	Lecturer	M
269	Nseka Denis	Lecturer	M
270	Aboda Caroline	Lecturer	F
271	Mulinde Catherine	Assistant Lecturer	F
Department of Forestry, Biodiversity And Tourism			
272	Nyakaana Jockey Baker	Professor	
273	Banana Abwoli Yabezi	Professor	M
274	Tweheyo Mnason	Professor	M
275	Nyeko Philip	Professor	M
276	Obua Joseph	Professor	M
277	Eilu Gerald	Associate Professor	M
278	Okullo John Bosco	Associate Professor	M
279	Babweteera Fred	Associate Professor	M
280	Ahebwa W Manyisa	Associate Professor	M
281	Mwavu Nector Edward	Associate Professor	M
282	Balaba Susan Tumwebaze	Associate Professor	F
283	Bahati Joseph Basikhan	Senior Lecturer	M
284	Mugabi Paul	Senior Lecturer	M
285	Nakabonge Grace	Senior Lecturer	F
286	Orikiriza Baguma Lawrence Justus	Senior Lecturer	M

287	Ayorekire Jim	Senior Lecturer	M
288	Mbogga Michael Ssekaayi	Lecturer	M
289	Nagawa Christine Betty	Lecturer	F
290	Muhwezi Deus Kamunyu	Lecturer	M
291	Rutabatiina Abraham Mwesigye	Lecturer	M
292	Mugizi Francis	Lecturer	M
293	Kizito Simon	Lecturer	M
294	Boonabana Brenda	Lecturer	M
295	Ssekuubwa Enock	Lecturer	M
296	Ochieng Amos	Lecturer	M
297	Byaruhanga Micheal	Assistant Lecturer	M
298	Sseremba Owen Emmanuel	Assistant Lecturer	M
299	Syofuna Agatha	Assistant Lecturer	M
300	Nsobyia Joseph	Librarian	M
301	Mulwany Edward	Security Personnel	M

CAES CONTRACT STAFF

CONTRACT STAFF PAID BY THE COLLEGE

No.	POSITION	NAME	GENDER	UNIT
1	Assistant Accountant	Namusoke Terry	F	Principal's Office
2	Assistant Accountant	Mbabazi Grace	F	Principal's Office
3	Systems Admin	Muhumuza Albert	M	Principal's Office
4	Records Clerk	Acheko Dinah	F	Principal's Office
5	Custodian	Muhairwe Jude	M	Principal's Office
6	Watchman	Kayima Humalu	M	Principal's Office
7	Custodian	Francis Musana	M	DEM
8	Custodian - MUARIK	Benjamin Ashok Ogutti	M	Principal's Office
9	Office Attendant	Namirembe Rose	F	Principal's Office
10	Office Attendant	Kisembo Wilson	M	Principal's Office
11	Driver	Mukonzi Eric	M	Principal's Office
12	Driver	David Kajozi Mubiru	M	Principal's Office
13	Driver	Mabonga Wilson	M	Principal's Office
14	Watchman	Owundo Dominic	M	Principal's Office
15	Administrative Assistant (Rec)	Gorret Kamoga Namukwaya	F	Principal's Office
16	Securty Guard	Collin Wandwali	M	Principal's Office
17	Assistant Registrar	Hilda Mukune	F	Dean's Office SAS
18	Records Assistant	Joan Businge	F	SFEGS
19	Securty Guard	Darius Mboniyintwari	M	SFTNB
20	Accounts & Logistics	Muguruka Lugard	M	MUARIK
21	Coordinator Dvc	Taremwa Precious	M	MUARIK

22	Technician	Wamala Robert	M	SFTNB
23	Technician	Nkinzehiki Allan Moses	M	SFTNB
24	Computer Technician	Lutalo William	M	SFEGS
25	Assistant Domestic Bursar	Kato Innocent Mwesige	M	MUBFS
26	Headman	Kugonza Robert	M	MUBFS
27	Cook	Kakyo Malyamu	M	MUBFS
28	Security Guard	Kasaija Ebenezer	M	MUBFS
29	Security Guard	Mugisa Expedito	M	MUBFS
30	Station Driver	Kyalimpa Wilson	M	MUBFS
31	Station Driver	Sembatya Paul	M	MUBFS
32	Store Man	Kemigisa Patience	M	MUBFS
33	Trail Cutter/Cleaner	Rutenta Wilson	M	MUBFS
34	Trail Cutter/Cleaner	Bamukusa Francis	M	MUBFS
35	Trail Cutter/Cleaner	Tibeya Adolf	M	MUBFS
36	Trail Cutter/Cleaner	Katuramu Clovis	M	MUBFS
37	Trail Cutter/Cleaner	Birungi Charles	M	MUBFS
38	Trail Cutter/Cleaner	Kisembo Vicent	M	MUBFS
39	Trail Cutter/Cleaner	Kusemererwa Charles	M	MUBFS
40	Trail Cutter/Cleaner (Ngogo)	Nyakahuma Richard	M	MUBFS
41	Trail Cutter/Cleaner (Ngogo)	Zahura James	M	MUBFS
42	Trail Cutter/Cleaner (Ngogo)	Atuhaire Samuel	M	MUBFS

CAES ACCOUNTS AS OF 31ST DECEMBER 2022

Account Name	Bank Name	Account Number	Currency
College of Agric & Environmental Sciences	ABSA	0341424240	UGX
College of Agric & Environmental Sciences	ABSA	0344241694	USD
College of Agric & Environmental Sciences	ABSA	6003566658	EURO
Makerere University Nutrition Innovation Laboratory	DFCU	02083502219046	USD
MAKERERE UNIVERSITY REGIONAL CENTRE FOR CROP IMPROVEMENT	BOU	003360088400006	USD
MAKERERE UNIVERSITY REGIONAL CENTRE FOR CROP IMPROVEMENT	BOU	003360088000005	UGX

ANNUAL REPORT 2022



MAKERERE UNIVERSITY



**COLLEGE OF AGRICULTURAL
AND ENVIRONMENTAL SCIENCES**



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