

COVAB ANNUAL REPORT 2021

50th
ANNIVERSARY REPORT

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WORD FROM THE

PRINCIPAL



Prof. Norbert Frank Mwiine,

Principal, COVAB

“

The year 2021 marked a 50-year milestone in the teaching and learning on the Veterinary Sciences and the yearlong celebration of achievements fits in well with the Mak@100 mark of excellence of Makerere University

It is a pleasure for me to present to you highlights of the achievements and milestones that the College of Veterinary Medicine, Animal Resources and Bio Security has realized over the year 2021. The report covers what we were able to do based on the targets set out in the strategic plan amidst the challenges. The past year in my view was both an exalating and challenging time not only at CoVAB but generally at Makerere University and in the higher education sector in the country. All this is because it posed to us as leaders in the sector, unprecedented scenarios that needed quick action and innovativeness as well as changes in the way we usually handle the teaching and learning. Indeed, it was not business as usual.

The year 2021 marked a 50-year milestone in the teaching and learning on the Veterinary Sciences and the yearlong celebration of achievements fits in well with the Mak@100 mark of excellence of Makerere University.

This report gives some highlights of the tremendous achievements realized in the delivery of services responsive to the needs of the communities. The signing of an agreement between the College and Alfasan Uganda Limited to address the problem of ticks and tick-borne diseases in Africa is worth mentioning. As part of the COVAB@50 celebrations, Nakyesasa Livestock Industrial Research, Incubation and Skilling Centre was commissioned as an alternative model of skilling education, community and

household transformation.

The College attracted a number of research grants that enhanced the practical teaching and learning experience at the college for both staff and students. Staff and students were able to reach out to the communities in need in the application of the skills and knowledge acquired through a number of studies and this made our presence felt among the communities for whom we exist.

I take this rare opportunity to appreciate the Government of Uganda and the University Administration for creating an enabling environment despite the hard times that saw us complete the academic year successfully. It is worth mentioning that all this has also been realized with support from our development partners to whom we are greatly indebted.

Based on the practice of collective responsibility, all that we have been able to do has been through the contribution of every member of staff at CoVAB, both Academic and Administrative and their input cannot go unnoticed. Suffice it to mention the great contribution made by my predecessor Prof. John David Kabasa who passed over the button of leadership at the end of the year.

I take cognizance of the lessons learnt along the way and these will be some of the basis that will guide the course of implementation of the College mandate in the coming period.

INTRODUCTION

1



COVAB@50

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 all through sailed from a faculty to a college having 2 schools i.e., Veterinary Medicine & Animal Resources (SVAR), Biosecurity, Biotechnical and laboratory Sciences (SBLS) and 1 skilling department the Africa Institute for Strategic Animal Resource Services and Development (AFRISA).

COVAB is a Constituent College of Makerere University as provided in Section 29 of the Universities and Other Tertiary Institutions Act as amended in 2006.

ABOUT US

COVAB MANDATE

This falls within the overall mandate of Makerere University namely;

- ◇ Provision of higher education through teaching and learning, research and knowledge transfer partnerships in sciences, innovations and Technology;
- ◇ 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.
- ◇ Provision of accessible physical facilities to the users of the Public University

COVAB MISSION STATEMENT

Healthier, Wealthier and Safer societies through animal value

COVAB MISSION

To drive transformative knowledge, skills, innovations and services for the continuous improvement of society

CORE VALUES

- ◇ Accountability
- ◇ Professionalism
- ◇ Inclusivity
- ◇ Integrity
- ◇ Respect





Prof. Frank Mwine

Principal COVAB 2021

COVAB STRUCTURE AND ADMINISTRATION IN 2021

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

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.

SCHOOLS, DEPARTMENTS AND ADMINISTRATIVE OFFICES

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 Biomedical Laboratory services (SBLS). These are charged with taking leadership in areas of programming, coordination and management of the respective units that are lined up according to the disciplines.

School of Veterinary Medicine and Animal Resources

The School of Veterinary medicine and Animal Resources is headed by Prof. Robert Tweyongyere, comprised of 3 departments which include Livestock and industrial Resources (LIR) headed by Dr. Rose Azuba, veterinary pharmacy, clinical and comparative medicine headed by Professor Julius Okuni and wildlife and Aquatic Animal Resources (WAAR) headed by Dr. Sarah Nalule.

School of Biomedical Laboratory Sciences

Prof. Frank Nobert Mwiine was the Dean before assuming the office of Principalship early 2022. This school is made up of 3 departments including Biomolecular resources and Biolab (BBS) sciences headed by Dr. Immaculate Nakalembe, Biosecurity, Ecosystems and Vet public Health (BEP) headed by Prof Clovice Kankya and Biotechnical and Diagnostic sciences (BDS) headed by Dr. Claire M. Mugasa

African Institute for Strategic Animal Resource Services and Development

The AFRISA-SPEDA initiative came about as a result of the presidential directives of the 2th 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.

A semi-autonomous institute called 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. AFRISA is currently led by Mr. Felix Okello



1.5. Institute and Centres

INSTITUTE/ CENTRE	AREA OF FOCUS	TARGET GROUP	PARTNERS	PRINCIPAL INVESTIGATOR / HEAD
Africa Institute for Strategic Resource Services and Development (AFRISA)	Comprehensive industrial value chain Education and cottage enterprises development	Academia Community Public Private Partnerships	UWA Stamping out sleeping sickness UNCST University of Edinburgh Michigan state University	Okello Felix
Ruth Keesling wildlife health Extension, research and Education	Strategic wildlife innovations	Wildlife community	UWA	Dr. Sarah Nalule
Centre for Biosecurity, zoonoses and Food Safety.	Bio-risks and bio-threats	Community	GoU	Dr. Enock Matovu
Joint National Animal Diagnostics Centre(J-NADIC)	Diagnostic Extension Services. Ticks and tick-borne diseases	Farmers Community private sector Learners Researchers	International Livestock Research institute (ILRI) Cornell University	Dr. Edward Wampande.
Walter Reed Project Laboratories for Emerging Infectious Diseases	Avian Influenza	Community Researchers	MAAIF	Professor Byarugaba Denis
Nakyesasa Incubation Centre for Industrial Livestock Research and business Innovations	Industrial Livestock	Community Farmers Researchers	Makerere university MAAIF Korea Uganda Dairy project (KUDAP) NARO	Professor John David kabasa
Buyana stock Farm	Field practical Teaching and Learning	Farmers Learners Researchers	Makerere University MAAIF	Dr. Wasswa Luboyela

Ruth Keesling Wildlife Health And Research Centre



50 YEARS OF TEACHING AND LEARNING

50 Years of Teaching and Learning

The year 2021 was a milestone achievement for CoVAB when it celebrated 50 years of Veterinary Higher Education, Science and Technology, Innovation and Service. The CoVAB Golden Jubilee celebrations kicked off on 17th June 2021. They were commissioned by the First Lady and Minister for Education and Sports, Hon. Janet Kataaha Museveni, who was represented by the Vice Chancellor, Prof. Barnabas Nawangwe at Nakyesasa Industrial Livestock Research, Incubation and Skilling (ILRIS) Center, Namulonge.

As part of the Makerere University Centenary celebrations which

will be held in 2022, CoVAB@50 celebrations were to run until June 2022. With the need to curb the COVID-19 spread, the celebrations were coupled with a number of virtual activities which included; the International Summer School, Cultural Boma, and Scientific Conferences to honor the College achievements this far.

