



MAKERERE UNIVERSITY

**College of Veterinary Medicine, Animal
Resources and Biosecurity (CoVAB)**

Annual Report 2023



Contents

Contents

Acronyms	vii
A word from the Principal	ix
Introduction	1
Student Enrolment in the period under review	3
Human Resources	6
Teaching and Learning Achievements	9
Research and Innovation Achievements	16
Research Projects and Publications	22
Knowledge Transfer and Partnerships	29
Budget Performance	40
Challenges and future Plans	41



CoVAB Leaders



Principal
Prof. Frank Nobert Mwiine



Deputy Principal
Assoc. Prof. James Acai-Okwee

Deans



Dean, School of Veterinary Medicine & Animal Resources (SVAR) - Prof. Robert Tweyongyere



Dean, School of Biotechnical & Biolaboratory Sciences (SBLS) - Dr. Claire Mugasa Marc

Heads of Departments



Veterinary Pharmacy, Clinical and Comparative Medicine - Prof. Julius Okuni



Wildlife and Aquatic Animal Resources (WAAR) - Dr. Sarah Nalule



Biomolecular Resources and Biolab Sciences - Dr. Immaculate Nakalembe



Biosecurity, Ecosystems and Veterinary Public Health (BEP) - Prof. Clovice Kankya



Biotechnical and Diagnostic Sciences - Dr. Joseph Erume



Livestock and Industrial Resources (LIR) - Dr. Dorothy Nampanzira



Acronyms



ADIS	-	Animal Disease Information System
AFRISA	-	Africa Institute for Strategic Services and Development
BBS	-	Department of Bimolecular Resources & Bio lab sciences
BDS	-	Department of Biotechnical & Diagnostic Sciences
BEP	-	Department of Biosecurity Ecosystems & Veterinary Public Health
CIRAD	-	French Agricultural Research Centre for International Development
COHESA	-	Capacitating One Health in Eastern and Southern Africa
CoVAB	-	College of Veterinary Medicine, Animal Resources and Biosecurity
GoU	-	Government of Uganda
ILRIS	-	Industrial Livestock Research, Incubation and Skilling
ILRI	-	International Livestock Research Institute
ISAAA	-	International Service for the Acquisition of Agri-biotech
ITE	-	Industrial Training and Education
LIR	-	Department of Livestock and Industrial Resources
MAAIF	-	Ministry of Agriculture Animal Resources and Fisheries
Mak	-	Makerere University
MOES	-	Ministry of Education and Sports
PCM	-	Department of Veterinary Pharmacy, Clinical & Comparative Medicine
PI	-	Principal Investigator
SBLS	-	School of Biotechnical and Bio Laboratory Sciences
SME	-	Small and Medium Enterprise
SVAR	-	School of Veterinary Medicine and Animal Resources
WAAR	-	Department of Wildlife & Aquatic Animal Resources
WARM	-	Wildlife and Aquatic Resources Management

A word from the Principal



Message from the Principal.

It is my pleasure to share the Annual Report for the year 2023, which highlights various milestones realized in the College of Veterinary Medicine, Animal Resources, and Biosecurity. First and foremost, I wish to congratulate all of us for the input rendered in the running of the college during the period, which effort made us score in several areas as prescribed by the mandate of the college and Makerere University as a whole.

Our mandate is teaching and learning, research and innovation, as well as knowledge transfer and partnerships. As you will realize in this report, this task has been handled meticulously through a concerted effort by all stakeholders, the students, the teaching, and the administrative staff and partners. The college takes pride in the contribution made by our partners who continue to support us in the delivery of the mandate in varied ways, such as Norbrook (U) Ltd, which since 2021 has continued to prize the best performing Veterinary students with cash prizes every year.

The College continues to excel in research and community outreach as evidenced by the increased research output in several Biomedical and Applied research projects with support from the Government of Uganda and our development partners which for instance resulted in the establishment of a Biomarker discovery and translation research laboratory at COVAB. Equipment was procured to support the development of point-of-care diagnostic kits for infectious and non-communicable diseases including cancer. The goal is to translate identified biomarkers into point-of-care diagnostics for both human and veterinary medicine. The platform supports drug target discovery and elucidation of drug action mechanisms.

The college hosts a Central Laboratory Animal Research Facility that support pre-clinical studies in animal models for vaccines, therapeutics and diagnostics, alongside refurbished laboratories at Biosafety Levels 2 and 3 (BSL2, BSL3), fitted with state-of-the-art equipment to execute cutting edge basic and applied research.

This and other efforts strategically place COVAB and Makerere at large in a position to confront major animal and even human health challenges as significant proportions of emerging and reemerging infectious diseases are of animal origin (Zoonotic).

We are looking forward to an even more successful period ahead of us, and together definitely we shall achieve all we set out to do.

A handwritten signature in blue ink, which appears to read 'Frank Nobert Mwiine'. The signature is stylized and fluid.

Prof. Frank Nobert Mwiine

PRINCIPAL



Heads of Administrative Units



College Registrar
Richard Byarugaba



College Bursar
Odoch Walter



Head Human Resource
Makubuya Godrey Kigonya



Asst. Procurement Officer
Mawa Majid



Communication Officer
Harriet Musinguzi



Web Administrator
Brook Musinguzi



1

The College of Veterinary Medicine, Animal Resources and Bio Security (CoVAB) was constituted in the year 1971 as a faculty of Veterinary Medicine and has therefore been operational over the last 50 years. It has grown from a faculty to a college having 2 schools i.e., The School of Veterinary Medicine & Animal Resources (SVAR), and the School of Biosecurity, Biotechnology and Laboratory Sciences (SBLS). COVAB is a Constituent College of Makerere University as provided for in Section 29 of the Universities and Other Tertiary Institutions Act as amended in 2006.

1.1 Mandate

This falls within the overall mandate of Makerere University which is;

- a) Provision of higher education through teaching and learning, research and knowledge transfer partnerships in Veterinary medicine.
- b) Dissemination of knowledge and giving opportunity of acquiring higher education to all persons regardless of sex, race, color or whether one has a disability or not.
- c) Provision of accessible physical facilities to the users of the Public University

1.2 College Structure and Administration

The College Board is the policy-making organ of CoVAB. This is comprised of the Academic staff and the College Registrar serves as secretariat. The principal is the executive head of the Board and Professor Frank Norbert Mwiine is the current Principal, deputized by Prof. James Acai-Okwee.

Introduction



The Board works closely with other bodies that include the Administrative Board that coordinates the day-to-day administration function of the College. Students are represented on all the boards as a way of ensuring their concerns are not left out. There are a number of other committees whose function feed into the operations of the boards and these include the Contracts Committee, the Internship Committee, and the Finance Committee among others.

1.3 Schools, Departments, and Centres

COVAB is made up of two (2) schools that are headed by Deans. These are the School of Veterinary Medicine and Animal Resources (SVAR) and the School of Biosecurity Biotechnical and Laboratory Sciences (SBLS). They are charged with taking leadership in areas of programming, coordination and management of the respective units that are lined up according to the disciplines.

Animal Resources and Biosecurity

1.3.1 School of Veterinary Medicine and Animal Resources (SVAR)

The School of Veterinary Medicine and Animal Resources is headed by Prof. Robert Tweyongyere, and is comprised of three departments, which include Livestock and Industrial Resources (LIR) headed by Dr. Dorothy Nampanzira, Veterinary Pharmacy, Clinical and Comparative Medicine headed by Professor Julius Okuni and Wildlife and Aquatic Animal Resources (WAAR) headed by Dr. Sarah Nalule.

1.3.2 School of Biosecurity, Biotechnology and Laboratory Sciences (SBLS)

The Dean of the School is Dr. Claire Mack Mugasa. This school is made up of three departments namely, Biomolecular Resources and Bio lab (BBS) Sciences headed by Dr. Immaculate Nakalembe, Biosecurity, Ecosystems and Veterinary Public Health (BEP) headed by Prof. Clovice Kankya and Biotechnical and Diagnostic sciences headed by Prof. Joseph Erume.

1.3.3 African Institute for Strategic Animal Resource Services and Development (AFRISA)

The AFRISA-SPEDA initiative came about as a result of the presidential directives of the 2nd July 2007,

under which Makerere University was directed to design innovations that would appropriate prosperity and address the challenges of perpetual peasantry and youth unemployment. AFRISA was established as a secretariat to coordinate the development and implementation of SPEDA model. A business incubation and skilling center was also initiated at Nakyesasa near Namulonge 20km from Kampala to provide the necessary infrastructure for effective delivery of SPEDA programs.

1.4 Institute and Centers

COVAB has one (1) Institute and seven (7) centers. The table below shows the centers and their areas of focus.

Table 1. Centres and their areas of focus

	Name of Institute/Centre	Area of focus	Target Group
1	Africa Institute for strategic Resource services and development (AFRISA)	Comprehensive industrial value chain Education and cottage enterprises development	Academia Community Public Private Partnerships
2	Ruth Keesling wildlife health Extension, Research and Education	Strategic wildlife innovations	Wildlife community
3	Centre for Biosecurity, Zoonoses and Global Health.	Bio-risks and bio-threats	Research Community
4	Joint National Animal Diagnostics Centre(J-NADIC)	Diagnostic Extension Services. Ticks and tick-borne diseases	Farmers Community private sector Learners Researchers
5	Walter Reed Project Laboratories for Emerging Infectious Diseases	Avian Influenza	Community Researchers
6	Nakyesasa Incubation Centre for Industrial Livestock Research and Business Innovations, Wakiso District	Industrial Livestock	Community Farmers Researchers
7	Buyana Stock Farm, Mpigi District	Field Practical Teaching and Learning	Farmers Learners Researchers
8	Ngoma Anti-Tick Vaccine Clinical Trial site, Nakaseke District	Anti-Tick Vaccine Clinical trial site	Researchers
9	Tropical Diseases and Vector Control Laboratory	Ticks and Tick-Borne Diseases Control Genomics & Vaccine Research Antimicrobial and anthelmintic resistance monitoring and action Neglected animal diseases and zoonoses control Pharmaceutical Research and Clinical Trials Pollinator Protections and Insect Research	Farmers Learners Researchers

2

Student Enrolment in the period under review



A. Graduate Students Academic Year 2022/2023

CATEGORY	FEMALE	MALE	TOTAL
Masters	31	74	105
PhD	3	7	10
Total	34	81	115

B. Undergraduate Students Academic Year 2022/2023

PROGRAM	FEMALE	MALE	TOTAL
BBLT	97	191	288
BAPT	44	71	115
BILB	13	49	62
BWHM	1	3	4
BVM	75	231	306
Total	230	545	775

2.1 GRADUATION STATISTICS FOR 2023

The table below shows the graduation statistics for students in the college that were presented at the 73rd Graduation ceremony.

Master's Degrees	Female	Male	Total
Master of Biomedical Laboratory Sciences and Management	1	3	4
Master of Science in Livestock Development and Management	1	5	6
Master of Veterinary Preventive Medicine	3	6	9
Postgraduate Diploma			
Postgraduate Diploma in Livestock Development Planning and Management		5	5
Undergraduate Degree Programs			
Bachelor of Veterinary Medicine	15	45	60
Bachelor of Animal Production Technology and Management	4	20	24
Bachelor of Biomedical Laboratory Technology	54	105	159
Bachelor of Feed Industry and Business		1	1
Bachelor of Industrial Livestock and Business	7	19	26
Bachelor of Wildlife Health and Management	3	6	9
Undergraduate Diploma			
Ordinary Diploma in meat Industry and Business		1	1
Ordinary Diploma in Poultry and Business		1	1



The Principal, Prof. Frank Nobert Mwiine (R) the Dean SVAR, Prof. Robert Tweyongyere and Dean SBLs Dr. Claire M. Mugasa presented the names of the graduands



The Best Veterinary Medicine Students receive their cash prize of Fifteen Million Shillings during the 73rd Graduation Ceremony



Some of the graduating students at the ceremony

3

Human Resources



The table below shows the status of the human resources at the college as at the end of 2023.

