COVAB TRANSFORMATION

COLLEGE OF VETERINARY MEDICINE ANIMAL RESOURCES AND BIOSECURITY

MAKERERE UNIVERSITY

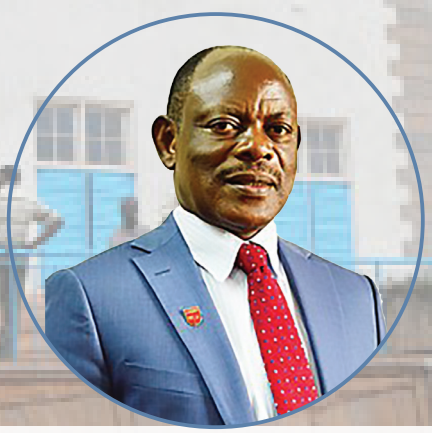
H.E Yoweri Kaguta Museveni
President of the Republic of Uganda

Hon. Janet K. Museveni
First Lady, Minister of Education and Sports.

University Administration

Prof. Ezra Suruma
Chancellor, Makerere University

Mrs. Lorna Magara
Chairperson, University Council



Prof. Barnabas Nawangwe
Vice Chancellor, Makerere University

WE BUILD FOR THE FUTURE

Makerere University

COLLEGE ADMINISTRATION

Prof. John David Kabasa
PRINCIPAL, COVAB

Dr. Samuel Majalija
DEPUTY PRINCIPAL , COVAB

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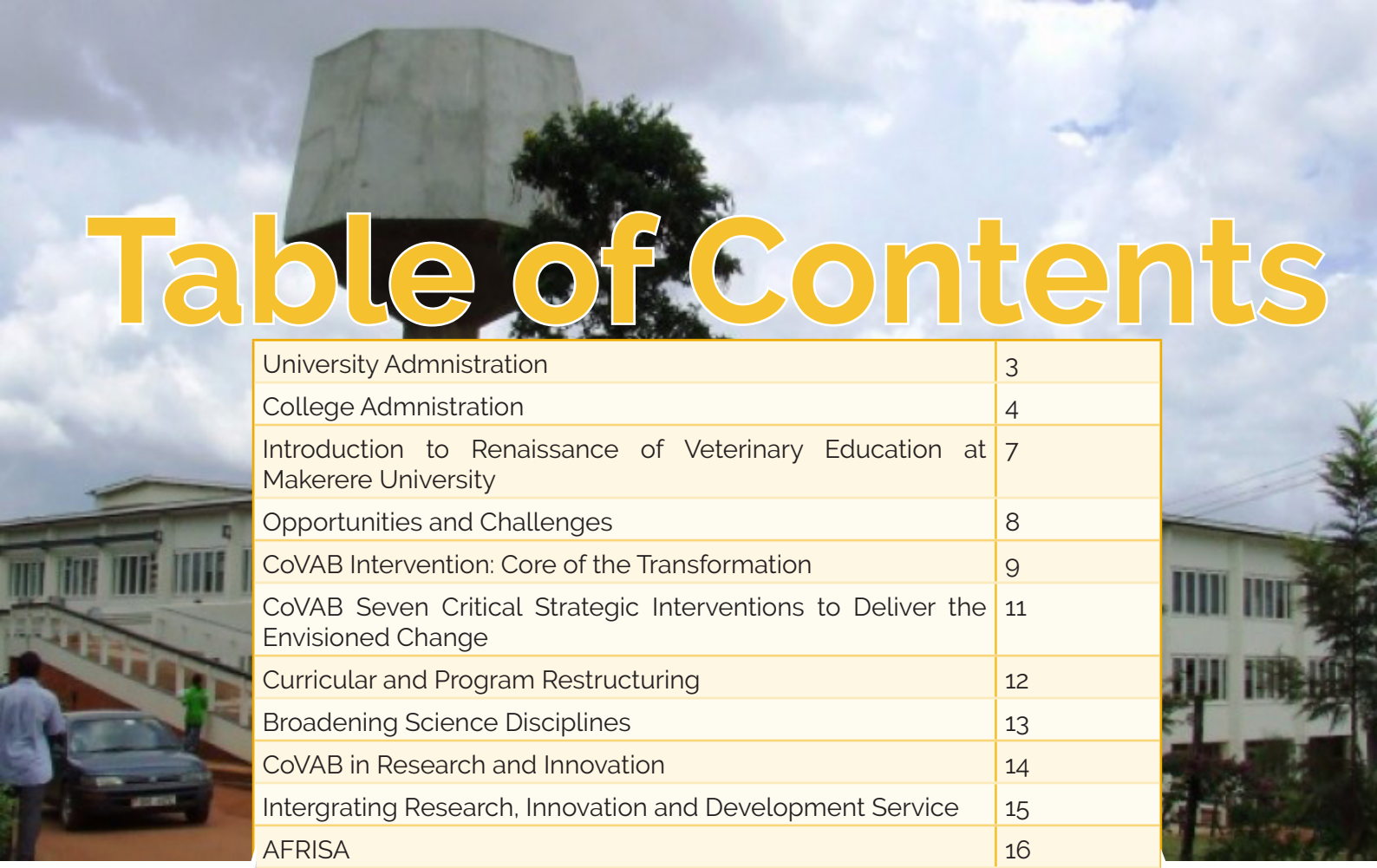
Dr. Azuba Rose



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THE RENAISSANCE

Renaissance of Veterinary Education at Makerere University

1. INTRODUCTION

PREAMBLE

Uganda has a wide range of animal resources, contributing about 17% to the National GDP (Livestock – 5%; fish – 3%, wildlife tourism – 8.4%). This contribution translates to about USD 4.7Billion, making animal resources sector one of the biggest. The contribution excludes the industrial value extractable from microbes, insects and other biological resources with potential for drug and vaccine production. However, while commodity prices for animal resources yield revenue for economic growth, they don't yield jobs and other developmental benefits required for the majority. Therefore, a rigorous vision is urgent of how to grow the value of animal resources to improve industrialization, enterprise and employment development, poverty eradication and the overall benefit for ALL. This is the focus of the COVAB Development Strategy and Investment Plan (DSIP), which was, endorsed by Makerere University Senate and Council in 2011 and now forms the dominant logic for COVAB's structural and functional transformation. The restructuring has repositioned COVAB as a new generation of Comprehensive Veterinary Colleges, with a unique capability to harness Africa's animal heritage and function as a fulcrum for national and regional transformation.

BACKGROUND

The upgrading of the Faculty of Veterinary Medicine (FVM) into the College of Veterinary Medicine, Animal Resources and Biosecurity (COVAB) came about as a result of a directive by HE the President of the Republic of Uganda in 2007. This followed a meeting of HE with the FVM fraternity on 18th December 2006 to explore options for appropriating Prosperity For All (PFA) through reforms in veterinary, animal and allied sectors. According to the directive, FVM was to transform into a Regional Veterinary College with a unique capability to provide an education mix involving intellectual, entrepreneurial, vocational and managerial competences and thereby address emerging needs of a rapidly expanding population, universal education and a growing regional market for animal-source products, higher education, science, technology and innovation. We have since worked through the University and government structures to implement the reforms.