Since 1971 when the Government of Uganda established the Faculty of Veterinary Medicine, it has transformed from a Faculty to a College, endorsed and accredited by the National Council for Higher Education.



Since 1971 when the Government of Uganda established the Faculty of Veterinary Medicine, it has transformed from a Faculty to a College...



Prof. J D Kabasa

COLLEGE OF VETERINARY MEDICINE ANIMAL RESOURCES & BIOSECURITY



Celebrating 50 Years

Of Veterinary Higher Education,
Science, Technology, Innovation
And Services In Uganda

www.covab.mak.ac.ug

2.1 Teaching Infrastructure.

The College has a number of teaching and learning centers that include lecture rooms, a library, Research laboratories, computer laboratory and demonstration centers like Nakyesasa and Buyana farm where students learn practically.

2.1.1 Library Services at CoVAB

The College Library set out to realize a number of objectives. One of these was to ensure collection, development and optimal utilization of information resources while producing quality graduates.

During the period under review, the following achievements were realized. 203 titles and 648 copies of books were identified; 181 titles and 301 copies were ordered by book bank ;20 titles and 80 copies of books received and accessioned; 390 print dissertations received and accessioned;4 print journals received and accessioned; 9 titles about COVAB Training history photocopied from Africana during Silver Jubilee celebrations. In the area of training and capacity building, 32 library users taught on one-on-one basis while 1 user training was carried out.

The library also acquired some equipment that were meant to help in strengthening the Virtual Digital Library Environment namely the hand-held digital scan and branch laptop. As a strategy for resource mobilization, one grant application was submitted to AAP transforming institutions.



2.2.1 The Summer School 2021 and the International Cultural BOMA and Conference at CoVAB.



Some of the students collecting a blood sample from a kob at Kibaale National Park.

Summer school is one of the learning avenues students and staff of Makerere and Michigan state University meet and train on comparative veterinary practices.

Tropical Veterinary Medicine and One Health Summer Course

commenced on 5th June 2021 as one of the activities to mark the CoVAB@50 celebrations and closed off with a virtual International Cultural Boma and Conference, held on 1st and 2nd July 2021. CoVAB, in partnership with Mississippi State University (MSU) ran the one-month course

under the theme; Tropical Veterinary Medicine and One Health in Uganda: A need for multi-sectorial partnership for Sustainable Livelihoods and Development.

The Summer Course comprised of a series of veterinary



theoretical studies in the first week, and field work which was undertaken for two weeks. Students were first introduced to Uganda's culture by Dr. Gabriel Tumwine and Mr. Gerald Brooks Musinguzi. Students were also taken through a review of tropical diseases by Dr. Herbert Mukilbi, the Anti-tick production initiative and how university is linked to Industry, which was facilitated by Dr. Saimo Margaret Kahwa. The 7 priority zoonotic diseases of importance to Uganda were also introduced to the students, this was handled by Dr. Denis Muhangi and Dr. Celsus Sente.

During this study, the Deputy Principal, CoVAB had an opportunity to present his recent research on "Harnessing Microbial Probiotics for Improving Pig Health and Productivity". The research embraces natural herbs from the ecosystem which farmers are using to boost the health of animals and treat certain illnesses.

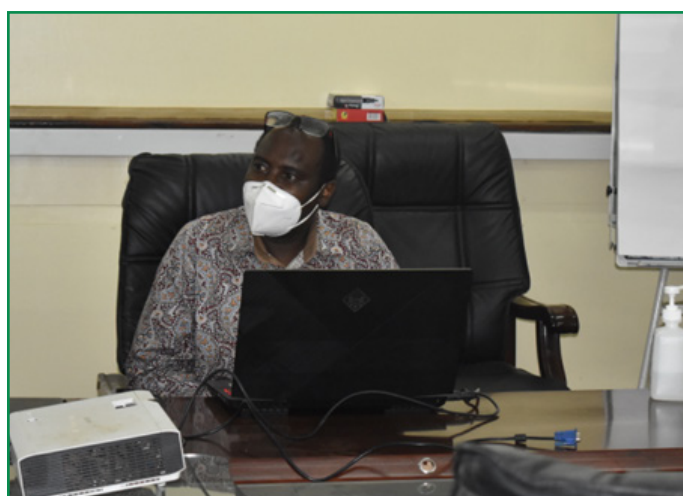
The MSU team of 11, spearheaded by Prof. Margaret Khaita and Dr. Stephen Reichley, were joined by some CoVAB Veterinary Medicine students for knowledge sharing on how veterinary practice and education runs in the two universities and home countries.

The Summer Course also comprised of hands-on experience by the students. While at the Central Public Health Laboratories, students were taken through the role of Laboratories in disease management by Dr. Sente. At the Kazo site, they were introduced to methods of converting wastes into organic fertilizers. More of the sites that students visited were the Zoo Clinics at Uganda Wildlife Education Center (UWEC) in Entebbe, fish ponds to be equipped with knowledge on aquatics and fisheries by Dr. David Kahwa, and as

well conduct some research in regards to fisheries. Students also visited National Parks such as Kibale and Queen Elizabeth National Parks for more study and research purposes.

The Summer Course climaxed with a Virtual International Cultural Boma and Conference which were held on 1st and 2nd July 2021, owing to the strict 42 days lockdown Presidential instructions to curb the spread of COVID-19.

During the international conference, the College Principal, Prof. John David Kabasa shared his thought on the need for highly capacitated populaces for sustainable economic development. He shared that transformative human capital has to change due to human population intensification and industrialization.



Prof. Samuel Majalija making a presentation of his research project during the Summer School theoretical session in the College E-Board room on 8th June 2021.

REFOR BIOSECURITY AND GLO



COVAB - MSU
SUMMER SCHOOL 2021

2.2 Teaching and Examinations



Just like the rest of the University, the college stopped teaching on 20th March 2021 due to COVID19. All staff and students were restricted from travelling and so there was almost no activity for the first two months of the lockdown. Around May 2021, some activities resumed after the public transport and private cars were allowed. Some members of staff resumed research activities and others started teaching students on line with effect from 5th October 2021 for continuing students. Full scale teaching started mid October 2021 when final year students and Masters Students were allowed back.

Examinations were conducted from 16th November to 30th December 2021 for the final year students and from 3rd December to 18th December 2021 for the continuing year students.

2.3 Programs Offered at COVAB

UNDER GRADUATE



POST GRADUATE



MASTERS



PhDs



PGD

2.3.1 Programs offered in COVAB by Schools

DEPARTMENT/ PROGRAM	UNDERGRADUATE	GRADUATE	
DEPT. OF BIOSECURITY ECOSYSTEMS AND VETERINARY PUBLIC HEALTH (BEP)	(BLSE) - BACHELOR OF LABORATORY SCIENCE EDUCATION AND INDUSTRY	(MIDM) - MASTER OF SCIENCE IN INTERNATIONAL INFECTIOUS DISEASES MANAGEMENT	(PSBL) - DOCTOR OF PHILOSOPHY (SCHOOL OF BIOSECURITY, BIOTECHNICAL AND LABORATORY SCIENCES)
DEPT. OF BIOTECHNICAL AND DIAGNOSTIC SCIENCES (BDS)	(BBLT) - BACHELOR OF BIOMEDICAL LABORATORY TECHNOLOGY		
DEPT. OF BIOMOLECULAR RESOURCES AND BIOLABORATORY SCIENCES (BBS)		(MSBL) - MASTER OF BIOMEDICAL LABORATORY SCIENCES AND MANAGEMENT	
		(MSBL) - MASTER OF BIOMEDICAL LABORATORY SCIENCES AND MANAGEMENT	
		(MSBS) - MASTER OF SCIENCE IN MOLECULAR BIOLOGY	