Department	Established Position	Filled	
		Female	Male
Principals' Office	Accountant & College Bursar	0	1
	Accountant	0	1
	Clerical Officer	1	0
	Principal Comm. Officer	1	0
	Human Resources Officer	0	1
	College Librarian	1	0
	Sen. Lib. Assistant	1	0
	Librarian Assistant	0	1
	College Registrar	0	1
	Senior Assistant Registrar	1	0
	Administrative Assistant	0	1
	Web Administrator	0	1
	Assist. Procurement Officer	0	1
	Administrative Assistant	1	0
Support staff -Principal's Office	Cleaner /Messenger	0	1
	Cleaner	0	1
	Sanitary Cleaner	1	0
	Driver	0	4
	Security Guard	0	2
	Chief Custodian	1	0
Dean's Office -SBLs	Copy Typist	1	0
Dean's Office -SVAR	Administrative Sec II	1	0
	Cleaner	2	0
	Farm Manager (KUDaP)	0	0
	Tractor Driver (Nakyesasa)	0	1
	General Farm Worker (Nakyesasa)	1	1
Buyana Stock Farm	Farm Manager (Buyana)	0	1
	General Farm Worker (Buyana)	0	6

Department	Established Position	Filled	
		Female	Male
Department of Biomolecular Resources and Biolab Sciences (BBS)	Professor	0	2
	Associate Professor	0	1
	Senior Lecturer	1	2
	Lecturer	3	3
	Assistant Lecturer	1	3
	Chief Technician	0	1
	Principal Technician	1	2
	Pool Stenographer	1	0
	Lab. Assistant	1	0
	Cleaner	3	1
Department of Biotechnical and Diagnostic Sciences (BDS)	Professor	0	2
	Associate Professor	0	1
	Senior Lecturer	1	0
	Lecturer	1	6
	Assistant Lecturer	1	0
	Chief Technician	0	2
	Technician	1	0
	Lab. Assistant	1	0
	Lab. Attendant	1	1
	Cleaner	2	0
	Cleaner/Messenger	0	1
Department of Livestock and Industrial Resources (LIR)	Professor	0	1
	Associate Professor	0	1
	Senior Lecturer	1	0
	Lecturer	1	0
	Assistant Lecturer	2	3
	Chief Technician	1	0
	Principal Technician	1	0
	Lab. Assistant	0	1
	Lab. Attendant	1	0
	Sanitary cleaner	4	0
	Veterinary Pharmacy, Clinical and Comparative Medicine	Professor	0
Associate Professor		0	3
Senior Lecturer		1	0
Lecturer		0	7
Assistant Lecturer		0	9
Chief Technician		0	1
Principal Technician		0	1
Clinician		0	1
Senior Technician		0	1
Technician		0	2
Technical assistant		2	0
Animal care taker		0	3
Clinician		0	1
Groundsman		0	1

Department	Established Position	Filled	
		Female	Male
Biosecurity, Ecosystems and Veterinary Public Health	Professor	0	1
	Associate Professor	0	1
	Senior Lecturer	0	2
	Lecturer	2	2
	Assistant Lecturer	0	1
	Chief Technician	1	0
	Principal Technician	1	0
	Cleaner	1	1
Wildlife and Aquatic Animal Resources	Professor	0	1
	Associate Professor	0	2
	Senior Lecturer	1	1
	Lecturer	1	3
	Assistant Lecturer	0	3
	Chief Technician	1	0
	Principal Technician	1	0
	Technical Assistant	1	0
	Sanitary Cleaner	1	0
	Cleaner	1	0



4

Teaching and Learning Achievements



Teaching and learning are the core function for which the College exists. A lot of effort therefore has been put in ensuring that the students admitted on the program get the best from the college through quality theoretical and practical training.

4.1 Programs offered at COVAB

The table below shows the various programs offered at the College.

SCHOOL OF VETERINARY MEDICINE			
Program	Undergraduate	Graduate	
		Masters	Ph.D.
BVET	Bachelor of Veterinary Medicine		
MVM		Master of Veterinary Medicine	
BILB	Bachelor of Industrial Livestock and Business		
BAPT	Bachelor of Animal Production Technology and Management		
MSAH		(MWHM) - Master of Science in Wildlife Health and Management with three tracks; Aquatic Health Management Wildlife Resource Management Wildlife Clinical Medicine	
GLPM		Post graduate Diploma in Livestock Development Planning and Management	
MSLS		Master of Science in Livestock Development and Management with two tracks; Livestock Sector Planning and Management Animal Product Processing, Entrepreneurship and Safety	
MVPA		MSC in Veterinary Pathology	
PSVM			Doctor of Philosophy
SCHOOL OF BIOSECURITY, BIOTECHNOLOGY AND LABORATORY SCIENCES			
BBLT	Bachelor of Biomedical Laboratory Technology		
MSBL		Master of Biomedical Laboratory Sciences and Management	
(MSBS)		Master of Science in Molecular Biology	
MIDM		Master of Science in International Infectious Diseases Management	
MVPM		Master of Veterinary Preventive Medicine	
			Ph.D. Veterinary Medicine

4.2 Skills development programs

Africa Institute for Strategic Services and Development (AFRISA) offers a number of skilling programs to communities since its initiation in 2007. The table below shows the various courses and disciplines where the trainings are conducted some at certificate and others at Diploma level.

- Bee Keeping, Products Development and Entrepreneurship
- Companion and recreation Animal Management and Training
- Dairy Production, Value Addition and Entrepreneurship
- Feed Production, Value Addition and Entrepreneurship
- Fish Production, Value Addition and Entrepreneurship
- Laboratory Science Education and Industrial Technology
- Leather Production, Value Addition and Entrepreneurship
- Meat Production, Value Addition and Entrepreneurship
- Pig Production, Value Addition and Entrepreneurship
- Poultry Production, Value Addition and Entrepreneurship
- Wildlife Production, Value Addition and Entrepreneurship

4.3 Library Services

In the effort to step up the teaching and learning function of the college, the library plays a pivotal role and therefore its functionality is of paramount importance in the college.



Mr. Kasusse (R) hands over to Lydia Namugera, witnessed by Principal Prof. Frank Nobert Mwiine on October 27th, 2023

4.3.1 CoVAB gets a new Librarian

Mr. Michael Kasusse, the long-serving College Librarian handed over to the Lydia Namugera Senjovu on October 26th, 2023. In his handover report presented to the incoming, witnessed by the Principal Prof. Frank Nobert Mwiine in the Library, Mr. Kasusse urged the college leadership to budget for and procure additional books and not rely solely on those provided by the main Library.

He also requested for the improvement of the library environment by providing curtains, door mats, and lighting. Mr. Kasusse pointed out the issue of inadequate staffing, and lack of a database for CoVAB other than the science-based database as some of the challenges that affect the smooth operation of the library. He noted that staff were not provided lunch by the college and yet were expected to work over lunchtime until late in the evening.

Further, he asked the college to merge the school-based libraries into one college library that can be easily managed by skilled personnel and as one way through which the staff challenge can be handled. He observed that the book banks at the departmental levels were being managed by Lab technicians or secretaries. Kasusse said the library that is located on level one has an average daily capacity of 100 users and is supported by three (3) staff.

Management should subscribe to at least one crucial database for Veterinary or Biomedical or at least work with partners to share access to that crucial database,' he emphasized while urging the college to identify and have a specific database for Veterinary Medicine and other programs offered.

4.3.2 Library Output as of October 2023

Below in the table is what the library achieve versus what it set out to do.

- **Strategic Objective 1:** Ensure collection development and optimal utilization of information resources while producing quality graduates
- **101 titles** (120 copies) of books purchased in May 2023.
- **104 Bibliographic and Item records** were created and modified in April - June
- **320 Bibliographic and Item records** were created and modified in July - September
- 112 Enhanced access in Institutional Repositories by October 2023
- **880 titles of books and 3 titles of print journals** were identified for weeding and the process of donating them to Agributec-Billington College, Serere District handled by College Sub Procurement Unit and Book Bank Section of main Library
- **551 copies of books** were re-spine labelled using the newly acquired spine label printer in 2022 up to date
- **1 defaulter's list** was updated and used during the transcript exhibition at freedom square in 2022
- **57 students cleared** for graduation having not lost library items by October 2022
- **2,977 titles accessed** via <https://mulib.mak.ac.ug>
- 946 titles in Closed shelves excluding books in departments
- **206 online journals** in veterinary science through Libhub on <https://mulib.mak.ac.ug>
- **Strategic Objective 2:** Strengthen Information literacy trainings and Current awareness services for library collection
- **2 Graduate Training** in user education and literature searching at CoVAB i.e., reference are Class representatives; Galiwango 0784-416715 and Monica 0702-916233
- **Lead trainer with Library training team** (Carol and Martha) in February 2023 in EAC Capacity Building Workshop organised by COBAMS -Reference is Dr. Asiimwe John Bosco
- **5 IL Training curriculum modules** were developed in 2022 and updated by October 2023 namely; User education; Searching Techniques; Reference Management and Citation; Open Access, IR, Citation Analysis & Altimetrics; Systematic Review & Metadata Analysis.
- **1 course units BAP 1111** taught in computing and information management Oct 2023
- **1 systematic review** conducted with Dr. Maureen Mayanja, Dr. Rebecca Nalubega, and Kasusse Michael in 2022
- **3 weeks Participation** in the Makerere University Transcript Public exhibition at the Freedom Square
- **Strategic Objective 4:** Strengthen the Virtual Digital Library Environment
- **12 computers and accessories** maintained with 1 Router for wireless internet access
- **1 spine label printer** maintained
- **Strategic Objective 5:** Strengthen Library Governance and Human Resources Management
- **Supported** Makerere University Library Collection Development Policy Team
- **Supported** Library Research and Innovations Committee
- **Supported** the College Academic Board
- **1 CUUL Training** in Policy Briefs
- **1 CPD, the APAS workshop** in participatory approach organized by CARTA
- **Strategic Objective 6:** Mobilise and Maintain Resources for sustainable library services
- **1 institutional linkage** maintained with USAID Africa One Health University Network (AFROHUN) in online collection development as it attains accreditation by NCHE. Was Lead trainer with Library training team (Carol and Martha) in May 2023 on how to access CUUL electronic Resources

4.3.3 Plans for the library

In order to continuously improve the library, it was proposed that; CoVAB Management budget for books in addition to what the main library procures. Management should subscribe to at least one crucial database for Veterinary or Biomedical or at least work with partners to share access to that crucial database. Follow up on the book donation to Agributech-Billington College, Serere District and create space for a computer laboratory within the library and support access to e-resources and trainings.



Assoc. Prof. James Acai-Okwe receives books donated by Vets for Africa December 23rd 2022



Vets for Africa donated books to a Wildlife NGO

4.3.4 Book donations in the Library

The consignment of books was received and placed in the library for reference.

Vet Books for Africa in December 2022 donated an assortment of Text Books to the College. The organization, a student-run venture was established in 1993 with the aim of empowering colleague Veterinary Universities in other countries and to build sustainable international relations between veterinary students.

The Delegation from the University of Pretoria was received at the College by Deputy Principal, Dr. Acai-Okwe, who in turn received the book donation. The team included Veterinary Students namely Daniel Archibald, Christine Kruger, Marnus Zaaman, Ivan de Beer, Jenna Lewis, Lara du Plessis Stan Wessels, and LeRoux Peples.

4.4 Laboratories in CoVAB

CoVAB offers a wide variety of laboratory services to veterinarians, researchers and students to assist in not only diagnostics of their patients but also undertake their studies. Services are varied, ranging from clinical diagnostics to genetic testing to infectious disease screenings. Each lab within the College operates independently as listed below. These are the main ones and are in a state ranging from average to good.

Name of Laboratory	Room No.
Reproduction Laboratory 1	101
Reproduction Laboratory 11	103
Phantom Laboratory	107
SPEDA Laboratory	111
Imuno histochemistry Laboratory	231H
Gross Anatomy Teaching Laboratory	232
Histology research lab	237
Pathology Research Laboratory	318
Diagnostic Laboratory	323
Nutrition Laboratory 11	329A
Central Diagnostics Laboratory	207 1-10
Physiology Teaching Laboratory	334A
Histology Teaching Laboratory	401
PH Teaching Laboratory II	410.5
PH Research Laboratory I	410.6
Molecular Biology Laboratory	411
Molecular Bio Dark Room	412
Parasitology teaching Laboratory	424
Post graduate Laboratory	425
Micro bio room 2 media	434
Micro bio-Diagnostic Laboratory	438
Avian Influenza Lab 1	441
Avian Influenza Lab 1	442
Research Laboratory 11	

4.5 The Small Animal Clinic at CoVAB

The College of Veterinary Medicine, Animal Resources and Biosecurity runs a small animal clinic which not only serves as a training avenue for Bachelor of Veterinary Medicine students but also serves as a community outreach for the surrounding catchment areas.

4.5.1 Teaching and Learning

The unit falls under Veterinary surgery. The section teaches courses directly at the docket of the veterinary surgery discipline including Principles of veterinary, surgery, anesthesiology, ophthalmology, radiology and soft tissue surgery procedures. These are divided into body regions, abdominal, head, neck, and thorax soft tissue surgeries. They also cover lameness and orthopedics in addition to other opportunistic cases brought by the community.

4.5.2 Internships and training

As a training unit, the small Animal Clinic usually hosts International Students in an internship program. The unit also provides tailor-made training sessions

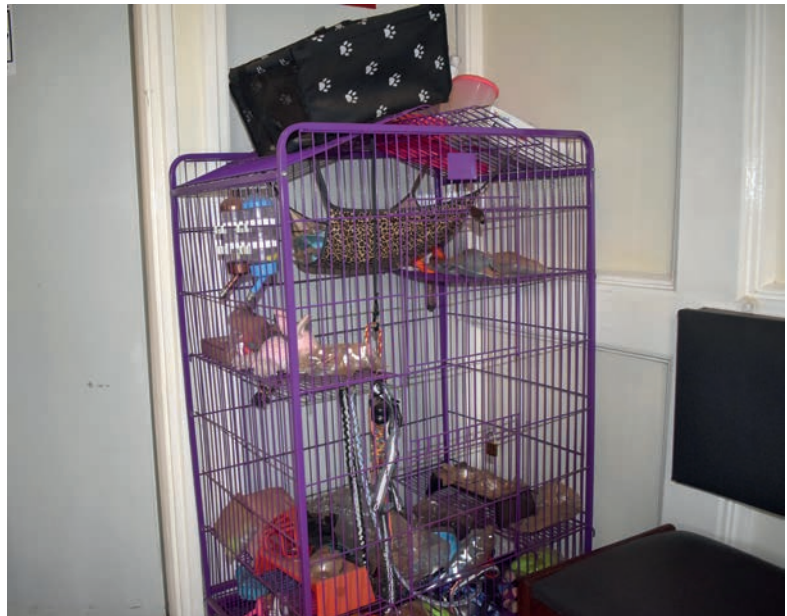
divided into surgery sections, production sections, medicine sections, and preventive medicine sections. During such engagements, the students are guided through the common procedures that a veterinary practitioner should undertake and they get scored based on the parameters of skills, knowledge, and teamwork.