MISSION

Healthier, Wealthier and Safer Societies through Animal Value

VISION

To Drive Transformative knowledge, Skills, Innovations and Services for the Continuous Improvement of Society

OPPORTUNITIES AND CHALLENGES

ANIMAL SECTOR AND INDUSTRY

Uganda has enormous reserves of domestic and wild animal resources (livestock, wildlife, fish, birds, insects and microbes). These combined contribute over 17% to the National GDP equivalent to USD 4.7B (UGX 17 Trillion), making the animal sector a promising strategic development pathway for Uganda. It presents multiple opportunities for industrial and commercial enterprise development to propel wealth and employment creation.

(a) The rising regional and global demand for Animal-Sourced Products (ASP) presents additional opportunities. The Common Market for Eastern and Southern Africa (CoMESA) for example imported into the region in 2018, ASP, amounting to USD 614M (Live animals), USD 2.1B (Meat), USD 1.3B (fish and aquatic products) and USD 1.4B for Diary, Eggs & Honey. It is also the largest wildlife tourism destinations in the world.

(b) At continental level, rising demand for ASP heightens prospects for a vibrant animal industry. The ASP demand is projected to rise 3 – 8 times between 2030 and 2050, when population in African cities hits between 400M and 700M. This demand will require a daily slaughter of either 1M Cattle, or 8M goats, or 20M Chickens or a harvest of 80M kg of fish.

(c) Globally, the trend for safe ASP is similar to that on the African continent. Total global leather goods market for example is projected to grow at 5.4% starting from USD 414 B (in 2017) up to 2030 and beyond.

(d) However, while the demand side looks promising, the supply side has critical bottlenecks to overcome. The animal sector is dominated by peasantry systems that have failed to transform the common person and industry to realize the desired growth. Most animal products are unprocessed raw materials of low quality and short shelf-life. They fetch low prices amidst booming domestic, regional and global markets. The sector is also a global biothreats epicenter as it harbors most of the world's deadliest germs including Ebola, Marburg, FMD, African swine fever, anthrax and tuberculosis. These germs have the potential to wipe out entire populations, degrade global health and trade, and food and agro-security. They threaten to annihilate the very animal biodiversity we seek to secure on planet earth. These and many other issues underpin COVAB's drive to reposition into a global frontline institution.

PEASANTRY FACTOR

Uganda has about 5.13 Million farming households, of which, only 7 percent undertake commercial agriculture. A daunting 68 percent are subsistence farmers. Historically, farming was never developed as a profession. Yet, if farming was taken on as a dignified profession and business occupation, most development challenges in Uganda would be addressed. World Bank (2013) records show that farming as an industrial business could create a US$ 1 trillion industry in sub-Saharan Africa by 2030 if farmers are transformed into skilled human capital with competitive commercial enterprises. This would provide the much-needed jobs to absorb most youth into gainful employment. However, despite heavy government investment in agricultural and rural development, conventional education, extension and research are yet to transform peasantry. Agricultural production and productivity as well as the standard of living have stagnated. Farming is regarded an ancient and degrading occupation meant for the poor, uneducated, forgotten school drop outs, and retirees. Thus, the young generation is finding it difficult to take up farming, and the creation of the next generation of indigenous farmers to replace the current aging peasants looks uncertain. COVAB transformation is addressing these issues.

YOUTH FACTOR

Uganda has an average youth unemployment rate of about 70%. Over 2.7 million youth are jobless. Rising youth unemployment is particularly fueled by: (1) incessant school exit - over 2.2 million young people drop out of school and only about 5% progress to tertiary education; 2) available workforce is not competitive – many lack the required skills and know-how; (3) access barriers to production assets and resources; (4) unidentified opportunities in potentially promising sectors of the economy; (5) conventional white-collar extension and education systems which disengage youth from practical problem solving and dealing with commercial business ventures. These issues combined have disarmed the majority of youth from effectively harnessing the abundant resources to create profitable commercial enterprises and employment. There is therefore, urgent need to transform from peasantry to profitable commercial ventures in agriculture and other sectors critical for job creation, economic growth and middle-income status attainment. COVAB transformation is addressing this challenge.

ANIMAL SECTOR EDUCATION AND TECHNOLOGY TRANSFER

Historically, the animal sector education in Uganda was never developed as a conduit for holistic industrial value-chains development and business. Instead, throughout the missionary and colonial era, veterinary education was oriented to white collar jobs. Education was limited and designed to produce administrative personnel (veterinary and husbandry officers and assistants) whose focus was supervision of peasants to produce unprocessed raw materials (primary segment of the value chain) required for industrial production in Europe. Post-colonial education policy unfortunately did little to change these trends.

Consequently, conventional education models have persistently divorced learners from innovation and problem-solving engagement that would benefit community and economic development. Models are founded on the "ivory tower" approach, whose emphasis is skewed to academic talent. They are neither sufficiently oriented nor flexible enough to harness other talents, solve societal problems, and provide transformative service to community, industry, private sector and national development. The COVAB transformation addresses this gap.

COVAB INTERVENTION

CORE OF THE TRANSFORMATION

Institutional re-engineering has occurred at several levels:

(1) Ideological re-orientation

(2) Improving functions

(3) Adjusting structures

(4) Curricula and program restructuring

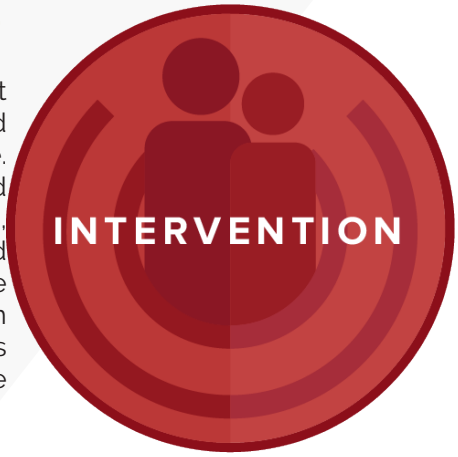
(5) Broadening science disciplines

(6) Integrating research and development service and

(7) Providing special national and regional development service.

(8) Student and alumni support

(1) Ideological re-orientation (shift in intervention logic)



COVAB has deliberately shifted from Education, Research and Service (ERS) that are focused on primary production, to ERS that is market oriented and dedicated to comprehensive animal value chains development, trade and commerce. COVAB ERS is oriented to serving holistic animal resources development and industry at the primary (raw materials production), secondary (value-addition, processing and packaging) and tertiary (trade and commerce, quality and standards) levels. COVAB has coined this paradigm as the Total Animal Value Ideology and Concept (TAVIC). It focuses on harnessing the value of animals in totality along all the diverse and available animal value chain opportunities. This accelerates sustainable socio-economic development in the country and the region.