DEPARTMENT/ PROGRAM	UNDERGRADUATE	GRADUATE	
DEPT. OF LIVESTOCK AND ANIMAL RESOURCES (LIR)	(BILB) - BACHELOR OF INDUSTRIAL LIVESTOCK AND BUSINESS	(MSLS) - MASTER OF SCIENCE IN LIVESTOCK DEVELOPMENT & MANAGEMENT (LIVESTOCK SECTOR PLANNING AND MANAGEMENT)	
	BAPT) - BACHELOR OF ANIMAL PRODUCTION TECHNOLOGY AND MANAGEMENT	(MWHM) - MASTER OF SCIENCE IN WILDLIFE HEALTH AND MANAGEMENT	
		(GLPM) - POSTGRADUATE DIPLOMA IN LIVESTOCK DEVELOPMENT PLANNING AND MANAGEMENT	
DEPT. OF WILDLIFE AND AQUATIC ANIMAL RESOURCES (WAAR)	(BWHM) - BACHELOR OF SCIENCE IN WILDLIFE HEALTH AND MANAGEMENT	(MASTERS IN WILDLIFE TOURISM & RECREATION MANAGEMENT-TRM).	
(PCM) DEPT OF VETERINARY PHARMACY, CLINICAL AND COMPARATIVE MEDICINE	(BVET) - BACHELOR OF VETERINARY MEDICINE	(MVPA) - MSC. IN VETERINARY PATHOLOGY	(PSVM) - DOCTOR OF PHILOSOPHY (SCHOOL OF VETERINARY MEDICINE AND ANIMAL RESOURCES)
		(MVMF) - MASTER OF VETERINARY MEDICINE (FOOD ANIMAL HEALTH AND PRODUCTION)	
		(MVPA) - MSC. IN VETERINARY PATHOLOGY	

SKILLS DEVELOPMENT PROGRAMS

- 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





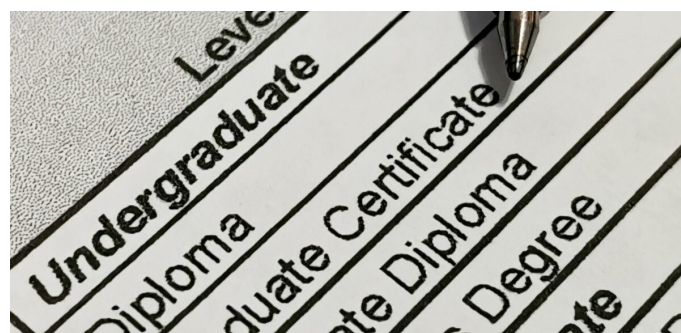
Change of Guard

Prof. J D Kabasa hands over to the new Principal,
Prof. Frank Mwiine

2.3.2 Undergraduate Student Admissions 2020/2021

A total of 238 undergraduate students were admitted. Of these of 59 were on government scholarship while 179 students were on the Private scheme.

NO.	PROGRAM	MALE	FEMALE	TOTAL
1	VET MEDICINE	39	24	63
2	BLT	66	48	114
3	BILB	25	11	36
4	WHM	05	04	09
5	BAP	11	05	16
		146	92	238



2.3.3 Postgraduate Student Admissions 2020/2021

A total of 73 graduate students were admitted.

NO.	PROGRAM	TOTAL
1	(MSLS) - Master of Science in Livestock Development & Management	15
2	(MWHM) - Master of Science in Wildlife Health and Management	3
3	(MVPM) - Master of Veterinary Preventive Medicine	12
4	(MVMF) - Master of Veterinary Medicine (Food Animal Health and Production)	5
5	(MSBS) - Master of Science in Molecular Biology	15
6	(MSBL) - Master of Biomedical Laboratory Sciences and Management	7
7	(MIDM) - Master of Science in International Infectious Diseases Management	10
8	(GLPM) - Postgraduate Diploma in Livestock Development Planning and Management	6

2.4 Internship and Attachment Program in COVAB

Internships and attachments are some of the best practical learning exposures needed for students in the CoVAB. Most of the programs offered are practical in nature and therefore students need more and more encounters during Internships and attachments to improve on a number of skills. The period under review was affected by the COVID 19 pandemic and this equally affected the level of implementation of the internship program. The students did not get adequate exposures

due to the strict observance of the standard operating procedures in a number of organizations. However, some modalities were changed and the activity was undertaken.

Attachments always happen in the middle of a semester or at the end of every semester depending on the course program while internships only apply for final year students.

2.5 Graduation output in 2020/2021

NO.	PROGRAMMES	NO. OF GRADUANDS	
		F	M
1	Doctor of Philosophy	2	4
2	(MVPM) - Master of Veterinary Preventive Medicine	2	6
3	(MSBS) - Master of Science in Molecular Biology	6	14
4	MSBL - Master of Biomedical Laboratory Sciences and Management	2	5
5	(MSLS) - Master of Science in Livestock Development & Management	1	5
6	(MIDM) - Master of Science in International Infectious Diseases Management	4	7
7	(MWHM) - Master of Science in Wildlife Health and Management	0	4
8	(MWTM) Masters in Wildlife Tourism and Recreation Management	2	1

9	(GLPM) - Postgraduate Diploma In Livestock Development Planning And Management	1	11
10	BAPT) - Bachelor of Animal Production Technology and Management	8	23
11	(BVET) - Bachelor of Veterinary Medicine	13	51
12	(BDIB) - Bachelor of Dairy Industry and Business	0	03
13	(BILB) - Bachelor of Industrial Livestock and Business	0	03
14	(BPIB) - Bachelor of Poultry Industry and Business	01	0
15	(BWHM) - Bachelor of Wildlife Health and Management	02	08
16	(BLSE) - Bachelor of Laboratory Science Education and Industry	00	03
17	(BBLT) - Bachelor of Biomedical Laboratory Technology	64	95
18	(DDIB) - Ordinary Diploma in Dairy Industry and Business	00	01
19	(DFIB) - Ordinary Diploma in Feed Industry and Business	00	01
20	(DLSE) - Ordinary Diploma in Laboratory Science Education and Industry	00	01
	TOTAL	108	246

2.5.1 Covab – Afrisa Passing Out Over 1900 Skilled Livestock Agribusiness Entrepreneurs



The Vice Chancellor, Prof. Barnabas Nawangwe (4th Left), DVCAA-Dr. Umar Kakumba (5th Left) and the then Principal CoVAB-Prof. J.D. Kabasa (3rd Left) together with Makerere University Academic Registrar, Mr. Alfred Masikye Namoah (2nd Left), Mr. Byakatonda Patrick (1st Left), Prof. Samuel Majalija (1st Right) and Mr. Felix Okello (3rd right) pose for a group photo before the Academic Procession at the graduation ceremony and CoVAB@50 Celebrations Commissioning, Nakyesasa-Namulonge on 17th June 2021.

COVAB through the SPEDA Program under the Africa Institute for Strategic Animal Resource Services and Development (AFRISA) passed out 1930 skilled livestock agribusiness entrepreneurs with various levels of Industrial Certification and Diplomas.