4.5.4 Community Outreach

The small animal clinic serves as a community outreach Centre and it handles cases that include pet birds, small animals that include cats and dogs, and once in a while some wild monkeys. It is one of the avenues available for staff and students to practice. All the academic staff are supposed to be involved in the routine practice for them to be able to teach well.

4.5.5 The Ambulatory Services

For the big animals like cattle, these are handled on the farms through the ambulatory program which involves visiting farms as outreaches. Dr. Agwai explained that the activities are all aligned to the curriculum and that students are divided into groups



The animal cage at the clinic

through School mentorship sessions as well as parental and career guidance on the subject of Veterinary Medicine as a career for students.

4.5.3 The Boot camps

The unit organizes Boot camps in Buyana Stock farm for 4th and 5th-year Veterinary Medicine students

and they undertake two weeks of field work but also respond to emergencies as and when they come. The areas covered are Kampala and the surroundings and the furthest being Kiboga.



Dr. Agwai show off some pets in the cage

4.5.6 Veterinary support services

The unit also offers support services to organizations and agencies like Uganda Wildlife Education Centre (UWEC), National Animal Generic Resource Centre and Data Bank (NAGRIC), National Agricultural

4.5.7 Research

In the area of research, the unit undertakes a number of studies and currently plans are in advanced stages for conducting the Animal Model Testing for the Ventilator Machines designed and made by Kira Motors which equipment is already in place.

The Clinical Skills Centre equipment were received in the Centre. This will enable provision of physical and educational resource in clinical skills learning for veterinary professional programs at the College.

4.5.8 Diagnostic Services

The small animal clinic also undertakes diagnostic services using the available equipment that include the Xray, Ultra Sound, Endoscope, and Oscope for the ears. In the course of undertaking the diagnostic services, students learn from these experiences to enable them gain the skills that they will utilize later on in the profession.

4.5.9 Staffing

The unit is run by a lean staff that include four teaching staff, one technical staff, one technician, one theatre attendant and three cleaners.

4.5.10 Affiliations

As practicing veterinarians, the players in the Small Animal Clinic are expected to be registered with associations the Uganda Veterinary Board, the

Uganda Small Animal Protection Association, and African Small Animal Practitioners Association (AFSCAN).

4.5.11 Challenges and recommendations

The Challenges faced by the Small Animal Clinic include inadequate staffing. This is a big department merged from four to one. Originally with seven teaching staff, 2 technicians and four cleaners, the clinic now has four teaching staff, one Technician, 1 Technical Assistant, one Theatre Attendant and 3 cleaners.

The position of a Radiographer was omitted from the structure of the College. Consequently, the services of operating the Imaging machine are outsourced despite the importance they serve in the unit. There is need for the University to consider this position and recruit qualified staff to handle such a specialized machine.

The in-service teaching hospital is in an incomplete state. Staff and students are not in position to gain from the experience of such a facility. The University and the College should undertake a fundraising drive to complete the structure.

Staff are not specialized in the various genres of surgery. They therefore cut across all areas. There is need for specialized training for the staff.

4.6 Makerere University Students Animal Welfare Club (MUSAWC), championing Animal Rights

The Mission of MUSAWC is to promote Animal Welfare through strengthening the human- animal bond, encouraging student research and outreach programs in animal welfare. In the course of the year, several activities were undertaken including sensitization on animal welfare, vaccinations, deworming, cleaning animal houses and providing food to animals in need. All these were done with support from the club patrons Dr. Tayebwa Dickson, Dr. Nalubwama Sylvia and Dr. Sam Okech.

Activities undertaken in the Animal welfare week included hoof trimming, an outreach in Gomba as an animal welfare club during the rabies week, participated in the National Rabies day, undertook school outreaches, deworming of animals conducted welfare advocacy sessions in all classes at CoVAB, showered dogs and cats and many more as illustrated in the pictures below.

World Rabies Day 2023



5

Research and Innovation Achievements

5.1 CoVAB presents a fresh Vision for Veterinary training in Uganda



Members of the Education Policy Review Commission tour the Centre for Biosecurity and Global Health (CEBIGH) at CoVAB

The College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB) is proposing a policy shift in Veterinary training from the focus on animal welfare to the promotion of Industrial Veterinary Education, Science, Technology, Innovation and Medical Services.

The proposed policy shift will help re-orient Uganda's animal sector education to a holistic Industrial Value-chains Veterinary Education, Science, Technology, Innovation and Medical Services system. During a discourse with the Education Policy Review Commission (EPRC) held at the College on Thursday 25th January 2023, it was explained that the shift in the way various programs are taught would promote competitiveness, Transformative and export oriented education in the 21st century in Uganda.

The Principal, CoVAB, Prof. Frank Nobert Mwiine while presenting the proposal to the committee led

by Hon. Amanywa Mushega noted that once adopted, the new direction would speak to the future needs of the country and the continent. The strategy he said, would help create a comprehensive animal resources development system in the country. The shift comes in following a directive by H.E the President in 2007 about reforms in the veterinary and animal resources education sector to inform policy, strategy, planning and subsequent engagement.



Although the Animal Industry contributes 40% of Agricultural GDP globally and is the fastest growing sub-sector of Agriculture, Veterinary education is offered only at Makerere University, while other institutions offer Animal production and management. He pointed out the apparent lack of veterinary training at certificate or diploma levels which presented a service gap in the community.

He further noted that research and extension were divorced from education reiterating the fact that a functional veterinary education should not be divorced from research & extension. 'The "Ivory tower" system does not ably promote veterinary education from research and extension because they are delinked.



Prof. Enock Matovu demonstrates how some of the machinery in the centre operates

While at the CoVAB, the EPRC team was taken on a guided tour of the facilities in the Centre for Biosecurity and Global Health (CeBIGH), which were refurbished with support from ADB. They were updated about ongoing work that include the Covid 19 Vaccine development. It was explained by Dr. Matovu that the government of Uganda through the Ministry of Science Technology and Innovation was supporting production of locally made vaccines and that the center has as a rodent facility where many drugs can be tested.

The main function of the Education Policy Review Commission (EPRC) is to **draft a new macro policy framework for education and sports for Uganda**. This will replace the current Government White Paper on Education of 1992. The Education Policy Review Commission was launched by the First Lady and Hon. Minister of Education and Sports in May 2021.

5.2 The Black Fly Insect Larvae Enterprise for COVID-19 Livelihood Resilience Project Launched at CoVAB

The College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB) in Collaboration with Michigan State University has embarked on upscaling the use of the Black Fly Larvae as a source of insect protein for animal production.

An awareness session was convened at the college on Monday 20th February 2023, attended by stakeholders that included the academia, entomology extension staff from peri urban districts, officials from the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and the Centre for Insect Research and Development (CIRD).



Stakeholders that attended the launch take off time to take a group photo



L-R Commissioner Entomology, Dr. Amulen Deborah, Prof. Eric Benbow, Prof. Acai Okwee and Dr. Vudriko Patrick interact at the launch event



PI, Dr. Amulen Deborah, Deputy Principal CoVAB Prof. Acai-Okwe and Prof. Eric Benbow

The Black fly larvae is known to be one of the most environmentally friendly sources of insect protein that is highly nutritious and cheap to rear making it a possible replacement of expensive animal protein based feed ingredients like mukene or silver fish.

During the project launch, it was explained that Black Soldier Fly Larvae farming was growing rapidly despite some challenges that include issues of safety and quality of the larvae produced from different farms, the nutritional content as well as the mixing ratios with other feed ingredients.

Dr. Amulen Deborah and Dr. Patrick Vudriko the respective Principal and Co -Investigators are working together with Prof. Eric Benbow and Dr. Jennifer Pechal from Michigan State University in implementing the USAID funded project namely; Scaling cost effective, safe and quality Black Soldier fly insect larvae enterprise for COVID-19 Livelihood resilience in Uganda. The project comes in to address some of the identified challenges in the Black Soldier Fly enterprise.

According to Dr. Amulen Deborah, the key outputs of the project include a Policy brief on the use of Black Soldier fly larvae in livestock value chains which will guide the policy formulation processes by the planners. She said the one-year project that is supporting a Masters' Student on Veterinary Medicine will also come out with one formula for BSFL based diet for broiler chicken.

Dr. Amulen explained that in line with the Universities community outreach policy, the project will support training of 100 youth and women in BSFL startups and for sustainability purposes support the Centre for Insect Research and Development (CIRD) as a one stop knowledge center. In addition to strengthening the collaboration between Makerere and Michigan

State University, Dr. Amulen explained that another output will be a scientific research paper within the scope of the objectives of the project.

The project is intended to assess the impact of COVID-19 on livestock feed protein source to map out actors in the BSFL value chains in Peri Urban Kampala and to assess the quality and safety of BSF larvae reared. It is also intended to build the capacity of women and youth in small scale commercial BSFL farming in the Districts of Mpigi, Wakiso, Mukono Entebbe and Luweero.

The collaborating Institutions include Makerere University, Michigan State University and the Centre for Insect research and Development (CIRD), which has since 2019 piloted small-scale commercial BSFL farming under the leadership of the Principal Investigator on this project, Dr. Amulen. The major milestones achieved by CIRD in the pilot phase include setting up a small-scale BSFL unit producing one ton of BSFL weekly, supporting establishment of 100 BSF farming business, establishing market channels for both BSF equipment and breeding seeds such as eggs and pupae, as well as creating demand for dry BSFL among poultry and animal farmers.

In the course of implementing the project, entomologists from selected Districts will support the identification of farmers willing to start BSF farming and serve as focal point persons in the baseline study. The other planned activities include three field questionnaire surveys, seven training workshops for commercial BSL farming to be conducted at CIRD, Laboratory analysis of BSFL for nutritional content and safety, feeding experimentation and determining the performance of black soldier Fly larvae-based feed in broiler chicken as well as a dissemination workshop.

Dr. Vudriko Patrick the Co- PI while giving his reflections on the BSFL enterprise pointed out the need to seriously consider sustainability and the economics of the enterprise, the alternative wastes and their supply chain management as well as the legal framework for the enterprise, in addition to the National technical capacity for BSF development at Ministry and Local Government levels as institutions mandated to undertake training.

Dr. Vudriko emphasized the need for education as a vehicle for knowledge expansion and human resource technical competence, noting that our education system lacks the technical competence, citing the limited content for BSFL training at the College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB), The College of Natural Sciences (CONAS) and the College of Agricultural and Environmental Sciences (CAES).

He further emphasized the need for a product diversification as part of a holistic value chain development, product diversification, zero waste, not only looking at the larvae but considering maximizing revenue from all products. Other areas to focus he proposed, concerned product certification, determining who to call a breeder, and what it takes for one to qualify to become one.

The Ministry of Agriculture, Animal Industry and Fisheries was in attendance to address issues concerning establishing whether the relevant, laws and regulations were in place, as a condition for providing an enabling environment and ensuring the right standards to have the desired quality of products. MAAIF was also to give guidance regarding the existing technical capacity of the ministry and offer direction.

While officiating at the closing of the engagement, the Commissioner for Entomology in the Ministry of Agriculture Animal Resources and Fisheries Mr. Lawrence Tusiime Muhangi noted that the Black Soldier Fly was relatively a new venture. 'Apart from using the basic principles of entomology, we are all here to learn and the National Livestock Development Policy is the starting point for us all. Most of our participation is in bee keeping and my wish would be to advocate for skilling students at university', said the Commissioner, affirming that the standards were not in place. He said the Ministry was aligning the Animal Disease Management Bill and that given the fact that the Black Soldier Fly was a biological organism, there was need for a training manual and standards to create a fair condition for all stakeholders, including

development economists, the academic, the farmers and extension workers to participate.



Commissioner Entomology MAAIF® addresses the participants

He commended CoVAB for initiating the project and emphasized the need for the Ministry to consider other areas of entomology including the Black Soldier fly since it was steadily getting onboard as a viable enterprise. 'We need to check where we are in different areas of entomology. Communities are looking at entomologists to get solutions to the many challenges they face and the ministry needs to come in and support', he said.

He encouraged Makerere University through the key departments responsible for basic entomology to carry out a campaign to ensure that the needed infrastructure is put in place, cognizant of the fact that there were few staff entomologists at the ministry. 'Use friends, colleagues and contemporaries to push this agenda forward. I look at this as a salvation. These things are known in a small way but we need to think beyond what the entomologist can say' he said while emphasizing the need for the academia to support the Ministry in instituting the necessary policies and guidelines.

The commissioner encouraged the entomologists to ensure that there were demonstrations at the Districts and where they were not, have them started at their respective homes, and that with more orientation, more knowledge was to be gained in the management of the Black Soldier Fly enterprises.

In this project, the BSF value chain actors will be coordinated by the private sector (the Center for Insect Research and Development, CIRDI) and regulated by the Department of Entomology, Ministry of Agriculture, Animal Industry, and Fisheries.



5.3 Rabies Surveillance using a One Health approach

Stakeholders in the Rabies Elimination project in Uganda (eRabies) have intensified efforts aimed at the use of electronic Rabies Surveillance using a One Health approach in the efforts towards elimination of rabies in Uganda.

A two-day workshop was convened at the College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB), Makerere University on 28th-29th September 2023, during which the stakeholders deliberated on several proposals for the best applicable surveillance tools to address One Health concerns in the effort towards the elimination of Rabies.