(2) Improvements in functions

To attain comprehensive animal value-chains ERS, the institution transformed from a mono function teaching establishment to a multifunction college focusing on fostering:

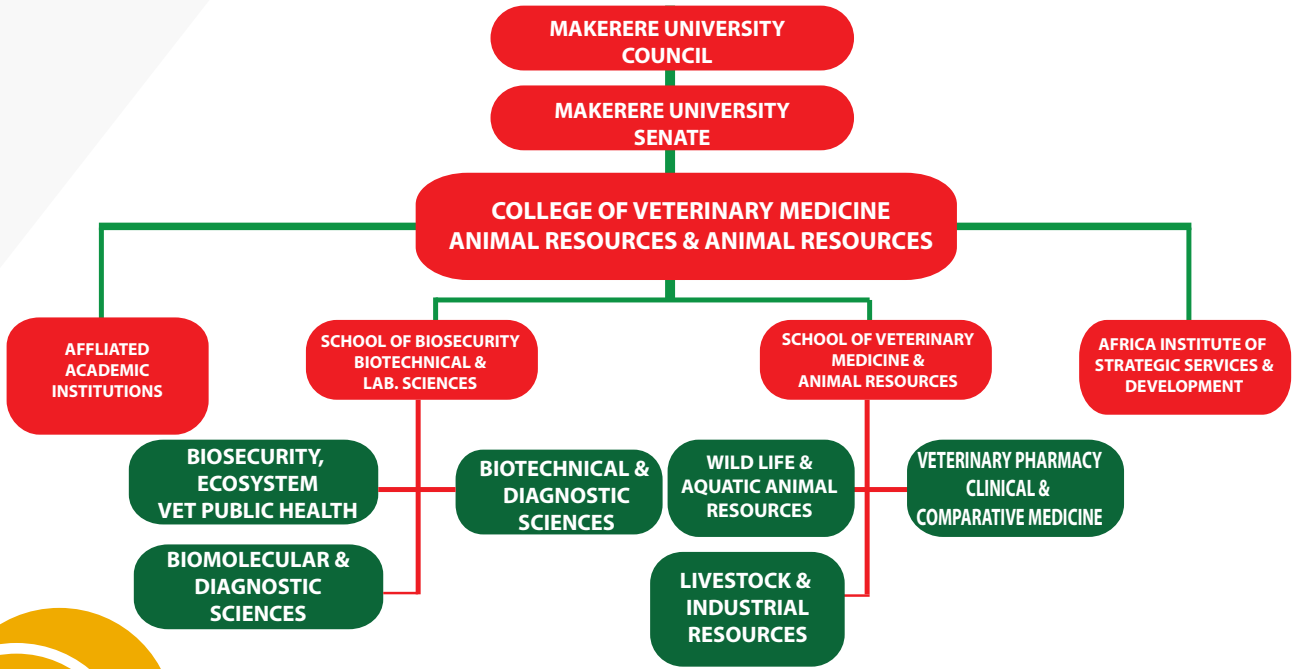
1) Skilled human capital development, capacity building and education
2) Research, science, technology and innovation
3) Strategic development service and outreach
4) Industrial incubation and holistic harnessing of animal value-chains
5) Sustainable engagement platforms for national and regional development
6) Securing animals and bioresources as assets for today and tomorrow

(3) Adjustments in structure

Functional reorientation was followed by structural adjustments. The college has been re-structured around seven major spheres of veterinary influence. They focus on developing science, technology and innovations in the following unique sectors that rely on the animal world footprint:

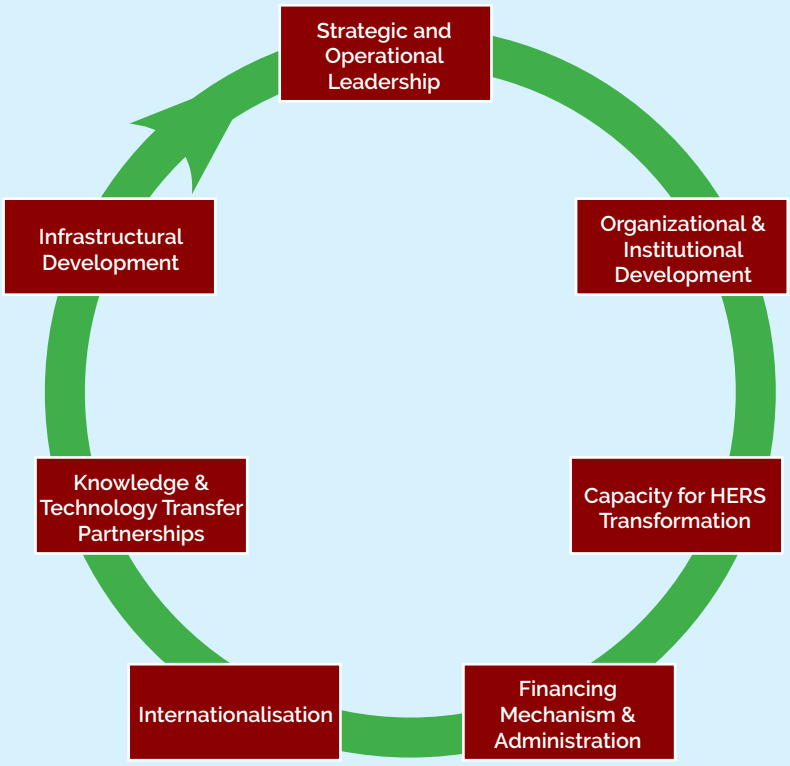
1) Veterinary Pharmacy and Medicine Development
2) Livestock and Industry Development
3) Wildlife and Aquatic Resources Development
4) Bimolecular Resources Development
5) Biotechnical and Diagnostic Services Development
6) Biosecurity, Ecosystems and Public Health Development
7) Community and Household Enterprise Development

Consequently, the college has transformed into a Comprehensive Veterinary College with multidisciplinary departments, centers, institutes and schools.



COVAB SEVEN
Critical Strategic Interventions to Deliver the Envisioned Change

To drive the realization of the COVAB structure and function, seven strategic interventions to deliver the envisioned change where instituted. These are summarized below.



4 Curricula and Program Restructuring

To appropriate the market-oriented value-chain education and training, the college has expanded the range of training programs to cater for other occupational opportunities available in the animal world which hitherto were under-harnessed. As a result, the college has transformed from a mono-degree (veterinary medicine) institution of 150 students to a multi-professional and multidisciplinary degree college of over 2000 learners in the following programs:

	Professional Training Program	Degree Enrolment (graduate and undergraduate)	Diploma and Certificate*
1.	Veterinary Medicine	350	
2.	Biomedical Laboratory Technology	530	-
3.	Animal Production Technology & Management	120	40
4.	Wildlife Health and Management	60	-
5.	Industrial Livestock Farming and Business		
	a. Leather Technology & Industry		
	b. Insect Technology & Industry		
	c. Dairy Technology & Industry		
	d. Feed Technology & Industry		
	e. Meat Technology & Industry		
	f. Fish Technology and Industry		
	g. Avian Technology and Industry	100	600
6.	Livestock Development and Management	50	-
7.	Molecular Biology & Biotechnology	60	-
8.	Natural Products Technology & Value-chains Development	10	-
9.	Epidemiology, Preventive Medicine & Public Health	40	-
10.	Biosecurity and Infectious Disease Management	30	-
11.	Food Animal Health and Production	10	-
12.	Laboratory Sciences and Management	15	50
TOTAL		1375	690

** Diplomas and Certificates are tenable at affiliated institutions (AFRISA and ISTVS)*

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Broadening Science Disciplines

In line with the value-chain education development paradigm, science discipline specialties at the college have expanded from the nine traditional disciplines of veterinary medicine to embrace at least 22 disciplines essential for comprehensive veterinary medicine, animal resources and biosecurity development. These are summarized below.