The virtual graduation ceremony which was held on 17th June 2021 at the College Industrial

Livestock Research, Incubation and Skilling (ILRIS) Center at Nakyesasa – Namulonge was officiated by Makerere University's Chancellor, Prof. Ezra Suruma, who was represented by the Vice Chancellor, Prof. Barnabas Nawangwe. Awardees comprised of 298 Diplomas, Ordinary Certificates and 34 Industrial Artisan Certificates from COVAB- AFRISA, 312 awardees

from Atiak- Amuru District, Northern Uganda, 549 from Butaleja, Eastern Uganda, 97 from Mubende, Central Uganda, 319 from Sheema, Western Uganda and 80 Industrial Artisan Certificate awardees (AFRISA-SDF Partnership). AFRISA-SPEDA programs are all accredited by the National Council for Higher Education.



Research



Of Solid Research

3.1 Resource Mobilisation & Collaboration

Research and innovations are some of the key outputs of the College. A lot of work has been undertaken and this is evident in the ever-increasing grants received by staff in the College. In the period under review, COVAB had a number of projects running and these are illustrated below.

3.2 The Mak-Rif/COVAB Research and Innovations Dissemination 2021



Dr. Musenero, Prof. Bazeeyo, and Prof. Nawange at the Innovations Dissemination Event

The College of Veterinary Medicine, Animal Resources and Bio Security (CoVAB) with support from the Makerere University Research and Innovations Fund (Mak-RIF) held an open day during which a number of research outputs and innovations were disseminated.

The event held on Monday 15th November 2021 in Makerere University brought together a number of stakeholders to hear from the college about research and innovation that has been going on for the past three years with over 7 billion shillings spent on 60 Mak-RIF supported

research projects over a three-year period. While presiding over the event where ten of the projects were disseminated, the Minister of Science, Technology and Innovation Dr. Monica Musenero Masanza commended the leadership at the college and the University as a whole for the flexibility and outlook that has enabled the realigning of university business to the National development Plan III which she said emphasizes science led economic social transformation

Dr. Musenero emphasized the importance of the output from the University indicating that many of the strategic industrial value chains were aligned to colleges in the University. She enumerated them to include the engineering economy, mobility, beauty and apparel, the digital economy, A skills, innovations and services Agro security and the pathogenic economy. 'We have created a prototype along many value chains and Makerere has to play a core role taking on a new mantra as a University for Technology advancing the country' she said urging the institution to aim at making more influence on the economy. The Minister cited the example of the two Centres of excellence in CoVAB like the Bio Security Centre which was to be supported to become a national Centre of excellence.

In his remarks, the Vice Chancellor Makerere University Prof. Barnabas Nawangwe noted that there was tremendous transformation going on in the colleges adding that he was excited to witness what he always wanted the University to be. While congratulating the researchers from CoVAB for the good work done, the Vice Chancellor noted that universities were increasingly getting tasked to show what they

Dr. Musenero emphasized the importance of the output from the University indicating that many of the strategic industrial value chains were aligned to colleges in the University.

...presented to the Minister some of the projects that were being disseminated

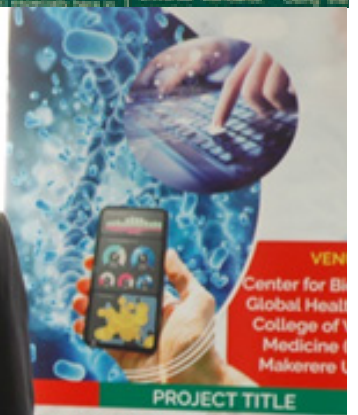
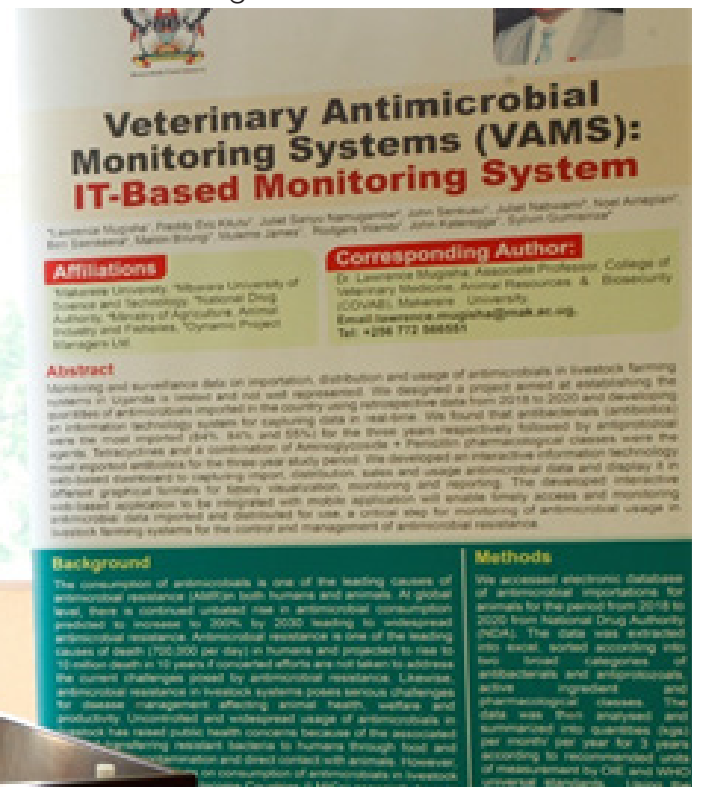


INSET: Prof. John David Kabasa



are doing for society for instance their contribution towards the realization of the Strategic Development goals. 'As a university we have a role to transform the nation' he said adding that we were duty bound to be part of the solution to our society.

Prof. John David Kabasa, the Principal CoVAB while welcoming guests on behalf of the management and staff of CoVAB said as scientists, they were ready to take off given the various grants they receive. He commended the Minister for Science Innovation and Technology for the support rendered to the college especially the revamping of the research infrastructure like the Centre for Bio security and Global Health. He also presented to the Minister some of the projects that were being disseminated.



Developing Monitoring System for Quantifying and Mapping antibacterial used in Livestock Farming Systems in Uganda by Prof. Lawrence Mugisha.



50 Years of Veterinary Higher Education,
Science, Technology & Innovation

1971 - 2021

4.0

INNOVATION

4.0 RESEARCH INNOVATIONS AND TECHNOLOGIES

COVAB is at the lead in as far as developing technologies is concerned by its nature and the kind of teaching and learning exposures offered. A number of innovations were unveiled in the period under review and they included the following;

4.1. COVID-19 BIOMARKER PROJECT'S INITIATIVE TO REDUCE ON COVID-19 PATIENT CROWDING IN HOSPITALS

The COVID-19 Bio-marker Project, with support from the Government of Uganda through the Presidential Scientific Initiative on Epidemics, conducted research on the different classes of COVID-19 infections to reduce on the burden of patient crowds in hospitals. This research project sought for markers used in classification of COVID-19 infections and grouped the patients into; the controls, symptomatic, asymptomatic and severe based on their markers.

Under the leadership of Dr. Kato Charles Drago as Principal Investigator, the project was also intended to develop diagnostic kits to be used for early prediction of who was likely to become severe in infection. Given the fast spread of COVID-19, health facilities were becoming overwhelmed because of the large numbers of patients received daily amidst inadequate equipment. This research also discovered that some patients could be treated from home, and only visit health facilities once they became severe.



4.2 ANTI-TICK VACCINE PRODUCTION AGREEMENT MADE BETWEEN CoVAB AND ALFASAN UGANDA LIMITED.



Makerere University Leadership, COVAB Administrators and Staff, Alfasan Uganda Limited Administrators together with the Anti-Tick Project Team and Partners pose for a group photo after the MOU Signing Ceremony at the Center for Biosecurity and Global Health on 19th March 2021.