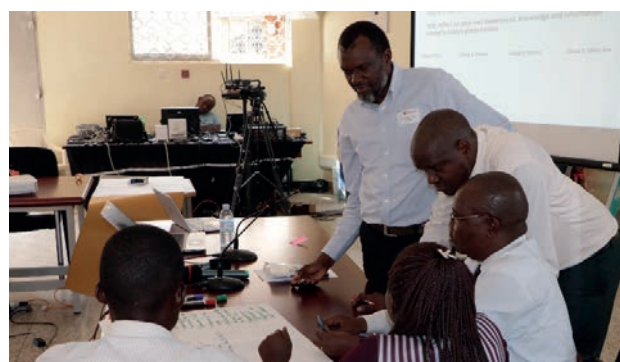
The purpose of the meeting was to hear from various actors and see what works for us, to enable us collect information and have it shared in a sustained way with One Health as a key component' said Prof. Clovice Kankya, the Head of the Department of Biosecurity, Ecosystems and Veterinary Public Health at CoVAB, at the start of the meeting held in the Centre for Biosecurity and Global Health.

Kankya noted that with one year of implementation to date, the eRabies project was progressing well drawing a lot of support from the implementing local Governments of Kyegegwa, Soroti, and Kampala Capital City Authority that spearhead the community engagements and other related activities. He said the graduate fellows from the Ministry of Health and Ministry of Agriculture, Animal Industry and Fisheries supported by the project were also on schedule.

He said Rabies is a global challenge being a zoonotic disease affecting the entire world more so here in

Africa where there is close interaction between the wild animals and the human population. The Uganda Wildlife Authority, he said, was brought on board specifically Queen Elizabeth National Park to address some of the challenges affecting people drawing from the wild animals.

The Deputy Principal CoVAB, Prof. James Acai Okwee, in his remarks noted through the eRabies project, Makerere University and the host CoVAB were consolidating efforts towards the control of rabies in Uganda. 'In as much as Rabies is a killer 100%, it is also preventable 100%' observed Prof. Acai, adding that Makerere University and CoVAB specifically have been involved in such efforts through field activities, vaccinations and animal welfare all programs aimed at the control of rabies. He said through research, such efforts were to be intensified from a scientifically informed point of view



Participants engage in a group discussion

Prof. Sonja Hartnack, from the Vetsuisse Faculty, University of Zurich, one of the partners gave an

In the table below is a snapshot of some of the ongoing research in the college. It illustrates the different research areas and the Principal investigators.

overview of the project. She said the four-year project has seven different work packages while emphasizing that presently, the stakeholders were addressing work package one, which entails Surveillance systems and integrated bite case management. She noted that the communities were crucial in the rabies control efforts specifically in identifying the barriers for rabies control through research interventions and the development of educational materials for awareness creation.

She referred to the World Organization for Animal Health (WOAH) recommended practices that point out that dog owners are clearly identified as one way through which the barriers to dog vaccination can be addressed in the communities and emphasize responsible dog ownership.

6

Research Projects and Publications



6.1 Ongoing research projects

Research Project	Objective	Expected output	PI
Promoting sustainability of higher education through global collaboration, student program development mobility and training (EDUPROMO)	The main objective is to strengthen and further develop established existing graduate program within One Health research and education focusing on zoonoses, toxicology, aquatic and environmental health	EDUPROMO is expected to have 40 PhD students and graduate students participate in short training and courses in the South and Norway. Makerere will benefit from having its staff and students trained and capacity built in One Health areas of Zoonoses, Toxicology, Fish, and Environmental Health	Dr. Terence Odoch
eRabies surveillance - a way forward to rabies elimination in Uganda	This project aims to contribute to the global elimination of canine-transmitted rabies by 2030, the WHO target.	The project will improve rabies surveillance and apply one health principle. sponsorship of 4 MSc and 1 PhD student and staff publications in peer-reviewed journals	Dr. Terence Odoch
MAD-tech-AMR- Management of Animal Diseases and antimicrobial use by Information and Communication Technology to Control AMR in East Africa	The overall objective of the project is to provide an ICT framework for monitoring and control of AMU and AMR in livestock in LICs	Mobile and web-based app for monitoring antimicrobial usage in Farmers	Assoc. Prof. Lawrence Mugisha
A Cross-Disciplinary Alliance to Identify, PREDict and prePARE for Emerging Vector-Borne Diseases (PREPARE4VBDs)	Improve baseline knowledge of target VBDs, in particular tick, mosquito and snail vectors, in endemic areas in West, East and southern Africa by harnessing and integrating existing and novel data from different sources and more	Capacity building in surveillance of vector borne diseases with 1 PhD and 1 MSc	Dr. Julius Okuni
ADAPT	Africa One network for Disease Prevention, capacity building	Validated diagnostic technologies, dissemination tools and hygiene practices for AMR mitigation	Dr. Julius Okuni
PREPARE-TID	Pipeline for Rapid Diagnostics of Emergency Transboundary Infectious Diseases	Validated tools for rapid diagnosis of emerging pandemic zoonoses	Dr. Julius Okuni
Strengthening risk -based Control strategies for Foot and Mouth Disease in Uganda	To strategically strengthen surveillance of FMD in Uganda to support stage 2 of the PCP-FMD.	Data Collection and analysis to generate FMD risk maps for Uganda based on predictions developed machine-based learning models	Prof. Frank N Robert Mwiine

Capacitating One Health in Eastern and Southern Africa (COHESA)	Net-mapping of OH stakeholders within baseline assessment	80% of the output realized	Prof. Kankya Clovice
The consequences of biodiversity loss and land use change on infectious disease emergence	<ol style="list-style-type: none"> 1) Provide phenotypic and molecular characterization of pre-epidemic virus variants; 2) Study the genetic adjustment of pre-epidemic variants by analyzing intra- and inter-host genetic diversity and selective pressures as drivers for virus evolution and diversification after spillover infections to new vectors and hosts; 3) To probe the host transcriptome response to infection with pre-epidemic arboviruses at the single cell level; 4) Assess the influence of different socioeconomic and ecological factors on the risk of virus transmission and disease outbreaks; 5) Model virus and host distribution as well as infection risk under current and future climatic and land use scenarios based on collected field data. 	<ol style="list-style-type: none"> 1) Training students in Germany; 2) Sample collection in the field; Research 	Dr. Rwego Innocent
Developing a National Network of STI Excellence as a Foundry for Accelerated Transformative STI Human Capital Development	<p>To collect quantitative and qualitative data from STI establishment around the different regions of the country.</p> <p>To set up modalities for the establishment of an STI network.</p> <p>To analyze data</p>	<p>Drafting Plan for STI development policy framework,</p> <p>Designing a website for registration of STI establishments</p>	Dr. Claire Mack Mugasa
Surveillance ELISA Project	Optimized Protocol S1 Antibody Capture RDT, Optimized Protocol RBD Antibody Capture RDT, Production of polyclonal Antibodies, Expanded colonies of Myeloma Cells		Prof. Enock Matovu
Subunit Vaccine Project	<ol style="list-style-type: none"> 1. Analysed data from Pre-Clinical Trial (Variants), 2. Characterized the Vaccine substance, 3. GMP facility made ready, Carry out Pre-Clinical Trial for Novel Adeno Vaccine 		Prof. Enock Matovu
Strengthening Surveillance of Leishmaniasis in Uganda and Kenya through a Collaborative Multisectoral One Health Capacity Building Approach in Endemic foci	To strengthen the surveillance of leishmaniasis in Uganda and Kenya, and contribute towards the elimination of the disease. The university will benefit through taking lead, publications, and curriculum development for a one health course	Reviewed medical records, risk factors for the disease identified, mass screening of dog populations	Dr. Charles Drago Kato
Innovation for Sustainability and Societal relevance: Partnerships in evidence-based higher Education on food systems and climate change	To strengthen collaboration and mobility between EU member states and Africa, enrich curriculum of partners institutions in food systems and climate change.	Mobility grant for curriculum enrichment for selected courses and enhance teaching through the use of digital technology.	Dr. Charles Drago Kato
Establishment of a Biomarker research facility to first track the development of COVID-19 novel diagnostics and treatment alternatives in Uganda	To establish a biomarker research facility, develop lateral flow kits for detecting COVID-19 patients	Lateral flow development, clinical validation of lateral flow kits, training of junior scientists	Dr. Charles Drago Kato

Controlling and progressively minimizing the burden of Animal Trypanosomosis (COMBAT)	To contribute to the reduction of Animal Trypanosomosis burden in Uganda by using the Progressive Control Pathway (PCP) as a strategic framework	1) A new progressive control pathway (PCP) packaged for African Animal Trypanosomiasis (AAT) will be extended to farmers in tsetse fly infested zones. 2) The burden and socioeconomic impact of AAT will be determined. 3) The genetic, immunogenic differences between trypanotolerant and susceptible breeds will be determined. 4) 1 Postdoc and 1 PhD student will be trained	Prof. Enock Matovu
Evaluation of The Safety, Efficacy and Stability of Sangatraz®-125 and Sangatraz®-250: A Randomised Single-Blinded Positive Controlled Multi-Site Acaricides Field Trial	To determine the safety, efficacy and stability of Sangatraz®-125, Sangatraz®-250, Sangadelta, Sangaphos and SangaSupa when applied on cattle for tick control	Safety, efficacy and stability of Sangatraz®-125 and Sangatraz®-250, Sangadelta, Sangaphos and SangaSupa when applied on cattle for tick control established	Dr. Muhanguzi Dennis

6.2 Publications

Reflections on Drivers for the Emergence and Spread of Antimicrobial Resistant Bacteria Detected from Chickens reared on Commercial Layer Farms in Mukono District, Uganda. Steven Kakooza, Dickson Stuart Tayebwa, Kassim Rashid Njalira, Edrine Beatrice Kayaga, Ismail Asimwe, Mariam Komugisha, Mariam Wanyana, Raymond Kisekka, Alex Kyabarongo, David H Kiryabwire, Esther Nabatta, & Wilfred Eneku, Published online: 06 Dec 2023

Animal Source Foods Quality and Safety Standards Implementation in Uganda. A Review; Joseph M Kungu¹ Francis Ejobi Bosco A Okuyo, Namayanja Josephine, Namyalo Rehema Meeme

Antimicrobial resistance and stewardship among stakeholders of the poultry value chain in Wakiso and Soroti districts, Uganda Knowledge, attitudes and practices report. Paul Ssajjakambwe, Collins Atuheire, Justine Okello, Steven Kakooza, Joshua Waiswa, Dreck Ayebare, Kristina Roesel and Arshnee Moodley.

A survey of biosecurity practices of pig farmers in selected districts affected by African swine fever in Uganda. John E. Ekakoro, Margaret Nawatti, David F. Singler, Krista Ochoa, Robinah Kizza, Dickson Ndoboli, Deo B. Ndumu, Eddie M. Wampande, and Karyn A. Havas

Mentorship of the next generation of One Health workers through experiential learning: A case of students of Makerere University, by Peninah Nsamba, Innocent B. Rwego innocent.rwego@mak.ac.ug, Edwina Atusingwize, Sylvia Wanzala, Esther Buregyeya, Gabriel Tumwine, Doreen Tuhebwe.

Prevalence and socio-economic effect of Bovine African Trypanosomosis in agro-pastoral communities around Murchison Falls National Park, D Kizza – 2023.

Knowledge, attitudes, and practices about nosocomial infections and antibiotic susceptibility among Staphylococcus aureus isolated from surfaces in Nakasongola ...WEK Wasswa - 2023

Reflections on Drivers for the Emergence and Spread of Antimicrobial Resistant Bacteria Detected from Chickens reared on Commercial Layer Farms in Mukono District, Uganda., Dickson Stuart Tayebwa, Kassim Rashid Njalira, Edrine Beatrice Kayaga, Ismail Asimwe, Mariam Komugisha, Mariam Wanyana, Raymond Kisekka, Alex Kyabarongo, David H Kiryabwire, Esther Nabatta & Wilfred Eneku.

Mastitis on selected farms in Wakiso district, Uganda: Burden, pathogens, and predictors of infectivity of antimicrobial resistant bacteria in dairy herds. S Kakooza, F Mutebi, P Ssajjakambwe 2023 *In silico* identification, characterisation of plasmodium falciparum hypothetical proteins and their assessment as molecular targets for a malaria vaccine. C Aguttu

Seroprevalence of Foot and Mouth Disease in apparently healthy beef cattle in Uganda post the 2021 outbreak Celsus Sente, Braiam Rosado-Ramos, Susan Kerfua, Innocent Tuwangye, Cooper Brookshire, Peter Kalumba, Robinah Sarah Nakabuye, Solome Namirimu, Andrew Tamale, Stephen Reichley, Margaret Khaitsa

Knowledge, attitudes, and practices of dairy cattle feeding in selected districts of major milk sheds of Uganda, B Atwijukire – 2023

Mastitis on selected farms in Wakiso district, Uganda: Burden, pathogens, and predictors of infectivity of antimicrobial resistant bacteria in dairy herds. S Kakooza, F Mutebi, P Ssajjakambwe

Antimicrobial resistance and stewardship among stakeholders of the poultry value chain in Wakiso and Soroti districts, Uganda: Knowledge, attitudes, and Practices. P Ssajjakambwe, C Atuheire, J Okello, S Kakooza 2023.

Retrospective study on cattle and poultry diseases in Uganda, J Byaruhanga, DS Tayebwa, W Eneku.

Characterization and Antibiograms of Extended-Spectrum Beta-Lactamase-Producing Escherichia coli Isolated at the Human-Animal-Environment Interface J Muleme, C Kankya, M Munyeme

Prevalence and factors associated with cryptosporidiosis among livestock and dogs in Kasese District, Uganda: A cross-sectional study: C Kankya, J Okello, J Natweta Baguma, R Wambi... - medRxiv, 2023

Variation of Rabies Incidence with Rainfall Pattern in Uganda: Neglected Implication of Climate Change on Rabies Risk. K Bwambale, J Okwee-Acai, C Kankya, 2023.

Epidemiology of extended-spectrum beta-lactamase-producing Escherichia coli at the human-animal-environment interface in a farming community of central. R Wambi, RK Mugambe, C Kankya.