Multidisciplinary Department	Discipline Specialties	Faculty per Discipline	Technical Staff
Department of Vet Pharmacy, Clinical & Comparative Medicine (PCM)	Veterinary Surgery	4	1 (temporary)
	Theriogenology and Reproductive Technology	5	1 (retiring)
	Veterinary Medicine	8 (1 is Dean)	2 (temporary)
	Veterinary Pharmacy, Pharmacology & Toxicology	3	1 (temporary)
	Veterinary Pathology	5 (1 retiring)	1
Department of Livestock & Industrial Resources (LIR)	Livestock and Entomic Production Technology	5	1
	Animal Product Technology and Value Addition	3	
	Livestock Economics, Entrepreneurship and Policy	3	
Department of Wildlife & Aquatic Animal Resources Management (WARM)	Wildlife Health and Production	5	1
	Aquatic Health and Production	4	1
	Wildlife and Animal Resources Management	5	1
Department of Bio-technical & Diagnostic Sciences (BDS)	Biomedical Laboratory Technology	3	1 (study leave)
	Microbiology	5 (1 is Deputy Principal)	1
	Immunology & Vaccinology	1	-
	Parasitology & Entomic Vector Technology	3	1
Department of Biomolecular Resources & Biolab Sciences (BBS)	Physiology, Biochemistry & Nutrition	6	3
	Molecular Biology, Computational & Biosynthetic Technology	4 (1 is Dean)	
	Anatomical Sciences	4	
Department of Biosecurity, Ecosystems & Vet Public Health (BEP)	Veterinary Public Health & Food Safety	3	1
	Epidemiology and Preventive Medicine	3 (1 on study leave)	1
	Biosecurity and Ecosystem Health	3 (1 is principal)	1
	Research, Biometry & Decision Sciences	3 (1 on study leave)	

"

Research ... is nothing but a state of mind-a friendly, welcoming attitude toward change; going out to look for a change instead of waiting for it to come. Research, for practical men, is an effort to do things better.....

Charles F. Kettering

COVAB IN RESEARCH AND INNOVATION

Integrating Research, Innovation and Development Service

6

To implement research and development services consistent with the TAVIC paradigm, COVAB has mainstreamed strategic research and development service centers and laboratories that operate in a multidisciplinary fashion. These are summarized below.

COVAB Research, Knowledge and Technology Transfer Services.

- AFRISA
- Nakyesasa Incubation Centre
- Centre for Biosecurity and Global Health
- Wildlife Research and Service Centre (Ruth Keesling Centre)
- RTC Laboratory (Vector and Insect Technology)
- Veterinary Medical Clinic
- Viral Biotechnology & Diagnostics Laboratory (Walter Reed Laboratory)
- Molecular Biotechnology & Diagnostics Laboratory
- Joint National Animal Diseases Diagnostic Centre
- Reproductive Biotechnology and Diagnostics Laboratory
- Central Pathology Laboratory
- Fish and Aquaculture Technology Facility
- Feed and Nutrition Laboratory
- Biochemistry Research Laboratory
- Buyana Stock Farm

AFRISA

Africa Institute for Strategic Services and Development

AFRISA is a regional center of excellence for comprehensive industrial value chain education and cottage enterprises development through Academic- Community Public- Private Partnerships (ACPPP)

AFRISA students exhibit some of the value chain products at a recent expo.

Nakyesasa Incubation Centre

Skills, Innovation, Enterprise, Technology and Production

FACILITIES

Feed Facility
Leather Facility
Dairy Feed Facility
Leather Facility
Dairy Facility
Basic Hostel

BIOSECURITY

The Centre of Biosecurity & Global Health

This centre is focused on strategic research and development services for effective management and governance of

1. Zoonotic Disease Biothreats.
2. Biochemical threats & pollution.
3. Biotechnology Development.
4. Bioeconomy & Data management.
5. Food and drug safety.

Meeting with the National Biosafety Committee

Interior view of some of the chambers in the Biosecurity & Global Health Centre

The Biosecurity and Global Health Centre at COVAB

Wild Life Conservation & Research

THE RUTH KEESLING WILDLIFE HEALTH AND RESEARCH CENTRE- RKWHERE

> The RK WHERE Centre is focused on Strategic Wildlife Innovations

The Late Ruth Keesling (middle frontrow)

The Ruth Keesling Block

The team pose for a photo at the Centre

RTC LABORATORY

Research in Tropical Diseases and Vector Control (RTC)

Specialized Services at RTC

- RTC POLLINATOR & INSECT RESEARCH
- SEROLOGY & VACCINE EFFICACY MONITORING
- TICK ACARICIDE SUSCEPTIBILITY TESTING & MONITORING
- PHARMACEUTICAL R & D AND CLINICAL TRIALS
- TOXICOLOGY & CHEMICAL ANALYTICS
- RTC GENOMICS

The RTC POLLINATOR & INSECT RESEARCH PROJECT (PRI) has developed a PROPOLIS INFUSED TEA Product prototype funded by UNCST-2019

TrypanoGEN+

The genetic determinants of neglected Tropical Diseases

Molecular Biotechnology & Diagnostics Laboratory, COVAB

TrypanoGen: Spearheading research in Human and Animal African Trypanosomiasis (HAT; AAT)

SCHISTOMIASIS

Finding possible alternative control approaches

Identification of loci and pathways associated with either phenotype, molecules could be designed for supportive therapy to compliment conventional chemotherapy that hitherto only targets the parasite with no consideration for aiding the host to fight back. In addition,

National control programs can use identified genetic markers for disease susceptibility to screen and identify most vulnerable populations in order to formulate appropriate control regimens/plans so that the usually insufficient resources are targeted to communities where they are most needed.