Prof. Barnabas Nawangwe and Dr. Stephen Birungi exchange signed MOUs after the signing ceremony on 19th March 2021 in the COVAB Center for Biosecurity and Global Health.

On 19th March 2021, COVAB and Alfasan Uganda Limited sealed a joint initiative to address the problem of ticks and tick borne diseases in Africa through signing a Memorandum of Understanding. The Anti-tick Vaccine Project is

spearheaded by Dr. Saimo Margaret Kahwa, who is the Principal Investigator.

CoVAB Scientists identified vaccine candidate proteins from the local ticks which they exploited to produce an anti-tick vaccine. COVAB

embarked on averting the challenge of ticks and tick-borne diseases in livestock through the development of an Anti-Tick Vaccine to be manufactured by Alfasan Uganda Limited, a manufacturer and distributor of veterinary and human medicine.



Prof. Barnabas Nawangwe and Dr. Stephen Birungi exchange signed MOUs after the signing ceremony on 19th March 2021 in the COVAB Center for Biosecurity and Global Health.

Development of the Anti-tick Vaccine

Vision

Towards a tick free herd.

Mission

To contribute to the control of ticks and tick-borne diseases by offering innovative alternative immunological control within the integrated tick and TBDs control strategy.



4.3 AU SAFE FISH PROJECT HOSTS AFRICAN UNION DIGNITARIES FOR M &E



African Union Delegates, Aquaculture Research and Development Center administration, the Safe Fish Project team together with student researchers under the project pose for a group photo at NAFIRRI.

The AU Safe Fish Project hosted officials from The African Union on 20th May 2021 for a monitoring and evaluation of the research project implementation. The meeting held at the Center for Biosecurity and Global Health, CoVAB brought together stakeholders of the project who included; African Union (AU) delegates, researchers, academicians, government agency administrators as well as students. Students and researchers under this project also had the opportunity to share their study findings with the delegates; Ms. Monica Ebele Idinobe and Mr. Yayehiyirad Kassa.

The Principal Investigator of the Safe Fish Project, Dr. Jesca Nakavuma gave an overview of the project. She informed them of the project partners in Ghana, UK, and Uganda, and that the final beneficiaries were inland fisheries sectors in Uganda and Ghana, fish consumers, fish farmers, and line ministries in fisheries and aquaculture.

She pointed out some challenges in fish farming such as inability to access quality feeds and seeds, and diseases which arise leading to over use of drugs and chemicals, hence resulting into issues of Antimicrobial Resistance (AMR), and yet, these can be addressed by natural enemies of

bacteria.

"We engage in some practices to address challenges of diseases, and similarly, there are practices in aquaculture that may influence disease outbreaks, however, the solution by the Safe Fish Project



"As AU, we have to implement ground visit of the AU grant projects. We decided to at least visit one of the projects at Makerere University this year, the Safe Fish Project in particular to see how it is progressing," said Ms. Idinobe

is to use of bacteriophages which are natural enemies of bacteria. These are abundant in nature and they affect only specific bacteria which they are targeted to attack. Fortunately, these also attack drug resistant bacteria and they don't attack animal and plant cells, and so, animals and humans are safe," explained Dr. Nakavuma.

She said that the mapping of bacterial pathogens of farmed tilapia in Uganda and Ghana, and the development of phage products would improve fish health management, ensure safe fish production and improved fish farm productivity.

"As AU, we have to implement ground visit of the AU grant projects. We decided to at least visit one of the projects at Makerere University this year, the Safe Fish Project in particular to see how it is progressing," said Ms. Idinobe, the AU delegate. She commended AU Safe Fish Project for the worthy progress and affirmed that the monitoring and evaluation was a way of verification to ensure that the money that was allocated to a particular program was used for its intended purpose.

"Also, we needed a direct contact report to know the challenges, if there's any, associated with the implementation of project activities. So far, it has been good and we have interacted with one another and some of the things that have emanated from this meeting will help the team to also improve on their implementation process," she added.

Delegates also had a visited the

National Fisheries Resources Research Institute (NAFIRRI) at Kajjansi to gain more knowledge on up scaling fish health and production. They were received by the head of the Aquatic Research Development Center of NAFIRRI, Dr. Victoria Tibenda Namulawa. The team was later taken through the various facilities at this institution by Ms. Catherine Agoe.

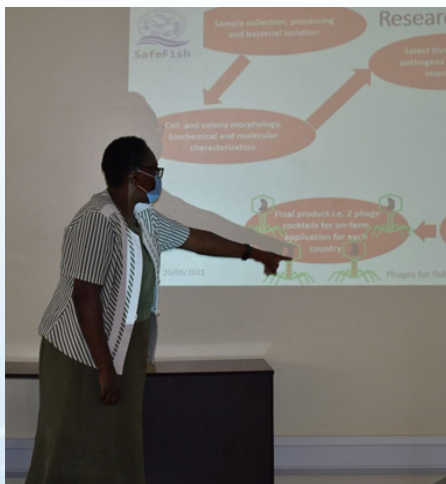
Makerere University is one of the beneficiary institutions of the African Union Grant programs. This was a 2018 call, and Safe Fish is in its third year to finalize the activities. The Safe Fish project is an African Union Commission funded project which aims to develop bacteriophage cocktails as fish disease bio-control agents for improved aquaculture productivity among tilapia farmers, and for economic and social development by addressing food and nutrition safety in Ghana and Uganda.



The AU Delegates, the COVAB and NAFIRRI Administration, the Safe Fish Project team together with student researchers under the project pose for a group photo at the Center for Biosecurity and Global Health at COVAB.



Ms. Monica Ebele Idinobe making her remarks during the Safe Fish Project Monitoring and Evaluation meeting.



Dr. Jesca Nakavuma introducing the research work of the Safe Fish Project to the AU Delegates at COVAB.



AU Delegates together with the Safe Fish Project team in a meeting with the head of the Aquatic Research Development Center of NAFIRRI, Dr. Victoria Tibenda Namulawa.



The Delegates together with the Safe Fish Project team visit the fish ponds at NAFIRRI.



A student under the project presenting their research work.

4.4 COMMISSIONING OF NAKYESASA LIVESTOCK INDUSTRIAL RESEARCH, INCUBATION AND SKILLING CENTRE.



On behalf of the First Lady and Minister of Education and Sports-Hon. Janet Museveni, the Vice Chancellor-Prof. Barnabas Nawangwe, sided by DVCAA-Dr. Umar Kakumba (R) and the then Principal CoVAB-Prof. John David Kabasa (L) commissions the SPEDA Training, Incubation and Research Centre-Nakyesasa, with assistance from the COVAB Principal's Office Administrative Assistant, Ms. Lillian Tukahirwa on 17th June 2021.

As part of the CoVAB@50 celebrations, Nakyesasa Livestock Industrial Research, Incubation and Skilling Centre was commissioned on 17th June 2021 by the Minister for Education and Sports and First Lady, Hon. Janet Kataaha Museveni. The Centre was established as part of the joint effort of the Makerere University and government to promote the SPEDA model, an alternative model of skilling education, community and household transformation.

The incubation hub skills students in agribusiness fields of poultry industry, dairy industry, feed production, leather industry, pig industry, bee industry, meat production and aquaculture. SPEDA model is championed by MAK College of Veterinary Medicine, Animal Resources and Biosecurity (COVAB) through its community development institute – AFRISA (Africa Institute for Strategic Animal Resource Services and Development).