- Antimicrobial resistance among farming communities in Wakiso District, Central Uganda: A knowledge, awareness and practice study** J Muleme, JC Ssempebwa, D Musoke, C Kankya... - *Plos one*, 2023 - [journals.plos.org](#)
- Characterization and Antibiograms of Extended-Spectrum Beta-Lactamase-Producing Escherichia coli Isolated at the Human-Animal-Environment Interface** J Muleme, C Kankya, M Munyeme... - *Infection and Drug ...*, 2023 - Taylor & Francis
- Molecular Detection of Cryptosporidium Species in Wildlife and Humans at the Wildlife-Human Interface around Queen Elizabeth National Park, Uganda.** C Ndekezi, T Tusabe, A Musoba, C Kankya - *Parasitologia*, 2023 - [mdpi.com](#)
- Danger of free-roaming dogs in urban settings: A report of two suspected rabid dogs on rampage that inflicted 47 bites to people and domestic animals in peri-urban ...**D Tayebwa, NK Rashid, E Wilfred, C Ssekandi... - 2023 - [researchsquare.com](#)
- Antimicrobial Resistance profiles of staphylococcus aureus in farming communities of Isingiro and Kamuli districts, Uganda ...**, J Oposhia, W Olum, L Nyakarahuka, C Kankya... - 2023 - [researchsquare.com](#)
- Health workers' perspectives on the occurrence and management of antimicrobial resistance at the human-animal-environment interface in Uganda. ...**, SPS Kibira, JC Ssempebwa, RK Mugambe, C Kankya... - 2023
- Detection of carbapenem resistance genes in Campylobacter coli and Campylobacter jejuni isolated from chickens, and diarrheic children aged less than five years in ...**, LR Ninsiima, P Marin, D Onafroo, P Pithua, C Kankya... - *medRxiv*, 2023
- Knowledge, attitudes, and practices towards antibiotic use and resistance in Kyegegwa district, Uganda—a questionnaire study.** MA Kahunde, T Odoch, D Okello Owiny, C Kankya... - *medRxiv*, 2023 - [medrxiv.org](#)
- Climatic determinants of COVID-19 cases and deaths in Uganda: 2020-2022.....**, D Muwanguzi, AM Phiri, M Munyeme, C Kankya... - 2023 - [eartharxiv.org](#)
- A Survey of Waterborne Parasites in Queen Elizabeth Protected Area, Uganda,**C Sente, H Onyuth, A Tamale, B Mali, BG Namara... - 2023 - [preprints.org](#)
- Knowledge, Attitudes and Practices of High-Risk Groups Towards COVID-19 Vaccination in Kampala, Uganda....**, J Okello, S Zalwango, MO Ochola, C Kankya... - 2023 - [researchsquare.com](#)
- Leptospirosis in humans and selected animals in Sub-Saharan Africa, 2014–2022: a systematic review and meta-analysis.**JM Gizamba, L Mugisha - *BMC Infectious Diseases*, 2023 - Springer
- Detection of carbapenem resistance genes in Campylobacter coli and Campylobacter jejuni isolated from chickens, and diarrheic children aged less than five years in ...**, LR Ninsiima, P Marin, D Onafroo, P Pithua, C Kankya... - *medRxiv*, 2023 - [medrxiv.org](#)
- Spatiotemporal description of African swine fever virus nucleic acid and antibodies detected in pigs sampled at abattoirs in the greater Kampala metropolitan area ...**R Okwasiimire, EB Kayaga, JE Ekakoro... - *Porcine Health ...*, 2023 - Springer
- Climatic determinants of COVID-19 cases and deaths in Uganda: 2020-2022 ...**, D Muwanguzi, AM Phiri, M Munyeme, C Kankya... - 2023 - [eartharxiv.org](#)
- Leptospirosis in humans and selected animals in Sub-Saharan Africa, 2014–2022: a systematic review and meta-analysis.** JM Gizamba, L Mugisha - *BMC Infectious Diseases*, 2023 - Springer
- Molecular characterization of the 2022 Sudan virus disease outbreak in Uganda.** S Balinandi, S Whitmer, S Mulei, C Nassuna... - *Journal of ...*, 2023
- Surveillance of climate-sensitive zoonotic diseases: Leptospirosis at livestock slaughterhouses in three regions of Uganda.** L Alinaitwe, M Wainaina, K Roesel, C Kankya, S Dürr... - 2023 - [cgspage.cgjar.org](#)
- Spatio-temporal analysis of sheep and goat pox outbreaks in Uganda during 2011–2022.** G Nizeyimana, P Vudriko, J Erume, F Mubiru... - *BMC Veterinary ...*, 2023
- Mentorship of the next generation of One Health workers through experiential learning: A case of students of Makerere University,** CD Kato, A Musewa, JM Kungu, F Mwiine... - *CABI One ...*, 2023 - [cabidigitallibrary.org](#)
- Variation of Rabies Incidence with Rainfall Pattern in Uganda: Neglected Implication of Climate Change on Rabies Risk.** O Terence, SN Ssali, FN Mwiine... - ... *MEDICAL SCIENCES ...*, 2023 - [researchgate.net](#)
- Economic losses associated with respiratory and helminth infections in domestic pigs in Lira district, Northern Uganda.** P Oba, M Dione, FN Mwiine, B Wieland... - ... in *Veterinary Science*, 2023 - [frontiersin.org/1008](#),
- Co-infections of respiratory pathogens and gastrointestinal parasites in smallholder pig production systems in Uganda.** P Oba, B Wieland, FN Mwiine, J Erume, MM Dione - *Parasitology research*, 2023 - Springer
- Seroprevalence of Contagious Bovine Mycoplasma mycoides subsp. mycoides small colony type (MmmSC) in Cattle from Karamoja Region, North-eastern Uganda.,** M Kamusiime, S Ainebyoona, H Abizera, FN Mwiine... - 2023 - [researchsquare.com](#)
- Seroprevalence of Foot and Mouth Disease in apparently healthy beef cattle in Uganda post the 2021 outbreak.** C Sente, B Rosado-Ramos, S Kerfua, I Tuwangye... - 2023 - [researchsquare.com](#)
- Mosquito virus diversity in Western and North-western Uganda.**, E Matovu, S Nyakaana, ADS Filipe, F Mwiine... - *bioRxiv*, 2023 - [biorxiv.org](#)
- Climatic determinants of COVID-19 cases and deaths in Uganda: 2020-2022.** J Okello, L Nyakarahuka, J Muleme, C Atuheire... - 2023 - [eartharxiv.org](#)
- Mentorship of the next generation of One Health workers through experiential learning: A case of students of Makerere University.** P Nsamba, IB Rwego, E Atusingwize... - *CABI One ...*, 2023 - [cabidigitallibrary.org](#)
- Seroepidemiological investigation of Crimean Congo hemorrhagic fever virus in livestock in Uganda, 2017,** L Nyakarahuka, J Kyondo, C Telford, A Whitesell... - *Plos one*, 2023 - [journals.plos.org](#)
- Antimicrobial Resistance profiles of staphylococcus aureus in farming communities of Isingiro and Kamuli districts, Uganda ...**, E Namyalo, J Oposhia, W Olum, L Nyakarahuka... - 2023 - [researchsquare.com](#)
- Molecular characterization of the 2022 Sudan virus disease outbreak in Uganda.**, I Krapunaya, F Scholte, L Nyakarahuka... - *Journal of ...*, 2023 - *Am Soc Microbiol*
- Prevalence of Crimean-Congo haemorrhagic fever in livestock following a confirmed human case in Lyantonde district, Uganda.** SA Atim, M Niebel, S Ashraf, P Vudriko, S Odongo... - *Parasites & ...*, 2023 - Springer
- Seroprevalence of Contagious Bovine Mycoplasma mycoides subsp. mycoides small colony type (MmmSC) in Cattle from Karamoja**

- Region, North-eastern Uganda.** R Tweyongyere, J Nkamwesiga, P Etiang, I Mugezi... - 2023 - researchsquare.com
- Prevalence of Crimean-Congo haemorrhagic fever in livestock following a confirmed human case in Lyantonde district, Uganda.** AR Ademun, C Masembe, R Tweyongyere... - *Parasites & ...*, 2023 - Springer
- Knowledge, attitudes, and practices of Crimean Congo hemorrhagic fever among livestock value chain actors in Kagadi district, Uganda.** A Mulyowa, A Muhwezi, R Tweyongyere... - *PLOS Neglected ...*, 2023 - journals.plos.org
- Distribution and prevalence of ixodid tick species (Acari: Ixodidae) infesting cattle from North-eastern Uganda (Karamoja),** C Ndekezi, J Bbira, S Ochwo, R Tweyongyere... - 2023 - researchsquare.com
- Ticks; a reservoir for virus emergence at the human-livestock interface in Uganda** JJ Lutwama, P Kaleebu, C Masembe, R Tweyongyere... - bioRxiv, 2023 - biorxiv.org
- Epidemiology and effectiveness of interventions for Foot and Mouth Disease in Africa: A systematic review and meta-analysis ...**, M Ocan, A Nanteza, S Biryomumaisho... - 2023 - researchsquare.com
- Danger of free-roaming dogs in urban settings: A report of two suspected rabid dogs on a rampage that inflicted 47 bites to people and domestic animals in peri-urban ...**, R Tweyongyere, TL Goldberg, S Biryomumaisho... - 2023 - researchsquare.com
- Variation of Rabies Incidence with Rainfall Pattern in Uganda: Neglected Implication of Climate Change on Rabies Risk** M Taremwa, K Bwambale, J Okwee-Acai... - ... MEDICAL SCIENCES ... , 2023 - researchgate.net
- Prevalence of African swine fever virus in apparently healthy domestic pigs in Uganda** DK Atuhaire, M Afayoa, S Ochwo, S Mwesigwa... - *BMC veterinary ...*, 2013 - Springer
- Antibacterial activity of ethanolic and aqueous extracts of Zingiber officinale on Streptococcus pneumoniae and Pseudomonas aeruginosa,** S MAJALIJA, S ODUR, S ALAFI, SG OKECH - bioRxiv, 2023 - biorxiv.org
- Spatio-temporal analysis of sheep and goat pox outbreaks in Uganda during 2011–2022** G Nizeyimana, P Vudriko, J Erume, F Mubiru... - *BMC Veterinary ...*, 2023 - Springer
- Acaricide Resistance Development in Rhipicephalus (Boophilus) Microplus (Acari: Ixodidae) Populations against Amitraz and Deltamethrin on Communal Farms of ...**WD Dzemo, P Vudriko, T Ramatla, O Thekisoe - 2023 - preprints.org
- Prevalence of gastrointestinal parasites and molecular identification of beta-tubulin mutations associated with benzimidazole resistance in Haemonchus ...** F Kalule, P Vudriko, A Nanteza, AB Ekiri... - *Veterinary Parasitology ...*, 2023 - Elsevier
- Seroprevalence of brucellosis in humans, knowledge and practices among patients and medical practitioners in Wakiso district, Uganda.** AJ Namuwonge, P Vudriko, M Dione, M Afayoa... - 2023 - researchsquare.com
- In Vitro Anti-Venom Potentials of Aqueous Extract and Oils of Toona ciliata M. Roem against Cobra Venom and Chemical Constituents of Oils,** DF Okot, J Namukobe, P Vudriko, G Anywar... - *Molecules*, 2023 - mdpi.com
- Ticks; a reservoir for virus emergence at the human-livestock interface in Uganda.**... , JG Shepherd, L Tong, AR Ademun, P Vudriko... - bioRxiv, 2023 - biorxiv.org
- Mastitis on selected farms in Wakiso district, Uganda: Burden, pathogens and predictors of infectivity of antimicrobial resistant bacteria in dairy herds** S Kakooza, F Mutebi, P Ssajjakambwe... - *Veterinary Medicine ...*, 2023
- Management of very severe tungiasis cases through repeated community-based treatment with a dimeticone oil formula: a longitudinal study in a hyperendemic ...**H McNeilly, F Mutebi, M Thielecke, F Reichert... - medRxiv, 2023 - medrxiv.org
- High level of knowledge about Tungiasis but little translation into control practices in Karamoja, Northeastern Uganda,**M Thielecke, H McNeilly, F Mutebi... - *Tropical Medicine and ...*, 2023 - mdpi.com
- Prevalence and Infection Intensity of Human and Animal Tungiasis in Napak District, Karamoja, Northeastern Uganda,**F Mutebi, H McNeilly, M Thielecke, F Reichert... - *Tropical Medicine and ...*, 2023 - mdpi.com
- Characterization of tungiasis infection and morbidity using thermography in Kenya revealed higher disease burden during COVID-19 school closures,**N Riithi, P Ouma, F Mutebi... - *Infectious ...*, 2023 - idjournal.biomedcentral.com
- Tungiasis Stigma and Control Practices in a Hyperendemic Region in Northeastern Uganda,** H McNeilly, M Thielecke, F Mutebi, M Banalyaki... - *Tropical Medicine and ...*, 2023 - mdpi.com
- Neurocognitive and mental health outcomes in children with tungiasis: a cross-sectional study in rural Kenya and Uganda,**E Chongwo, K Katana, C Nasambu, F Mutebi... - *Infectious Diseases of ...*, 2023 - Springer
- Reflections on Drivers for the Emergence and Spread of Antimicrobial Resistant Bacteria Detected from Chickens reared on Commercial Layer Farms in Mukono ...**,DH Kiryabwire, E Nabatta, W Eneku - *Veterinary Medicine ...*, 2023 - Taylor & Francis
- Spatio-temporal analysis of sheep and goat pox outbreaks in Uganda during 2011–2022** P Vudriko, J Erume, F Mubiru, W Eneku... - *BMC Veterinary ...*, 2023 - Springer
- Reflections on Drivers for the Emergence and Spread of Antimicrobial Resistant Bacteria Detected from Chickens reared on Commercial Layer Farms in Mukono,**S Kakooza, DS Tayebwa, KR Njalira... - *Veterinary Medicine ...*, 2023 - Taylor & Francis
- Spatio-temporal analysis of sheep and goat pox outbreaks in Uganda during 2011–2022,** G Nizeyimana, P Vudriko, J Erume, F Mubiru... - *BMC Veterinary ...*, 2023 - Springer
- Assessment of the Impact of Early Diagnosis and Early Treatment in the Integrated Control of East Coast Fever (ECF) Involving Acquired Immunity Induced by Natural ...**, A Kazibwe, C Terundaja, E Matovu, GW Lubega - *Pathogens*, 2023 - mdpi.com
- Antimicrobial Resistance profiles of staphylococcus aureus in farming communities of Isingiro and Kamuli districts, Uganda.** JM Kungu, SS Tegule, IA Awke, J Namayanja... - 2023 - researchsquare.com
- Prevalence of African animal trypanosomiasis among livestock and domestic animals in Uganda: a systematic review and meta-regression analysis from 1980 to 2022,** G Cecchi, C Scoglio, E Matovu, D Muhanguzi - *Scientific Reports*, 2023 - nature.com
- Seroprevalence and risk factors of Peste des petits ruminants in different production systems in Uganda,** B Wieland, A Perez, H Kiara, D Muhanguzi - ... *veterinary medicine*, 2023 - Elsevier
- Distribution and prevalence of ixodid tick species (Acari: Ixodidae) infesting cattle from North-eastern Uganda (Karamoja),** J Bbira, S Ochwo, R Tweyongyere, D Muhanguzi - 2023 - researchsquare.com
- Seroprevalence of Contagious Bovine Mycoplasma mycoides subsp. mycoides small colony type (MmmSC) in Cattle from Karamoja Region, North-eastern Uganda,** S Ainebyoona, H Abizera, FN Mwiine, D Muhanguzi - 2023 - researchsquare.com
- Spatio-temporal analysis of sheep and goat pox outbreaks in Uganda during 2011–2022,** S Atim, C Ayebazibwe, D Muhanguzi... - *BMC Veterinary ...*, 2023 - Springer
- Prevalence of African animal trypanosomiasis among livestock and domestic animals in Uganda: a systematic review and meta-**