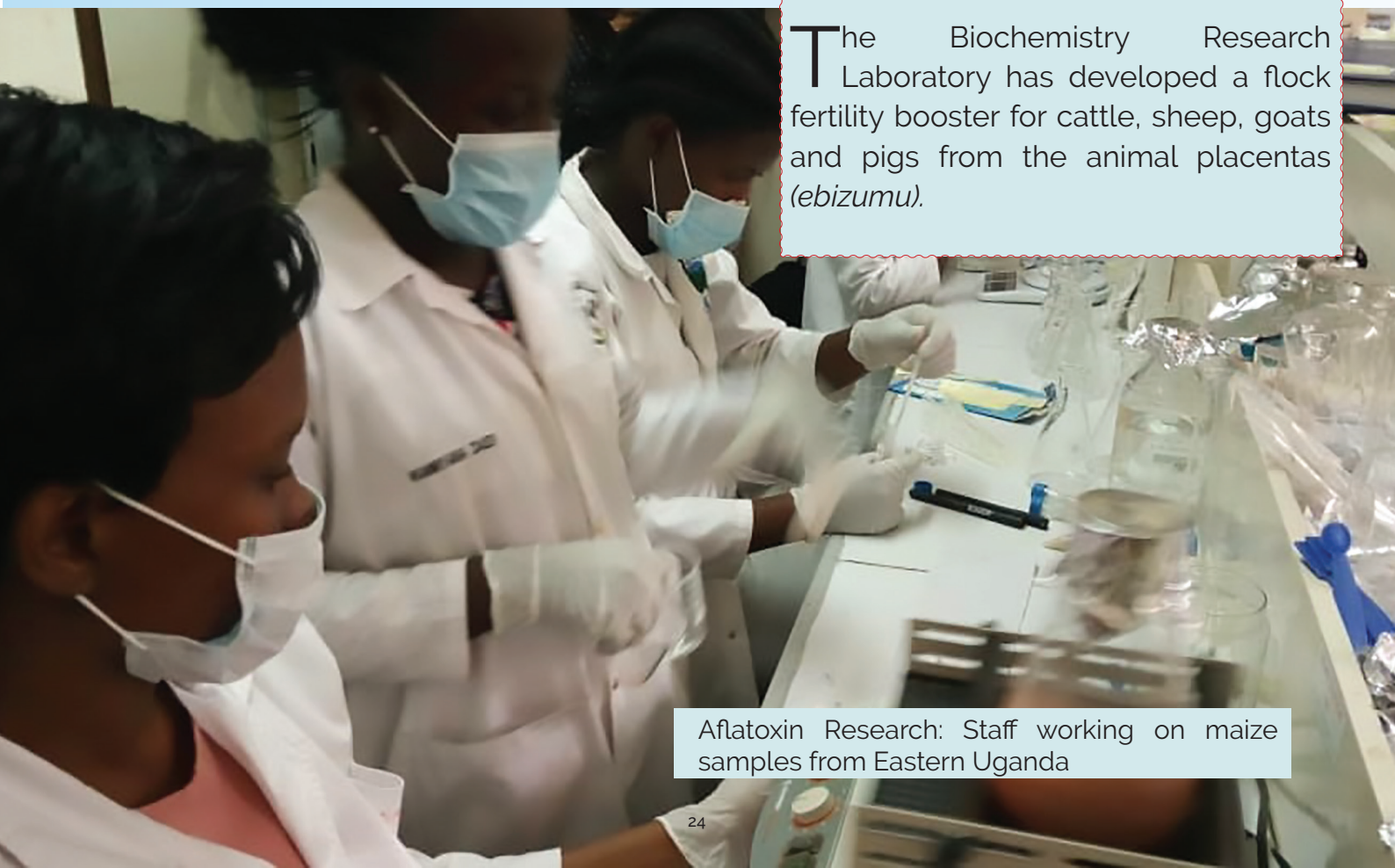
We set up a biobank of well characterised biological samples and computer servers for handling huge genomic data sets.- MOBILA

Biochemistry Research Laboratory

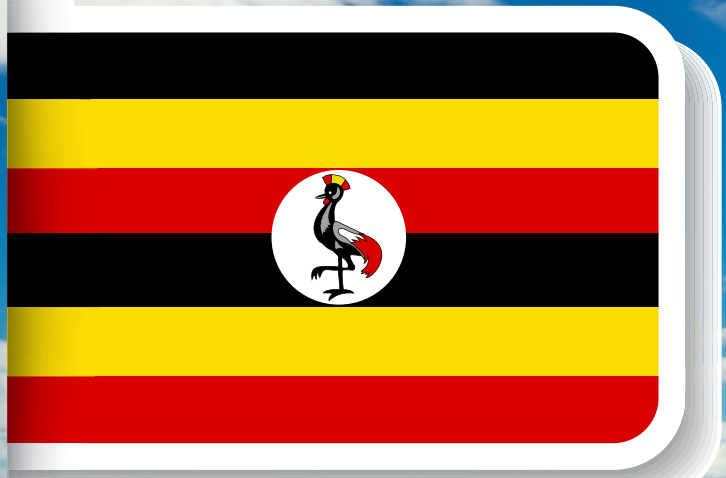
MYCOTOXIN RESEARCH AND FOOD SAFETY ASSESMENT

This laboratory is focused on biomedical research, including mycotoxin detection and quantification, food safety assessment, development of biotechnology products, antimicrobial residues detection, mineral analyses, colorimetry as well as other biochemical tests.

The Biochemistry Research Laboratory has developed a flock fertility booster for cattle, sheep, goats and pigs from the animal placentas *(ebizumu).*



Aflatoxin Research: Staff working on maize samples from Eastern Uganda



Special Services to National and Regional Development

COVAB seeks to impact directly, communities that need her services most. Accordingly, the college has created development tools and established semi-autonomous community and regional development institutes for effective outreach, knowledge and technology transfer. These include:

(1) SPEDA model – a special development tool for providing wholesome training while molding skilled human capital, commercial ventures, employment and household development in an integrated, systematic and collaborative manner. It is a tool for mass skilling, enterprise development, employment and household wealth creation. Government has recommended rollout of the model. A separate publication of the SPEDA model is underway.

(2) AFRISA - the Africa Institute for Strategic Animal Resource Services and Development, which translates Higher Education Science, Technology and Innovations (HESTI) into competitive livelihoods using SPEDA model. It's a special community development institute.

(3) ISTVS - the IGAD Sheikh Technical Veterinary School, which provides Mak diplomas and degrees to the IGAD region as part of sustainable peace building in the region. They are tenable at ISTVS in the Horn of Africa.

(4) OHCEA - the One Health Central and Eastern Africa network, which champions one health initiatives across Africa through the various participating university institutions.

(5) GFRA –the Global Foot and Mouth Disease Research Alliance, which provides comprehensive research and capacity building for the control and eradication of FMD globally in an integrated manner using facilities across the world.

(6) RUMPELHA – the Regional Universities Mediated Partnerships for Enhancing Livelihoods and Health in Africa, which champions, the international summer school, scientific conference and cultural boma annually. It also coordinates the African Natural Products Network.

AFRICA INSTITUTE FOR STRATEGIC SERVICES AND DEVELOPMENT (AFRISA)

AFRISA is a regional centre of excellence for comprehensive value chain education and cottage enterprises development through Academic-Community-Public-Private-Partnerships. (ACPPP)

COVAB
Affiliated Institutions

ISTVS

IGAD Sheik Technical Veterinary School (ISTVS) built and affiliated to Mak-COVAB

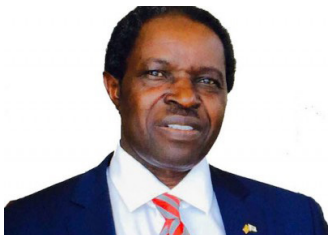
ISTVS, a well-established tertiary education institution located in Sheikh, Somaliland, was adopted by IGAD in July 2012 in line with its strategy to explore the viability of establishing a dedicated institution working for improved resilience in the pastoral areas of the ASALs region

COVAB CHAMPIONING ONE HEALTH

The One Health Educational Model
In partnership with veterinary and public heath institutions in East and Central Africa. COVAB promotes a multi and trans-disciplinary collaborative approach to research and development of holistic workforce capable of handling emerging and re-emerging health challenges and diseases.

- One Health Residence
- One Health Field Attachments
- One Health graduate & \under graduate programs

OHCEA
One Health Central and Eastern Africa



Prof. William Bazeyo
OHCEA PRINCIPAL INVESTIGATOR

Prof. John David Kabasa
OHCEA CO-PRINCIPAL INVESTIGATOR

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1.. & 2. Dog Vaccination during a recent One Health Community Outreach.