4.5 Mak RIF Grantees

No.	Project title	Principal Investigator
1.	Developing Novel Phytonutraceuticals from wild edible fruits and vegetables for Mitigating Malnutrition among pregnant women and School going children	Dr. Anne Juliet Nalunkuma Kazibwe.
2.	Developing a community-based model for integrating bioenergy and poultry production using rice agro-waste (Integrated bioenergy agriculture model).	Prof. David John Kabasa
3.	Herd-health and Community Action Research Approach for Strengthening Veterinary Clinical Training and Outreach at Makerere University	Prof James Okwee Acai
4.	Optimization of the dosage, adjuvant and route for the candidate anti-tick vaccine	Dr. Kokas Ikwap
5.	Cytokines as novel therapeutic agents in the management of late-stage Trypanosoma brucei rhodesiense sleeping sickness: a preclinical trial (CaNTMS).	Dr. Charles Drago Kato
6.	Strengthening veterinary clinical research, training and outreach at Makerere through a learner-centered herd-health and community action research program (SHARP) for improved animal welfare, health and productivity.	Prof. James Okwee-Acai
7.	Optimizing SMART Dairy Technologies for Efficient Sustainable Productivity of Dairy Farmers in Uganda.	Dr. Robert Tweyongyere.
8.	Agrochemical residues in meat and milk of cattle in the acaricide-tick-resistant infested areas, A case study of Gomba District.	Dr. Peter Waiswa.
9.	An Assessment of veterinary drug residues in milk, chicken and eggs and development of a residue monitoring plan for these foods in Uganda	Dr. John Kateregga

10.	Establishment of a platform to strengthen production of safe and healthy dairy and chicken derived foods using one health to counter antimicrobial resistance and drug residues in Uganda. (PLAS-SAFE).	Dr. Paul Ssajjakambwe
11.	Assessing ethical conflicts and moral distress among veterinarians in Uganda	Samuel George Okech
12.	Are Domestic Animals Reservoirs for Emerging viral infections: Investigating the role of domestic Animals in the Transmission dynamics of Ebolaviruses, Marburg	Luke Nyakarahuka
13.	Risk assessment of heavy metals in vegetables consumed in Kampala Uganda	Andrew Tamale
14.	Development and Validation of Lateral Flow based multiplex test device to detect and differentiate SARS CoV-2 from other human Coronaviruses	Steven Odongo
15.	Genomic Epidemiology and Transmission dynamics of Zoonotic Tuberculosis in Karamoja as a predictor for the high TB prevalence and poor TB treatment outcomes in Karamoja region.	Innocent Rwego
16.	Enhancing the efficiency of Emerging Entomic Meat and Protein Value Chains in Uganda	Claire Mack Mugasa
17.	Laboratory evaluation of selected phage isolates against prevalent fish bacterial pathogens for development of phage biocontrol agents for use in aquaculture in Uganda	Jesca Nakavuma
18.	Development Of Local Calibrations For Nutritional Evaluation Of Commercial Poultry Diets Using Near Infrared Reflectance Spectroscopy (nirs)	Samuel OKELLO
19.	Epidemiologic investigation of Rift Valley Fever in livestock from selected districts of the Uganda cattle corridor	Mathias Afayoa
20.	Enhancing Institutional Capacity for Ethical Conduct of Research Involving Animals (ICEcoRIA)	Muhangi Denis
21.	Enhancing Capacity For Mobile And Rapid Field Laboratory Diagnosis Of Bovine Trypanosomiasis	Azuba Rose
22.	Epidemiological investigation of brucellosis in livestock in selected agro-pastoralist districts of Eastern Uganda	Frank Norbert Mwiine
23.	Accelerating anti-tick vaccine discovery using bioinformatics-guided wet laboratory approaches	Muhanguzi Dennis

4.5.1 PROJECT ON ENHANCING THE EFFICIENCY OF EMERGING ENTOMIC MEAT AND PROTEIN VALUE CHAINS IN UGANDA



The Principal Investigator of the Entomic Research Project, Dr. Claire M. Mugasa giving an overview of the project during the dissemination meeting at COVAB.



Prof. John David Kabasa, Co- Principal Investigator of the Entomic Research Project making his remarks during the Project dissemination meeting at COVAB.

With funding from Makerere University Research and Innovation Fund (RIF), the Entomics Research Project at COVAB is undertaking a research and innovation project towards "Enhancing the Efficiency of Emerging Entomic Meat and Protein Value Chains in Uganda" implemented in Central Uganda.



Dr. Richard B. Asaba presenting his research during the Entomic Project Dissemination



Stakeholders of the Entomic Research Project pose for a group photo during the dissemination meeting at CoVAB.

The project is prioritizing emerging entomic meat value chains for food, feed, livelihood and public health enhancement in Uganda and, it is as well analyzing the public health safety and nutrition status of the edible grasshopper (Nsenene) along the value chain. The project completed the phase of the study comprising of community surveys.



4.5.2 THE PROJECT ON “ANTIBACTERIAL DRUG RESIDUES IN MILK, CHICKEN AND EGGS FROM FARMS IN SELECTED DISTRICTS OF UGANDA”

Antibacterial drug residues in milk, chicken and eggs from farms in selected districts of Uganda research project virtually disseminated its findings on 31st August 2021. The project Principal Investigator, Dr. John Kateregga reported that many farmers don't observe recommended drug doses and their withdrawal periods, which poses serious health risks to both human and animal health.

In this study, it was stated by Dr. Kateregga that poor use of veterinary drugs is a potential driver of antimicrobial

resistance which has a long lasting public health precarious impact. The project recommends the need for routine national residue monitoring and surveillance program for antimicrobial residues in foods in conformity with national food safety policy and regulatory framework.

This research was funded by the Government of Uganda through the Research and Innovations Fund at Makerere University

4.5.3 MEAT INSPECTORS TRAINED IN THE PROMOTION OF FOOD SAFETY IN THE MEAT VALUE CHAIN

From 4th October 2021 to 15th October 2021, a refresher training for Meat Inspectors in Uganda was held at the College of Veterinary Medicine, Animal Resources and Bio-security (COVAB) to retool meat inspectors in the country with additional hands-on skills in promoting meat hygiene and food safety.

The two weeks' workshop was organized by Boosting Uganda's Investment in Livestock Development (BUILD) project, in collaboration with COVAB, International Livestock Research Institute (ILRI) and Ministry of Agriculture, Animal Industry and



Dr. Wilfred Eneku taking Meat Inspectors through the process of animal health inspection before slaughter at CoVAB On 5th October 2021.

Fisheries (MAAIF) - Uganda.

The workshop which brought together meat inspectors from different districts in Uganda was coordinated by CoVAB's Head of Department of Biosecurity, Ecosystems and Veterinary Public Health, Prof. Clovice Kankya. Participating districts were over 27, to mention but a few which included; Kampala, Nakasongola, Luweero, Kalungu, Masaka, Mukono, Kiryandongo, Wakiso, Arua, Lyantonde, Kumi, Mityana, Bushenyi, Masindi, Kitgum, Fort Portal, Iganga, Gulu, Hoima, Busia, Kasese, Soroti, and Moroto.