- regression analysis from 1980 to 2022**, G Cecchi, C Scoglio, E Matovu, D Muhanguzi - Scientific Reports, 2023 - nature.com
- Seroprevalence and risk factors of Peste des petits ruminants in different production systems in Uganda**, B Wieland, A Perez, H Kiara, D Muhanguzi - ... veterinary medicine, 2023 - Elsevier
- Distribution and prevalence of ixodid tick species (Acari: Ixodidae) infesting cattle from North-eastern Uganda (Karamoja)....**, J Bbira, S Ochwo, R Tweyongyere, D Muhanguzi - 2023 - researchsquare.com
- Invasive cattle ticks in East Africa: morphological and molecular confirmation of the presence of Rhipicephalus microplus in south-eastern Uganda**, D Muhanguzi, J Byaruhanga
- Seroprevalence of Contagious Bovine Mycoplasma mycoides subsp. mycoides small colony type (MmmSC) in Cattle from Karamoja Region, North-eastern Uganda**, S Ainebyoona, H Abizera, FN Mwiine, D Muhanguzi - 2023 - researchsquare.com
- The burden and spatial distribution of bovine African trypanosomes in smallholder crop-livestock production systems in Tororo District, south-eastern Uganda**, D Muhanguzi, K Picozzi, J Hattendorf, M Thrusfield... - Parasites & vectors, 2014 - Springer
- Cost analysis of options for management of African Animal Trypanosomiasis using interventions targeted at cattle in Tororo District; south-eastern Uganda**, D Muhanguzi, WO Okello, JD Kabasa, C Waiswa... - Parasites & ..., 2015 - Springer
- Spatio temporal cluster analysis and transmission drivers for Peste des Petits Ruminants in Uganda**, A Perez, H Kiara, D Muhanguzi - Transboundary and ..., 2022 - Wiley Online Library
- Tick communities of cattle in smallholder rural livestock production systems in sub-Saharan Africa**, MN Frank, D Muhanguzi... - Parasites & ..., 2023 - parasitesandvectors.biomedcentral
- Identifying target areas for risk-based surveillance and control of transboundary animal diseases: a seasonal analysis of slaughter and live-trade cattle movements**, S Ochwo, NF Mwiine, L Boden, D Muhanguzi... - Scientific Reports, 2023 - nature.com
- Tick-borne pathogens and body condition of cattle in smallholder rural livestock production systems in East and West Africa**, MN Frank, D Muhanguzi... - Parasites & ..., 2023 - parasitesandvectors.biomedcentral
- Ticks; a reservoir for virus emergence at the human-livestock interface in Uganda**, P Vudriko, J Erume, S Odongo, D Muhanguzi... - bioRxiv, 2023 - biorxiv.org
- Variants of IL6, IL10, FCN2, RNASE3, IL12B and IL17B loci are associated with Schistosoma mansoni worm burden in the Albert Nile region of Uganda**, J Nassuuna, A Elliott, MP Kimuda... - PLOS Neglected ..., 2023 - journals.plos.org
- Economic losses associated with respiratory and helminth infections in domestic pigs in Lira district, Northern Uganda**, P Oba, M Dione, FN Mwiine, B Wieland... - ... in Veterinary Science, 2023 - frontiersin.org
- Comparison of rectal thermometry with the alternative undertail**, R Abigaba, PC Sianangama, O Chibinga, N Gulaita... - 2023 - ojafr.com
- Variation of Rabies Incidence with Rainfall Pattern in Uganda: Neglected Implication of Climate Change on Rabies Risk**, CGK Atuheire, M Taremwa, K Bwambale... - ... MEDICAL SCIENCES ..., 2023 - researchgate.net
- Mastitis on selected farms in Wakiso district, Uganda: Burden, pathogens, and predictors of infectivity of antimicrobial resistant bacteria in dairy herds**, E Wampande, E Nabatta, C Atuheire
- Antimicrobial resistance and stewardship among stakeholders of the poultry value chain in Wakiso and Soroti districts, Uganda: Knowledge, attitudes and ...**, P Ssajakambwe, C Atuheire, J Okello, S Kakooza... - 2023 - cgspace.cgiar.org
- Contribution of the one health approach to strengthening health security in Uganda: a case study**, JB Kibanga, A Nakanwagi, I Makumbi, I Nabukenya... - BMC Public Health, 2023 - Springer
- Antimicrobial Resistance profiles of staphylococcus aureus in farming communities of Isingiro and Kamuli districts, Uganda**, JM Kungu, SS Tegule, IA Awke, J Namayanja... - 2023 - researchsquare.com
- Animal Source Foods Quality and Safety Standards Implementation in Uganda. A Review**, JM Kungu, F Ejobi, BA Okuyo, J Namayanja... - 2023 - research square.com
- Mentorship of the next generation of One Health workers through experiential learning: A case of students of Makerere University**, D Tuhebwe, CD Kato, A Musewa, JM Kungu... - CABI One ..., 2023 - cabidigitallibrary.org
- Prevention of human exposure to livestock faecal waste in the household: a scoping study of interventions conducted in sub-Saharan Africa**, DN Sentamu, J Kungu, M Dione, LF Thomas - BMC public health, 2023 - Springer
- Seroprevalence of brucellosis in humans, knowledge and practices among patients and medical practitioners in Wakiso district, Uganda**, M Dione, M Afayoa, G Kibirige, DR Mugizi, JM Kungu - 2023 - researchsquare.com
- Economic losses associated with respiratory and helminth infections in domestic pigs in Lira district, Northern Uganda**, P Oba, M Dione, FN Mwiine, B Wieland... - ... in Veterinary Science, 2023 - frontiersin.org
- Co-infections of respiratory pathogens and gastrointestinal parasites in smallholder pig production systems in Uganda**, P Oba, B Wieland, FN Mwiine, J Erume, MM Dione - Parasitology research, 2023 - Springer
- Prevalence and predictors of tuberculosis among HIV patients who completed isoniazid preventive therapy (IPT) at Reach out Mbuya community health initiative**, W Sekayi, E Namyalo, J Namayanja, JM Kungu - Scientific Reports, 2023 - nature.com
- Antimicrobial Resistance profiles of staphylococcus aureus in farming communities of Isingiro and Kamuli districts, Uganda**, E Namyalo, J Oposhia, W Olum, L Nyakarahuka... - 2023 - researchsquare.com
- Climatic determinants of COVID-19 cases and deaths in Uganda: 2020-2022**, J Okello, L Nyakarahuka, J Muleme, C Atuheire... - 2023 - eartharxiv.org
- Molecular characterization of the 2022 Sudan virus disease outbreak in Uganda**, I Krapinaya, F Scholte, L Nyakarahuka... - Journal of ..., 2023 - Am Soc Microbiol
- Risk factors for human brucellosis in agro-pastoralist communities of south western Uganda: a case-control study**, C Kansiiime, IB Rwego - BMC Research ..., 2015 - bmcresearch.biomedcentral.com
- One Health capacity building in sub-Saharan Africa**, IB Rwego, OO Babalobi, P Musotsi... - Infection ecology & ..., 2016 - Taylor & Francis
- Development of core competencies for field veterinary epidemiology training programs**, S Shadomy, C Squarzoni, I Rwego... - ... in Veterinary Science, 2023 - frontiersin.org
- Mercury Contamination and Spill-over at Human-Wildlife-Environment Interface**, A Tamale, J Okello, C Sente - 2023 - intechopen.com
- Assessing the knowledge and practices of smallholder pig farmers and associated risk factors for swine gastrointestinal disorders in Masindi district, Uganda**, S Majalija, G Tumwine, J Kiguli, B Owori, RA Isabirye... - 2023 - researchsquare.com
- Antimicrobial Usage by Small-Scale Commercial Poultry Farmers in Mid-Western District of Masindi Uganda: Patterns, Public Health Implications, and ...**, M Samuel, T Fredrick Wabwire, G Tumwine... - Veterinary Medicine ..., 2023 - hindawi.com
- Spatio-temporal analysis of sheep and goat pox outbreaks in Uganda during 2011-2022**, G Nizeyimana, P Vudriko, J Erume, F Mubiru... - BMC Veterinary ..., 2023 - Springer