3 . Some of the One Health Students

4.. One Of The Farmers Show Cases How The Process Of Dairy Value Addition Is Run At The Namanyonyi Dairy Plant Mbale District during one of the One Health Field VISITS

THE INTERNATIONAL SUMMER SCHOOL

The Nalirri Team And The 2017 Summer School Team Conducting A Sensitization On Trypanosomiasis At Bukedi Secondary School Tororo District

The Summer School Team Taking A Nature Walk In Kibaale National Park

One Of The Students From Mississippi State Univesity Observing Some Of The Trapped Tsetse Flies At Nalirri

2017 Summer School Team Pose For A Group Photo In Kapchorwa District

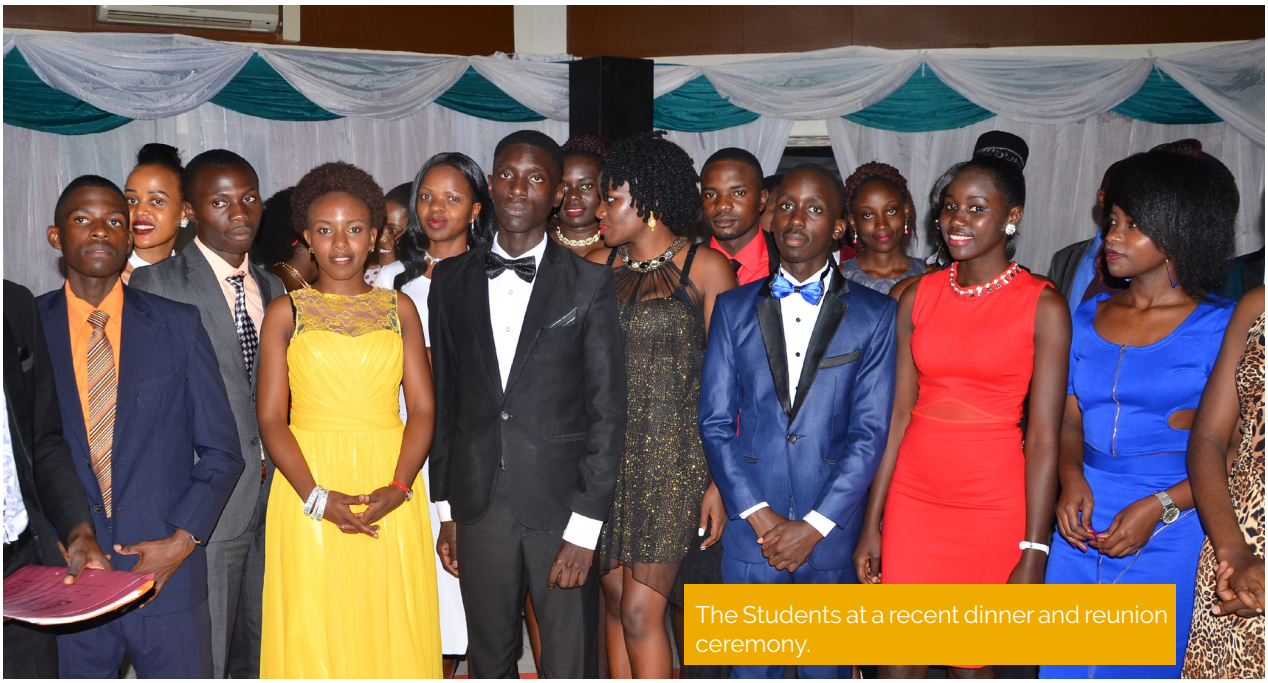
STUDENT AND ALUMNI SUPPORT

Freshmen pose for a group photo after their orientation..

Students commemorating the World Rabies Day recently.

Vaccination of animals during a recent field visit

The students are organized and supported in a variety of extra-curricular activities through their umbrella body, the COVAB Students Association (COVABSA). The various professional students' associations are integrated through COVABSA. COVABSA is represented on relevant committees of the college. Alumni of the college are supported to nurture their professions, form networks and labor unions to foster advancement of professional service delivery nationally and beyond.



The Students at a recent dinner and reunion ceremony.

THE COVAB IMPACT TRAIL

The COVAB programs of education, science, technology and innovations impact national development at various levels:

Human Capital Development

COVAB is a multi-disciplinary college. It trains over 11 professional cadres for national and international development:

1) Veterinarians
2) Biomedical Laboratory Technologists
3) Industrial Laboratory Technologists
4) Animal Production Technologists
5) Wildlife Health and Production Technologists
6) Epidemiologists and Biosecurity Officers
7) Molecular Biologists and Biotechnologists
8) Livestock Development Planners and Managers
9) Livestock Economists and Socio-economists
10) Scientists
11) Industrial Livestock Farmers, Farm Technicians and Entrepreneurs

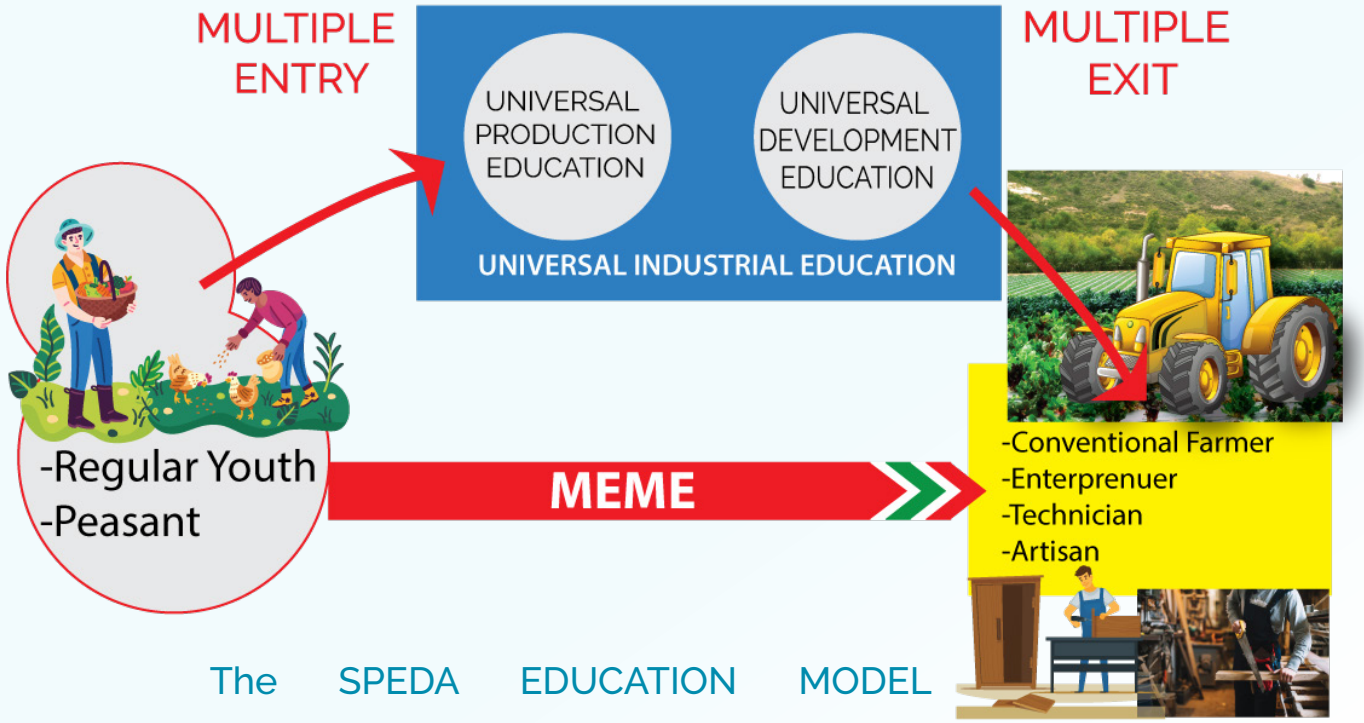
Current Innovations and Inventions

COVAB has and is in advanced stages of developing prototypes for the following innovations and technologies of commercial and development value:

1) SPEDA Model – a Wholesome Education and Community Development Tool with capabilities for sustainable enterprise development and employment creation
2) Farm Enterprise App
3) Anti-Tick Vaccine
4) Brucellosis Rapid Diagnosis tool
5) Rapid Diagnostic Tool for Sleeping sickness
6) Molecular Diagnostic Test for Animal and Human Trypanosomiasis
7) Novel Laval Fish Feed and Formulations from local resources
8) Bacteriophage Cocktails for Fish Organic Farming and Control of Bacterial Diseases
9) Biological Binders for Mycotoxin Management in Animal Feeds
10) Native Livestock Progesterone Recovery Tools for accelerating flock fertility and productivity
11) Herbal poultry growth promoters and immune boosters
12) Microbial Stench Control Cocktails for Piggery Enterprises

Skills Production Entreprise Development and Accreditation (SPEDA).

Moulding Youths & Household Enterprises



The SPEDA EDUCATION MODEL

SPEDA model concertrates on comprehensive industrial value chain education and training to pass out graduates with skills, Product innovations and enterprises while addressing unemployment, industrialisation and commercialisation.

Driven to vocationalise, Incubate Entreprenuership & Graduate SMEs and employment

- Industrial & Export-Oriented Education
- Innovation system and Community Service
- Academic-Community-Public-Private Partnerships (ACPPP)
- Regional Satellite Skills and Technology Centres
- Value Addition and Productivity.

Dr. Margaret K Saimo

Dr. Margaret unveils the anti- tick vaccine to H E Yoweri K Museveni and Vice Chancellor, Prof. Barnabas Nawangwe at the 2019 Innovations Expo at Makerere University.

The COVAB ANTI-

Upscaling And Production Of Anti-Tick Vaccine

Background

Tick-borne diseases (TBDs) cause high deaths in local calves, improved and naïve breeds of cattle, resulting in food insecurity and loss of income due to treatment costs, milk revenue, tick control and in communities where bull draught power is used to cultivate. Control of tick-borne diseases has relied mainly on the control of ticks using acaricides, applied weekly, which increases the appearance of acaricide-resistant ticks and escalation of costs, all to the great concern among cattle keepers.

Previous work identified vaccine candidate proteins from our local ticks which have been exploited by our scientists at College of Veterinary Medicine, Animal Resources and Biosecurity (COVAB) with support from government to produce an anti-tick vaccine. These proteins are being produced in Pichia pastoris and team has built capacity and is able to produce 80,000 doses per year.

Methods

The vaccine candidates were evaluated in two stall experiments by immunizing cattle in a stall experiment where the vaccine candidate proteins were injected intramuscularly, in the initial dose; this dose was repeated two times for boosting the immune response. Different developmental tick stages were attached on the animals and monitored for feeding. The detached ticks were collected in universal bottles, weight and incubated for laying the eggs or hatching for the eggs or molting for

-TICK VACCINE

the immature stages. The vaccine candidate proteins were assessed for immune response in the immunized cattle, the biological performance of the ticks and efficacy.

Results

Overall efficacy for the vaccine candidate proteins was 86% for R. appendiculatus (brown ear tick) adult ticks and immature stages (nymphs, larvae); the tick that transmits East Coast Fever (ECF) disease and 53% for R. decoloratus tick species (transmits Babesiosis). Engorged ticks from immunized cattle performed poorly as they did not attain full weight on detachment, which resulted in eggs with low weight thereby affecting their hatchability. Eggs from ticks detached from immunized cattle failed to hatch while those from animals that were not immunized hatched very well.

Objective

To develop an effective, affordable and safe anti-tick vaccine that will reduce acaricide use, and protect cattle from risk of acaricide resistant ticks, thus encourage investment in the sector, increase food security, household income and a multiplier effect on export of livestock products.

Recommendation

We plan to expand the immunization to include more animals in the field and carry out a clinical trial on these candidate vaccine proteins, to determine the appropriate dosage and immunization schedule.

Way forward

Promotion of the development of the vaccine, there is need to develop a vaccine plant or modify existing infrastructure to manufacture the anti-tick vaccine probably by government or other partnership with Makerere.

Anti-tick vaccine candidate proteins offer more opportunities to include other candidate vaccine proteins of other cattle diseases into the combination.

BIOCHEMISTRY RESEARCH LABORATORY

SyncBRL®

Empowering Farmers For Mass Production Of Cattle, Goats And Pigs.

"Steering for farmers to manage breeding"

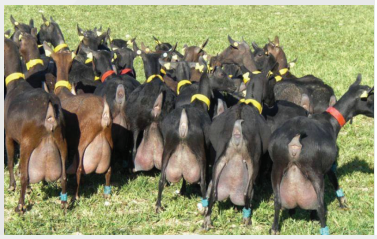
Introduction

College of Veterinary Medicine Animal Resources and Biosecurity's (COVAB) vision is to drive transformative knowledge, skills, innovations and services for the continuous improvement of society. To achieve this, COVAB has repositioned herself through creation of platforms for provision of research, knowledge and technology transfer services. The Biochemistry Research Laboratory (BRL) was established by a consortium of scientists in COVAB, to contribute towards the achievement of the college vision through development of biotechnology products including hormone based products, phytochemical based therapies and food safety research plus bio-analytical services.