During an opening ceremony of this engagement, trainees had an opportunity to meet the College Principal, Prof. John David Kabasa, who doubled as the Guest of Honor for the event. Prof. Kabasa assured them about the College's gratefulness to host such an important cause, and as well appreciated the efforts of CoVAB's Partners in supporting matters regarding human and animal welfare.

He later shared the theory of the College's Change, highlighting the fact that we all live by the market as one of the principles to have a livelihood. He affirmed to participants the opportunities that prevail in the animal world which veterinarians have to protect, since they are custodians of the ecosystem.

"Sustain the welfare of the animals which we consider as a resource to humans. We must ensure that animal health isn't a threat to public health," said Prof Kabasa.

Dr. Kristina Roesel from ILRI made further highlights on the value of meat inspection to human and animal health. "Through meat inspection, we can examine and witness many different diseases. We also see the hazards associated with it and find ways of protecting ourselves from these hazards," affirmed Dr. Kristina.

Participants were retooled with knowledge on the legal framework for meat inspection in Uganda by Dr. Hoona Jolly Justine from MAAIF, transportation of slaughter animals by the Assistant Commissioner, Veterinary Public Health, Dr. Mwesige Theophilus, knowledge on the design and operation of the abattoir by Prof. Kankya, common conditions in shoats, cattle, poultry, pigs (ante and post mortem) by Dr. Terence Odoch, Dr. Wilfred Eneku and Dr. Mathias Afayoa, which were theoretical sessions.

Participants were also trained in digital data collection using the Open Data Kit tool in regards to meat inspection, ante and post mortem inspection in poultry by Mr. Badiru Muyanja from UgaChick, as well as sampling, transport, reporting, and record keeping.

More theoretical sessions included; Hazard Analysis Critical Control by Mr. Justine Okello, Water Sanitation and Hygiene in the Slaughter house by Ms. Ninsiima and Mr. James Muleme.

The training was also coupled with early morning learning sessions in abattoirs such as City Abattoir, Kalerwe abattoir, Wambizi Abattoir, in addition to the practical sessions that were held in the CoVAB

slaughter house.

During the closing ceremony of the workshop, on behalf of the College Management, the Deputy Principal, Prof. Samuel Majalija appreciated all participants for being part of this training. He also appreciated all partnering organizations in this cause.

Prof. Majalija highlighted on Uganda's need for more qualified personnel in promoting food safety, given the high rate of zoonotic diseases spread which is associated with food safety issues.

"Our country has a record of slaughtering from anywhere without keeping track of the practice and number of slaughtered animals. Our inspectors are also few and cannot be everywhere at the same time, and that's why this training is valuable," said Prof. Majalija.

He further challenged participants to apply the acquired skill in their work areas.

Dr. Jane Francis Apolot, on behalf of the participants appreciated the efforts of all organizers in this engagement. She highlighted how valuable the training has been to them, since they gained attention towards a number of important aspects such as animal welfare and quality assurance.

The refresher training hosted 40 meat inspectors, 20 from Kampala's neighboring districts were trained in the first week, while those from far districts were part of this engagement in the second week.



HUMAN RESOURCES



5.0



*Human Resource Function
2021*

5.1 Academic Staff Career Development/Promotion

STAFF THAT ACQUIRED NEW QUALIFICATIONS	Dr. Robert Ssenfuma	PhD in Aquaculture and Fisheries from Lilongwe University of Agriculture and Natural Resources attained in 2020.
	Dr. Mary Frances Nakamya	PhD in Veterinary Medical Science from Mississippi State University with concentration VID Infectious Disease attained in 2021
PROMOTIONS	Dr. Frank N. Mwiine	Promoted to Professor
	Dr. Kizito Kahoza Mugimba	Promoted to Lecturer
	Dr. David Kahwa	Promoted to Senior Lecturer
	Dr. Asuman Sengooba	Promoted to Senior Lecturer
TRANSFERS	Godwin Okiror (Human Resource Officer)	Transferred to CoVAB
	Harriet Musinguzi (Principal Communications Officer)	Transferred to CoVAB
	Andrew Ssenyonga (Driver)	Transferred to CoVAB
	Nambwila Stephen (Cleaner)	Transferred to office of DVC (F&A)
RECRUITED STAFF	Dr. Paul Ssuna	Assistant Lecturer-PCM
	Geofrey Situma	Technician-PCM
	Juliet Nabutanda	Technical Assistant-WAAR
	Baker Turyasingura	Technical Assistant-PCM
	Brian Asimwe	Stockman-PCM
	Edward Ssebuufu	Technical Assistant-LIR
OBITUARIES	Ignatius Katongole	Principal Technician
RETIRED STAFF	Sarah Syedde Tegule	Chief Technician

5.2 Academic Staff Establishment

The table below shows a summary of the teaching staff by rank in the College.

RANK	MALE	FEMALE	TOTAL
Professor	10	0	10
Associate Professor	9	0	09
Senior Lecturer	5	7	12
Lecturer	21	10	31
Assistant Lecturer	21	05	26



Teaching Staff

5.3. Administrative and Support Staff

	POSITION	NAME OF OFFICE HOLDER
1.	Principal	Prof. Norbert Frank Mwiine
2.	Deputy Principal	Prof. Samuel Majalija
3.	College Registrar	Richard Byarugaba
4.	Registrar, SBLS	Shiba Pamela Kakama

5.	Registrar SVAR	Deus Ngabirano
6.	College Librarian	Michael Kiusse
7.	College Bursar	Walter Odoch
8.	Accountant	Wilson Kalinaki
9.	Human Resources Officer	Godwin Okiror
10.	Procurement Office	Mawa Magid
11.	Communications Officer	Musinguzi Harriet
12.	Web Administrator	Brooks Musinguzi
13.	Custodian	Sarah Ayer
14.	Administrative Assistant	Lillian Tukahirwa
15.	Administrative Secretary 1	Lovinah Atuheire

ACCOMPLISHMENTS IN 2021

- The administrative function of the college was adequately staffed and functional.
- Performance appraisal was undertaken as expected.

CHALLENGES

- The College did not have a systems Administrator and this affected the performance of the college in terms of timely access to internet connectivity.
- The College did not have a Store Keeper and this affected the receipt and recording of goods. It also raised a number of audit queries.
- A number of departments do not have secretaries.
- A number of cleaners have retired without being replaced.

RECOMMENDATIONS

- The College should recruit an Administrative Assistant (HR), Systems Administrator, Store Keeper and Secretaries for the academic departments.
- The University should expedite the process of procuring a cleaning company for the College.

6.0 Publications

The List below shows some of the Publications by staff in the College in the year 2021.

Namyalo, Edity & Luke, Nyakarahuka & Afayoa, Matthias & Baziira, Joel & Tamale, Andrew & Atuhaire, G. & Kungu, Joseph. (2021). Prevalence of *Helicobacter pylori* among Patients with Gastrointestinal Tract (GIT) Symptoms: A Retrospective Study at Selected Africa Air Rescue (AAR) Clinics in Kampala, Uganda, from 2015 to 2019. *Journal of Tropical Medicine*. 2021. 1-10. 10.1155/2021/9935142.

Balinandi, Stephen & Whitmer, Shannon & Mulei, Sophia & Luke, Nyakarahuka & Tumusiime, Alex & Kyondo, Jackson & Baluku, Jimmy & Mutyaba, Joseph & Mugisha, Lawrence & Malmberg, Maja & Lutwama, Julius & Shoemaker, Trevor & Klena, John. (2021). Clinical and Molecular Epidemiology of Crimean-Congo Hemorrhagic Fever in Humans in Uganda, 2013–2019. *The American Journal of Tropical Medicine and Hygiene*. 106. 10.4269/ajtmh.21-0685.