- Co-infections of respiratory pathogens and gastrointestinal parasites in smallholder pig production systems in Uganda,** P Oba, B Wieland, FN Mwiine, J Erume, MM Dione - *Parasitology research*, 2023 – Springer
- Diversity, Diverse Repertoire of Virulence-Associated Genes and Limited Antibiotic Resistance Genes among Commensal *Escherichia coli* from Food Animals in ...**DK Byarugaba, G Wokorach, S Alafi, B Erima... - *Microorganisms*, 2023 - mdpi.com
- Co-surveillance of rotaviruses in humans and domestic animals in Central Uganda reveals circulation of wide genotype diversity in the animals,** J Bwogi, C Karamagi, DK Byarugaba, P Tushabe... - *Viruses*, 2023 - mdpi.com
- Whole strains vs MGEs in short and longterm transmission of ESBL genes between healthcare and community settings in Uganda,** H Christensen, JE Olsen, DK Byarugaba - *Scientific Reports*, 2023 - nature.com
- Assessment of the Impact of Early Diagnosis and Early Treatment in the Integrated Control of East Coast Fever (ECF) Involving Acquired Immunity Induced by Natural,** A Nanteza, Z Nsadh, J Nsubuga, S Oligo, A Kazibwe... - *Pathogens*, 2023 - mdpi.com
- Epidemiology and effectiveness of interventions for Foot and Mouth Disease in Africa: A systematic review and meta-analysis,** E Namisango, AA Kinengyere, M Ocan, A Nanteza... - 2023 - researchsquare.com
- Detection of carbapenem resistance genes in *Campylobacter coli* and *Campylobacter jejuni* isolated from chickens, and diarrheic children aged less than five years in ...**W Okello, A Nanteza, FL Opiyo, J Okello, LR Ninsiima... - *medRxiv*, 2023 - medrxiv.org
- East Coast Fever Carrier Status and *Theileria parva* Breakthrough Strains in Recently ITM Vaccinated and Non-Vaccinated Cattle in Iganga District, Eastern Uganda,** S Oligo, A Nanteza, J Nsubuga, A Musoba, A Kazibwe... - *Pathogens*, 2023 - mdpi.com
- Potential persistence mechanisms of the major *Anopheles gambiae* species complex malaria vectors in sub-Saharan Africa: a narrative review,** R Mwima, TYJ Hui, A Nanteza, A Burt, JK Kayondo - *Malaria Journal*, 2023 – Springer
- Epidemiology and effectiveness of interventions for Foot and Mouth Disease in Africa: A systematic review and meta-analysis,** E Namisango, AA Kinengyere, M Ocan, A Nanteza... - 2023 - researchsquare.com
- Detection of carbapenem resistance genes in *Campylobacter coli* and *Campylobacter jejuni* isolated from chickens, and diarrheic children aged less than five years in ...**, W Okello, A Nanteza, FL Opiyo, J Okello, LR Ninsiima... - *medRxiv*, 2023 - medrxiv.org
- Prevalence of gastrointestinal parasites and molecular identification of beta-tubulin mutations associated with benzimidazole resistance in *Haemonchus* ...**, F Kalule, P Vudriko, A Nanteza, AB Ekiri... - *Veterinary Parasitology* ..., 2023 – Elsevier
- Morphological and Genetic Characterization of Jackfruit (*Artocarpus heterophyllus*) in Kayunga and Luwero Districts of Uganda,** R Gwokyalya, A Nanteza, H Wagaba, SJ Kayondo... - 2023 - researchsquare.com
- The antigen recognition portion of African buffalo class I MHC is highly polymorphic, consistent with a complex pathogen challenge environment, and the 3-region ...**I Obara, A Nijhof, P Atimnedi, D Mijele, A Nanteza... - *Immunogenetics*, 2023 – Springer
- Continent-wide genomic analysis of the African buffalo (*Syncerus caffer*)....**, FJ Martin, M Labuschagne, P Atimnedi, A Nanteza... - *bioRxiv*, 2023 - biorxiv.org
- A Survey of Waterborne Parasites in Queen Elizabeth Protected Area, Uganda,** C Sente, H Onyuth, A Tamale, B Mali, BG Namara... - 2023 - preprints.org
- Molecular Detection of *Cryptosporidium* Species in Wildlife and Humans at the Wildlife-Human Interface around Queen Elizabeth National Park, Uganda,** CM Mugasa, BB Mirembe, S Ochwo, J Nkamwesiga... - *Parasitologia*, 2023 - mdpi.com
- Molecular characterization of Carbapenem-resistant *Escherichia coli* isolates from sewage at Mulago National Referral Hospital, Kampala: a cross-sectional study,** G Nakabiri, J Nsubuga, A Kitibwa, CD Kato... - *Annals of ...*, 2023 – Springer
- Fish Vaccination,** S Dubey, KK Mugimba, J Kumar... - *Fish Vaccines: Health* ..., 2023
- Antimicrobial Usage by Small-Scale Commercial Poultry Farmers in Mid-Western District of Masindi Uganda: Patterns, Public Health Implications, and ...**M Samuel, T Fredrick Wabwire, G Tumwine... - *Veterinary Medicine* ..., 2023 - hindawi.com
- Prevalence of Crimean-Congo haemorrhagic fever in livestock following a confirmed human case in Lyantonde district, Uganda,** SA Atim, M Niebel, S Ashraf, P Vudriko, S Odongo... - *Parasites & ...*, 2023 – Springer
- Nanobodies: a review of generation, diagnostics, and therapeutics,** B Jin, S Odongo, M Radwanska, S Magez - ... *Journal of Molecular Sciences*, 2023 - mdpi.com
- Ticks; a reservoir for virus emergence at the human-livestock interface in Uganda,** L Tong, AR Ademun, P Vudriko, J Erume, S Odongo... - *bioRxiv*, 2023 - biorxiv.org
- Nanobody technology and new molecular biology methods to advance rapid diagnostic test for neglected tropical diseases,** M Radwanska, S Magez, S Odongo - *Rapid antigen* ..., 2023
- Assessment of the Impact of Early Diagnosis and Early Treatment in the Integrated Control of East Coast Fever (ECF) Involving Acquired Immunity Induced by Natural ...**A Nanteza, Z Nsadh, J Nsubuga, S Oligo, A Kazibwe... - *Pathogens*, 2023 - mdpi.com

7

Knowledge Transfer and Partnerships



7.1 UK-based Centre for Environment, Fisheries and Aquaculture Science (Cefas) seeks collaboration with CoVAB in Aquatic Health.

The College of Veterinary Medicine, Animal Resources and Biosecurity on 8th August 2023 hosted a team from the Centre for Environment, Fisheries and Aquaculture Science, an executive agency for the UK Government's Department for Environment, Food, and Rural Affairs. Dr. Richard Paley and Mr. Andrew Wokorac Joseph of the Environment and Animal Health group were in the College courtesy of Dr. John Walakira from the National Agricultural Research

Organization (NARO). Their visit was aimed at forging collaboration and supporting diagnostic and research activities pertaining to aquatic animal health.

While talking to the visiting team in view of the upcoming collaboration, Prof. Robert Tweyongyere on behalf of the Principal noted that Uganda is one of the main producers of fisheries products in Sub-Saharan Africa and with fish as the second largest foreign exchange earner for Uganda. He said the interventions in the collaboration were pertinent given the declining production that is also negatively affecting national and household income and food security which is being addressed by the Government of Uganda through promotion of aquaculture.



(L-R) Prof. Tweyongyere, The Dean, SVAR Dr. Claire M. Mugasa, Dean SBLs, Dr. David Kahwa.

in aquaculture, there are bound to be frequent disease outbreaks. He said anti-microbial resistance and drug residues were inevitable because, in the process of managing fish disease, antibiotics are administered. Further, he pointed out the limited knowledge and skills in fish health management which falls in the docket of veterinarians although few are well equipped with the requisite skills and knowledge.

He referred to Makerere University's vision of innovative teaching, learning, and services responsive to national and global needs, and the strategic direction of enhancing and strengthening partnerships with industry, and the community through multiple collaborations with universities and other research institutions regionally and globally. He informed the team that Makerere University offers comprehensive training programs in aquaculture, fisheries production, and aquatic animal health at CoVAB and the College of Natural Sciences (CoNAS). He said at CoVAB, research in aquatic animal health had expanded to cover core areas of biosecurity and ecosystem health following the one health approach and emphasized the need for increased collaborative ties and networks with the private sector, research institutions, universities, and technical agencies, working closely with the fish farmers.

He highlighted some of the fisheries/aquaculture research projects ongoing that include Safe Fish

which is investigating phages as alternatives to antibiotic use in fish management; Novel Feeds, which is developing a feed formulation for fish larvae; Bioconversion of Industrial waste products in Nile perch, Artificial Intelligence system to balance water quality and feed; Capacity Building in aquatic animal health and environmental health as well as probiotics for use on Tilapia and Nile Perch farms.

Dr. John Walakira from NARO noted that there was potential for a long-term relationship between CoVAB and NARO and urged the college to identify gaps that need to be filled in the future in the aquaculture industry. He said the team was in the college to establish what it could do in the industry, noting that issues of diseases were recurrent and a preserve of the veterinarians. He noted that aquaculture animal health was growing very fast with over 2.5 billion fingerlings in the region and in the process, diseases are on the increase.

The team from Cefas was in the college to establish what was on the ground for example the graduate courses as well as training for the practitioners in the industry. Africa has been without aquaculture-related diseases but now they are getting reported and veterinarians called to take up the challenge. Because of the rich resources in Uganda, it's time to train practitioners, he said, and that Makerere University especially CoVAB was a focal point, especially in dealing with such diseases.



(R-L) CEFAS team, Dr. Richard Paley flanked by Mr. Andrew Wokorac Joseph.

Dr. Richard Paley from the Centre for Environment, Fisheries and Aquatic Science said Cefas is an International Centre of Excellence involved in the maintenance of the health of wild and farmed seafood to minimize loss and maximize food security. He said as a world leader in marine science and technology, Cefas collects, manages, and interprets data on the



Some of the BVM students that attended the meeting

aquatic environment, biodiversity and fisheries. Their Weymouth lab has over 1100 scientists dedicated to aquatic health bringing together all the necessary disciplines that among many include disease inspection, diagnosis, research and development, microbiology, virology and many more.

The World Organization for Animal Health (WOAH) designated Cefas as the WOAH Collaborating Centre for Emerging Aquatic Animal Diseases. He said their aim is to function as a global resource for health and disease research, diagnostics, pathogen detection and description, and knowledge sharing associated with aquatic animals.

7.2 EDUPROMO international training session at CoVAB



The Consortium of the Norwegian University of Life Sciences, Makerere University, University of Zambia, University of Dar es Salaam Institute of Marine Sciences and Mbeya University of Science and technology won the Norwegian partnership program for Global Academic Cooperation (NROPART) funded project called; Promoting Sustainability of Higher Education through Global Cooperation, student program development, Mobility and Training (EDUPROMO) project.

This multidisciplinary project, the first of its kind, is aimed at addressing learner and facilitator mobility which is very crucial in attaining quality learner outcomes. The project is being implemented in Uganda, Zambia, Tanzania, and Norway and at CoVAB in the Department of Biosecurity, Ecosystems, and Veterinary Public Health (BEP).

The training held from the 16th of October to the 9th of November 2023 at CoVAB aimed to build capacity in statistical analysis, fish and environmental health, One Health in food security, and anti-microbial resistance.



Some of the beneficiary trainees

The EDUPROMO project aims to promote sustainability in higher education and will be delving into areas such as statistical analysis, fish and environmental health, one health in food safety, and antimicrobial resistance. These subjects are not only fascinating but also vital in the ever-evolving world of aquatic health and ecosystem management. I'm looking forward to gaining valuable knowledge and experiences and to bring this newfound expertise back to contribute to the betterment of aquatic ecosystems and animal health.

'I'm immensely grateful to Makerere University for this opportunity and to the entire EDUPROMO project team for their support. It's an incredible honor to represent my institution and country in this international endeavor' said Kezzy Bessa, MSc Candidate in Aquatic Animal Health and Ecosystem Management Fisheries and Aquaculture Fish Biodiversity Conservation from the University of Zambia, Lilongwe University of Agriculture and Natural Resources.

7.3 COHESA in Uganda; Stakeholders hold a discourse to lay strategies for project implementation

Capacitating One Health in Eastern and Southern Africa (COHESA) national strategic workshop was convened at Imperial Royale Hotel in Kampala, 25th -26th April 2023. It was aimed at making a contribution towards the One Health approach in Uganda through promoting COHESA activities from low to high-level stakeholders; reviewing and validating the findings from the baseline study and soliciting constructive recommendations on the way forward from the baseline study and how COHESA can incorporate those in its country plans.

The College of Veterinary Medicine, Animal Resources and Bio Security (CoVAB), in collaboration with the International Livestock Research Institute (ILRI), the French Agricultural Research Centre for International Development (CIRAD), and International Service for the Acquisition of Agri-biotech (ISAAA) embarked on implementing the project in Eastern and Southern Africa.

With close to 9 billion Euros from the European Union, COHESA is implemented in eleven African countries including Uganda, Ethiopia, Tanzania, Rwanda, and Kenya in East Africa. In the Southern part of Africa, the implementation is in Mozambique, Zambia, Namibia, Botswana and Malawi. It brings together a number of sectors including Wildlife, Environment, Fisheries, and many more to enable people to enjoy quality life



Conference participants take a group photo

through addressing the One Health challenges that characterize the respective countries.

According to the Team Leader in Uganda, Prof. Clovice Kankya from the Department of Biosecurity, Ecosystems, and Vet Public Health, COHESA will help address One Health and anti-microbial resistance issues affecting the region, and these were the main subjects of the discussion in the two-day event that came in following the launch of COHESA on December 7th, 2022. Prof. Kankya explained that the discourse was aimed at identifying strategies and guidance to find a better way of addressing issues of One Health.

‘It is imperative to lay strategies to address challenges even when there is no problem at hand. The National strategic workshop needs to plan how to address issues as and when they arise citing the examples of Covid 19 and Ebola that paused a burden on human and financial resources when they struck. There must be a plan beforehand to ascertain the availability of resources like finances and human capital, he observed. He noted that the world is facing unprecedented, interconnected threats to the health of people, animals, and the environment and that addressing these threats requires cross-sectoral, systems-wide approaches.

‘The One Health concept recognizes the interconnection between people, animals, plants, and the environment. COVID-19 and its origins as a zoonotic pathogen is a particularly pertinent example. One Health concerns many of the other major threats of our time, such as climate change and disease emergence, antimicrobial resistance, ecosystem destruction with loss of biodiversity, and the fragility of food and feed systems.

Prof. Kankya said efforts towards developing cadres in line with One Health were in advanced stages with the proposed Ph.D. program in Global Health and Biosecurity at the College of Veterinary Medicine, Animal Resources and Biosecurity, Makerere University.

He highlighted some of the challenges at hand including getting entities working together given that One Health is multi-sectoral and requires concerted effort. He said sharing data generated amongst many agencies, which unfortunately was not forthcoming. ‘We have to plan together and share the information he emphasized.’ While explaining the reason for the stakeholder engagement.

Theodore Knight Jones from the International Livestock Research Institute (ILRI), the body coordinating the implementation of the project said COHESA will work with Makerere and other Universities in the implementing countries in addressing such complex challenges affecting the health and well-being of people and animals. He said COHESA was to come up with a collaborative approach to deal with challenges like the environmental impacts arising from pollution, health, and agriculture. He said because the problems spill over different sectors, there was a need for high-level collaboration citing the example of diseases that spread beyond borders and that at the national level, the project would support different partners in dealing with the issues affecting them. He said emerging diseases were the major challenge affecting Uganda, in addition to food toxins, pesticides and general contamination of food and hence the human health system.

COHESA aims to generate an inclusive Research & Innovation ecosystem, facilitating rapid uptake, adaption and adoption of solutions to issues that can be dealt with using a One Health approach, with the One Health concept embedded across society in Eastern and Southern Africa (ESA), working for healthy humans, animals and environments. It is expected that by the end of the project, several outputs will be realized. Government entities with One Health mandates and stakeholders across society will be capacitated in cross-sectoral collaboration. They will also be capacitated in the development of evidence-based One Health strategies and policies. National secondary, tertiary, and vocational education institutes strengthened in building One Health capacity for the next generation workforce.

Research institutes will be capacitated in training next generation One Health researchers, capacitated in the identification, development, adaption, and delivery of One Health solutions including technologies, soft skills, and strategic approaches for addressing current challenges. Service providers (public, private) to be capacitated in identification, adoption and delivery of OH solutions. One Health-related Public-Private Partnerships strengthened in delivery of OH solutions and consultation on One Health issues. There will also be some contribution to the emerging understanding of One Health, its appropriate use, and added value, knowledge, and information on research and policies in East and Southern Africa promoted through project platforms.