Basuta Mirembe, Bernadette & Musewa, Angella & Kadobera, Daniel & Kisaakye, Esther & Doreen, Birungi & Eurien, Daniel & Luke, Nyakarahuka & Balinandi, Stephen & Tumusiime, Alex & Kyondo, Jackson & Mulei, Sophia & Baluku, Jimmy & Kwesiga, Benon & Kabwama, Steven & Zhu, Bao-Ping & Harris, Julie & Lutwama, Julius & Ario, A.R.. (2021). Sporadic outbreaks of crimean-congo haemorrhagic fever in Uganda, July 2018-January 2019. *PLOS Neglected Tropical Diseases*. 15. e0009213. 10.1371/journal.pntd.0009213.

Mugenyi, Albert & Muhanguzi, Dennis & Hendrickx, Guy & Nicolas, Gaëlle & Waiswa, Charles & Torr, Steve & Welburn, Susan & Atkinson, Peter. (2021). Spatial analysis of *G.f.fuscipes* abundance in Uganda using Poisson and Zero-Inflated Poisson regression models. *PLOS Neglected Tropical Diseases*. 15. e0009820. 10.1371/journal.pntd.0009820.

Okella, Hedmon & Ikiriza, Hilda & Ochwo, Sylvester & Ajayi, Clement & Ndekezi, Christian & Nkamwesiga, Joseph & Kaggwa, Bruhan & Aber, Jacqueline & Mtewa, Andrew & Koffi, Tindo & Odongo, Steven & Vertommen, Didier & Kato, Charles & Ogwang, Patrick. (2021). Identification of Antimicrobial Peptides Isolated From the Skin Mucus of African Catfish, *Clarias gariepinus* (Burchell, 1822). *Frontiers in Microbiology*. 12. 794631. 10.3389/fmicb.2021.794631.

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Mbyemeire, Herbert & Ssekatawa, Kenneth & Kato, Charles & Wampande, Eddie. (2021). Molecular characterization and distribution of cephalosporin resistance determinants in *Escherichia coli* and *Klebsiella pneumoniae* isolated from patients attending Kampala International University Teaching Hospital in Bushenyi, Western Uganda. *Alexandria Journal of Medicine*. 57. 205-214. 10.1080/20905068.2021.1952821.

Birungi, Doreen & Tumwine, Gabriel & Kato, Charles & Ssekamatte, Tonny & Ocaido, Michael & Majalija, Samuel. (2021). Knowledge, perceptions and effects of Ebola virus disease outbreak on the pig value chain in the agro-pastoralist district of Luwero, Central Uganda. *BMC Infectious Diseases*. 21. 10.1186/s12879-021-06337-8.

Emmanuel, Eilu & Odoki, Martin & Kato, Charles & Akinola, Saheed & Abyola, Ismail. (2021). PREVCE OF HR HPV TYPES PUBLICATION 2021. 6. 45-56.

Ssekatawa, Kenneth & Byarugaba, Denis & Nakavuma, Jesca & Kato, Charles & Ejobi, Francis & Tweyongyere, Robert & Wampande, Eddie. (2021). Carbapenem Resistance Profiles of Pathogenic *Escherichia coli* in Uganda. *European Journal of Biology and Biotechnology*. 2. 10.24018/ejbio.2021.2.2.171.

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Kasozi, Keneth & Laudisoit, Anne & Osuwat, Lawrence & Batiha, Gaber & Frederick, Eric & Ninsiima, Herbert & Michael, Usman & DeTora, Lisa & Macleod, Ewan & Nalugo, Halima & Crawley, Francis & Bierer,

Barbara & Mwandah, Daniel & Kato, Charles & Kennedy, Kiyimba & Emmanuel, Ayikobua & Lillian, Linda & Matama, Kevin & Welburn, Susan. (2021). A Descriptive-Multivariate Analysis of Community Knowledge, Confidence, and Trust in COVID-19 Clinical Trials among Healthcare Workers in Uganda. *Vaccines*. 9. 253. 10.3390/vaccines9030253.

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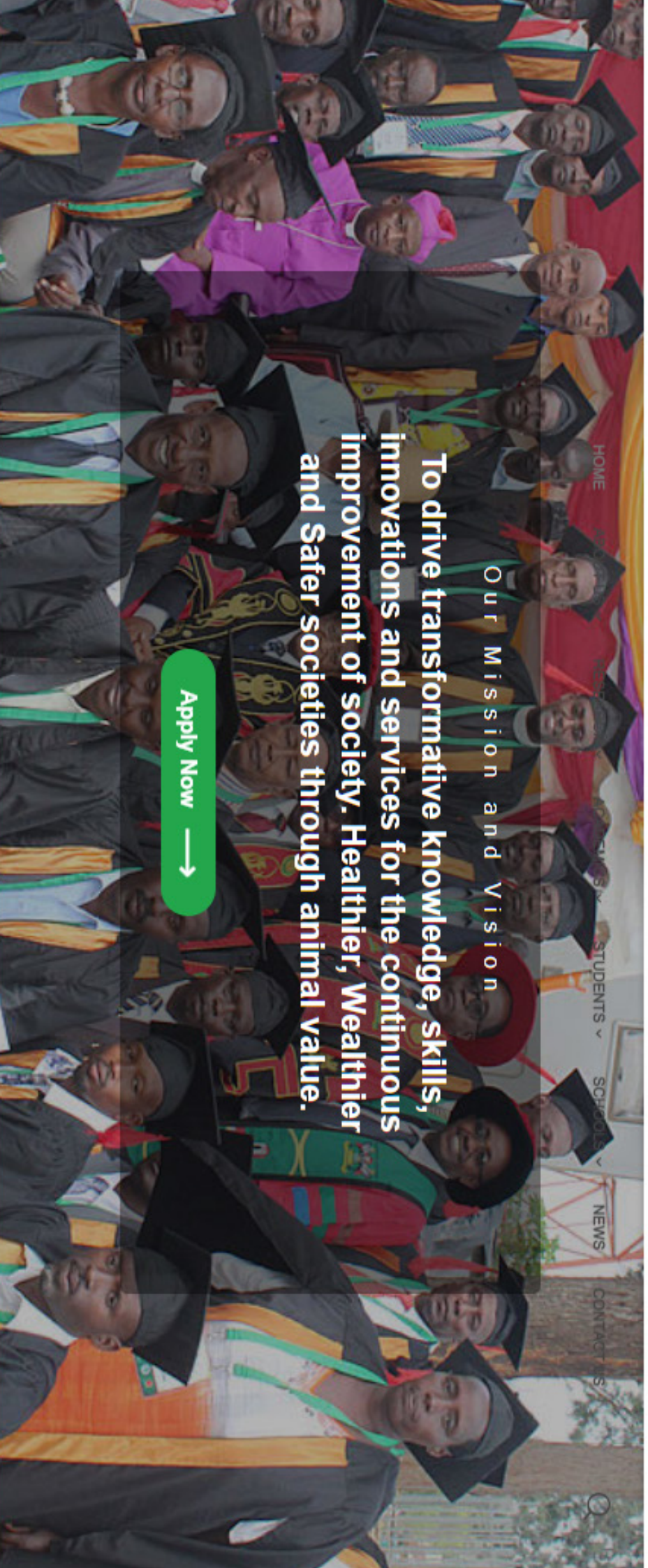
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