Students and staff from Mississippi State University who were at COVAB for the 2023 summer school pose for a picture with the Dean SVAR, Prof. Robert Tweyongyere (L)



Dr. Celsius Sente, the Summer School Coordinator addresses the students

7.4 The CoVAB - Mississippi State University Summer School 2023

The 2023 Summer School organized by the College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB) in collaboration with Mississippi State University (MSU) ended with participants making presentations about experiences of their stay in Uganda. The collaboration between Makerere's CoVAB and the College of Veterinary Medicine at MSU has been in existence for the last fourteen years and over the past period attracted other Universities like Virginia Tech which sent students for an externship program and also to explore ways of participating in subsequent summer schools.

During the presentations by participants held at the College on Thursday 22nd June 2023, the students in their thematic groups illustrated their experiences and lessons learnt during the course of the three weeks summer school.

According to the program coordinator Dr. Celsius Sente, the University of Surrey came aboard the summer school program in 2022 while Virginia Tech University was also in the process of developing a program to enable them participate.



Dr. David Kahwa (R) flanked by Dr. Mali Bob, from WAAR Department



Prof. Stephen Reichley (standing) interacts with the students



The Principal CoVAB Prof. Frank Nobert Mwiine (3rd R) welcomes the Malaysian team in his Office

While speaking on behalf of the Head, Department of Wildlife and Aquatic Resources Management, Dr. David Kahwa congratulated the participating students and faculty for the resilience during their stay out in the wild. He said the summer school was a very opportune engagement since a number of staff wrote publications in addition to gaining useful exposures and experiences. He called for further collaborations in order to increase the number of beneficiaries that should include Veterinary Medicine students from CoVAB.

Prof. Stephen Reichley, the Team leader from Mississippi University appreciated CoVAB for making all the necessary preparations that helped their students participate in the month-long Summer School. He said in 2023, the number of students increased to 18 from 3 when the program began. He stressed the need to engage CoVAB's Bachelor of Veterinary Medicine Students fully throughout the program so that they too can benefit from the great opportunity that the summer school offers to its participants. He said the summer school was opening up opportunities for further collaboration in areas like student exchange programs as well as graduate research.

7.5 Malaysia based Bio-Angle Vacs SDN.BHD Seeks out partnership with CoVAB

The College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB) on Tuesday 19th July 2023 hosted Malaysia based Bio-Angle Vacs SDN.HBD., a pharmaceutical company supplying veterinary vaccines for goats and sheep. It was led by the Chief

Executive Officer Noor Shazreena Ishak, who was accompanied by Alhaj Habib Kagimu, the Honorary Consul of Malaysia in Uganda, and Fatim Mohemd Tarip from Pure Adventure Global Trade.



Bio-Angle Vacs SDN.BHD Chief Executive Officer Noor Shazreena Ishak (centre) addressing the meeting

During their interactions with the CoVAB management and staff, it was revealed that Bio-Angle Vacs SDN.HBD were the manufacturers of the first intranasal spray vaccine for small ruminants in the world.

While welcoming the team, CoVAB Principal Prof. Nobert Frank Mwiine gave a brief background about the college and Makerere University as a whole. He said with effect from the year 2022 going forward, the University was refocusing towards becoming research-led. He said University and Industry work hand in hand in offering solutions to societal problems, adding that it was high time that the college created strong partnerships with the industry to come up with products that benefit society.



CoVAB staff listen attentively

Prof. Mwiine noted that the community was affected by several diseases and that it was important that scientists address the control, management, and total elimination of diseases. He cited the example of the global agenda of eliminating foot and mouth disease noting that Uganda was incapacitated because of such diseases and cannot export products to international markets.

He said that at Makerere University, several postgraduate programs can address such challenges through research. ‘The Animal Industry must be improved. It is our role as researchers to prevent diseases, there are protocols to prevent diseases, he said while taking cognizance of the fact that as much as Uganda was gifted with wildlife, these bring with them several viruses and bacteria. It is upon us as researchers to find solutions, he observed.



Prof. Mwiine (2nd R) flanked by Dr. Margaret Saimo Kahwa PI, Anti-Tick Vaccine Development Initiative

While addressing himself on the vaccine produced by Bio-angle Vacs Sdn Bhd, Prof Mwiine observed that this was for the small ruminants like goats and sheep and called upon the scientists to help find solutions

to other diseases, bearing in mind that need is the mother of innovation.

The Bio-angle Vacs Sdn Bhd Chief Executive Officer Noor Shazreena Ishak, said her company was focusing on products that through innovations would help farmers improve productivity. She said their product STVac an intra nasal spray vaccine was wholly developed and patented by Universiti Putra Malaysia and had 98% proven efficacy. She explained that the vaccine stimulates local immunity that protects the respiratory tract from the invasion of M. haemolytica A 2, A7, and A9 and at the same time stimulates the systematic immunity of the animals.



Alhaj Habib Kagimu, the honorary Consul of Malaysia in Uganda led the delegation

Alhaj Habib Kagimu, the honorary Consul of Malaysia in Uganda said he was proud of Makerere University, citing the example of the Electric Car which he said he supported and it came to reality. He said Makerere University was internationally recognized and charged the researchers and teachers at the University to ensure that the knowledge they are generating impacts others. ‘You people here at Makerere are our leaders whether you know it or not’ he said adding that education is something that cannot be stolen, and pledged continued partnerships with the college.

Makerere University signed a Memorandum of Understanding (MoU) with Alfasan Uganda Limited on 19th March 2021 to facilitate the production of test batches of the Anti-Tick Vaccine developed by the College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB). The MoU was signed on behalf of Makerere University by the Vice Chancellor, Prof. Barnabas Nawangwe and on behalf of Alfasan by the Managing Director Dr. Stephen Birungi.



Similarly, a memorandum of understanding was signed between The Principal Investigator of the Anti-Tick Vaccine Development Initiative and the Honorary Consul of Malaysia in Uganda for producing and using advanced technology in treating animals. This will enable bringing the technology to Alfasan, a company that is developing the Anti-tick and other vaccines that can be administered orally.



7.6 Capacity-building Engagement on Human Capital Development in Science, Technology, and Innovation Industrialization

CoVAB's Human Capital Development Project held a five-day capacity building training at Esella Hotel, Kira to equip the project's staff and protégé with knowledge and skills in product value chain industrialization. During the workshop which ran from 24th to 28th July 2023 staff and Protégé were imparted with knowledge on commercialization of an innovative product, strategic financial management, strategic planning and management, business planning, policy formulation, and management.

The Superintendent of Industrial Value Chains Development, Science, Technology, and Innovation (STI) Office of the President, Dr. Cosmas Mwikirize pointed out that people were the most important in

the process of development. "In the development tree, people are the most important ingredient to development. No country can be better than the quality of its human resource," said Dr. Mwikirize, adding that the mentorship model is important given that it gives opportunity to people to develop technologies, and hence no need to look for jobs."

He encouraged participants to embrace Science, Technology, and Innovation because of its big contribution to national GDP. "STI is the way out, and if you want a good place to invest your money, look at your students who have good ideas and start pulling resources. Invest in your people's ideas and you will not go wrong," said Dr. Mwikirize.



Dr. Cosmas Mwikirize made his remarks during the opening ceremony.



The Principal Investigator for the Human Capital Development Project, Dr. Claire Mack Mugasa moderating the event

The protégés who participated in the workshop were all spread under STI Value Chain Economies which included the engineering, mobility, beauty and apparel, the digital, Agro security, and the pathogenic economy.

The Principal for the College of Veterinary Medicine, Animal Resources and Biosecurity, Prof. Frank Norbert Mwiine appreciated government support towards research and mentorship initiatives. “We thank the Government of Uganda for the support towards research and innovation through funding several projects, and for equipping the University with resources and laboratories for quality research,” said Prof. Mwiine. He emphasized the benefits of research, stating that nations need research to evolve and that research and innovation are the way through which the University gives back to society.

The Human Capital Development Project is championed by Dr. Claire Mack Mugasa, who is the

Principal Investigator of this initiative. Dr. Mugasa highlighted the need for equipping scientists, researchers and innovators with specialized techniques which is a critical aspect in national development and industrialization.

“We have our scientists and innovators working separately and are not in touch with one another in their production lines, but with this mentorship program, we are ensuring that the scientists have specialized skills, techniques, and knowledge that is key in industrialization,” said Dr. Mugasa, adding that, with some amount of redirection and orientation, the scientists will be brought together in a foundry network.

The Human Capital Development Initiative is funded by the Government of Uganda through the Science, Technology, and Innovation Office of the President.



The Principal COVAB Prof. Frank Norbert Mwiine making a welcome address



AFRISA staff together with the team from Scripture Union Uganda pose for a photo after the signing ceremony which was held at the Centre for Biosecurity and Global Health, CoVAB on 14th April 2023.

7.7 AFRISA Formalizes Working Relations with Scripture Union Uganda (SUU)

The Africa Institute for Strategic Animal Resource Services and Development (AFRISA) signed a partnership agreement with Scripture Union Uganda (SUU) to join efforts in re-orienting generations into industrial value chain producers.

Mr. Felix Okello, the Head of Secretariat signed on behalf of AFRISA, witnessed by the Chairperson for the Department of Corporate Services and Learner Affairs (CoSLA), Ms. Namara Racheal. The Scripture Union of Uganda was represented by partnership signatories that included the National Director, Mr. Dickens Zziwa Ssenyonjo, witnessed by the SUU Administrator, Mr. Samuel Turyahikayo.

In a partnership meeting held at CoVAB's Centre for Biosecurity and Global Health, on 14th April 2023, AFRISA's Principal Innovations Director, Prof. John David Kabasa highlighted the responsibility of the church as a transformation agent. "To have a skilled, productive, entrepreneurial, developmental, accredited, and transformative (SPEDANT) nation, the church must be SPEDANT as well," he said. Adding that, "the church must be skilled, have the ability of the heart, and skilling of the hand."

Prof. Kabasa emphasized that in the skilling of the current generation, there must be Academic-Community- Private- Public Partnership. He also pointed out Genesis 1: 28 where man was given dominion by God over all living things upon the earth

and was blessed to multiply and fill the earth and subdue it. He said the church has numbers and that being part of a serious SPEDANT team is the way to a productive generation.

The National Director SUU, Mr. Dickens Zziwa Ssenyonjo expressed his appreciation towards what he termed as words of wisdom that were said by Prof. Kabasa. Mr. Ssenyonjo related to the history of transformation, in the 18th century when the British invented the mechanical engine, excelled by using science in all kinds of industrialization, and developed an education system that hasn't helped the current unskilled generation. "The church wholeheartedly embraced an education system which has not helped. The current generation is the victim of the mistakes that were made 400 years ago and now we have to reform and undo those mistakes," he affirmed. The National Director further appreciated the idea of joining a SPEDANT team through partnering with AFRISA which is a champion in re-orienting generations to industrial value chain development.

SPEDA model is an innovation by AFRISA for deliberately providing a unique and alternative model of education that combines wholesome skilling, production of tradable products, formation of enterprises and development clusters, and accreditation for community socio-economic transformation to mitigate the challenges of poverty, peasantry, school dropout, and unemployment. Scripture Union Uganda is an organization in the church that provides opportunities for children, young people, and adults to explore the Word of God.

7.8 Knowledge Transfer through Exhibitions

CoVAB took part in the Youth and Innovation Expo held from 6th to 7th October 2023 at Makerere University. The two-day event showcased student innovations, exhibitions of Innovations turned enterprises from the Youth4Business program led by UNDP, and a very comprehensive, insightful, and engaging program curated performances from the School of Performing Arts and Film.

The line-up of activities for the Expo included exhibitions from all ten (10) colleges of the University and other University institutions, an Art exhibition, a fashion show curated by Axarya Trends and the Margret Trowel School of Fine Art, a medical camp, and Food vendor stalls.

CoVAB participated in the exhibition where it displayed apiary, animal production as well as animal feed.



Prof. Okuni inspects the animal feed exhibition



Products from various enterprises



Apiary enterprise



The Phages demonstration

8

Budget Performance



MAKERERE UNIVERSITY COLLEGE OF VETERINARY MEDICINE, ANIMAL RESOURCES AND BIO SECURITY (COVAB) December 30, 2023			
	Notes	Sub Total	Total
Approved Budget	1	1,556,515,486	
Revised Budget			1,556,515,486
Releases / Warranties			
Quarter 1-4	2	1,556,515,486	
Total Releases/Warranties			1,556,515,486
Expenditure			
Actual Expenditure	3	1,556,317,713	
Encumbrances	4	-	
			1,556,317,713
Balance	5		197,773

9

Challenges and future Plans



9.1 Infrastructure and transport


- a) Insufficient infra structure for the increasing student numbers
- b) inadquet transport for students and staff
- c) Lack of a standby generator
- d) Lack of a teaching Hospital

9.2 Human Resource

- a) Inadquet clinicians and technicians.
- b) Lack of an X-Ray attendant

10. Future Plans

- a) To acquire transport in order to facilitate movement of students to the field
- b) Establish and operationalize Veterinary Teaching hospital
- c) To expand the Ambulatory Clinic teaching operational area outside greater Kampala Mukono, Mpigi, Wakiso and Masaka



**College of Veterinary Medicine, Animal Resources
and Biosecurity**

P. O. Box 7062 Kampala - UGANDA

Telephone: +256 414 554685

Email: principal.covab@mak.ac.ug

Web: covab.mak.ac.ug