Background of SyncBRL®

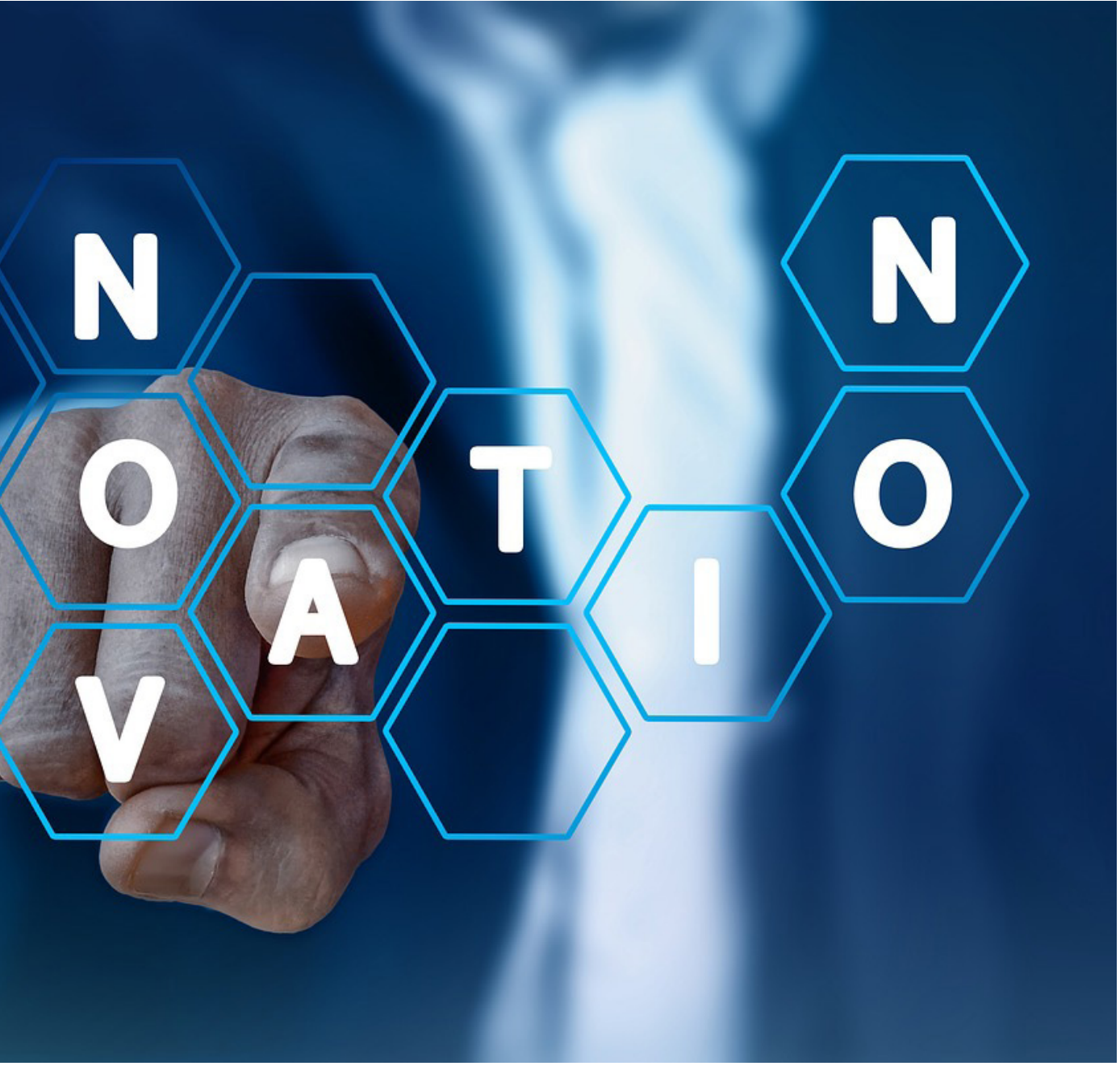
In order to be in control of breeding on your farm, you need to use SyncBRL® products. These are hormone based tools produced by Biochemistry Research Laboratory (BRL) at COVAB, Makerere University. The tools are used in cattle, goats and pigs. It's now possible for farmers to meet the market demands. This is how the tools can help you;

- SyncBRL® CATTLE: Produce beef from uniformly aged cattle, produce large quantities of milk in the same season, produce calves in the wet season.
- SyncBRL® SHOATS: Produce large quantities of milk from dairy goats, produce uniformly aged goats and sheep for chevon and mutton, and produce shoats when feeds are available.
- SyncBRL® PIG: Produce uniformly aged pigs for the pork market, produce pigs when feeds are available.



WHY SyncBRL®

Homemade- Buy Uganda, Build Uganda
Safe and Effective
Readily available
Cheap
Gender responsive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COLLEGE OF VETERINARY MEDICINE,
ANIMAL RESOURCES & BIOSECURITY

CHALLENGES

(1) Government through the Ministry of Finance informed Makerere University in a letter that the SPEDA model shall be rolled out with effect from July, 2019. However, this has not yet been realised, although COVAB and AFRISA are ready to roll out.

(2) Consistent with the Presidential initiative, the AFRISA and Nakyesasa Development Service centers, have been established and are providing strategic training, skilling and enterprise development service on behalf of government and the university across the country. However, these units have not yet received government subvention to cater for recurrent and development activities effectively and efficiently. The centers have a lot of hurdles in running activities. Urgent intervention is required to avoid collapse.

(3) The Presidential initiative has also established the Center for Biosecurity and Global Health (CEBIGHA) to provide strategic service and research to government to protect cross-border trade, animal agriculture, tourism and public health systems from biothreats originating from the animal world. The first phase of construction established a Biosecurity Level 2/3 laboratory unit. The laboratory unit to handle biotechnology development, chemical contaminants, food and drug safety has not been equipped due to inadequate funding. There is urgent need for government intervention to bring the center to completion, in order to fulfil the requirement for commissioning of the centre by the National Biosafety Committee.

(4) While the college has expanded, the academic staff establishment has remained the same as was the case during the faculty era, when the institution hosted only 150 Bachelor of Veterinary Medicine students. The number of professional degrees has increased from 1 to 11 and the science discipline specialties have expanded from 9 to 22. This phenomenon has curtailed staff efficiency in teaching, research, service and mentorship.

(5) Since the 1971 coup d'état, the COVAB main block has never been completed. There are a number of weak points on the block which need immediate completion to secure the block and steward critical research and teaching materials. The block has a temporary roof whose old iron sheets have suffered massive damage every rain season leading to water seepage, alteration of laboratory humidity and temperatures, and sometimes electric shock among other losses. These eventually have led to shorter shelf life, damage and loss of research and teaching equipment.

(6) The establishment of seven research and development service centers (Biosecurity Center, AFRISA, Nakyesasa Incubation Center, Joint National Animal Diagnostic Center, Wildlife Center, RTC Laboratory, and Buyana Stock Farm) has strained the current staff establishment of the college. There is urgent need for stop-gap staffing measures, while taking appropriate action for recruiting essential staff for each of the centers.

(7) Due to incessant University financial stress, technical and specialized administrative staff were drastically reduced over the years, yet the volume of students, practical training, research and development service at the various units has been increasing.

(8) Volume of field practical training and skilling has drastically increased, yet the vehicle pool has decreased and aged. This puts students at risk especially those who go for long distances deep into the National Parks and ranches.

(9) Teaching laboratories have remained the same despite the increase in student numbers. Labs are overused, with inadequate maintenance support.

(10) Complex formalities in the University have led to a lengthy COVAB transformation process. Many initiatives that should have been realized earlier have taken longer than expected.

CONCLUSION

(1) The transformation of COVAB has been implemented with patience in line with the University strategy and consistent with government guidance and HE the President's directives.

(2) Much progress has been made in implementing the college development strategy (DSIP). However, much is yet to be done to realize the full potential of the college. Solidarity, advocacy, continuous sensitization, partnerships and collaboration are much required.

(3) During implementation of the college DSIP, lessons have been learnt and carefully ploughed back into the evolution process of the college to ensure a sustainable institution and programs.

(4) The expansion of the college has created additional units to provide strategic service to government, communities and the region. Given this public good function, there is urgent need for government support beyond the conventional budget support normally provided by government to college.

(5) All degree programs in COVAB have been allocated a mother department consistent with their profession. Disciplines in each department have been defined and realigned. A college minute has been forwarded to the Appointments Board for staff re-deployment to their respective discipline specialties. The college awaits the decision of the Appointments Board.

(6) The college is underfunded and understaffed. Many academic staff are on PhD or Postdoc study leave. Remedial measures to address this challenge in the short-term are a priority.

PRAYER & NEXT STEPS

(1) There is need for a feedback meeting by the University Council with the Honorable Minister of Education and HE the President of the Republic of Uganda to secure further guidance on the implementation of HE's directives.

(2) There is need for the University Council to fast-track the approval of the revised structure of AFRISA, Nakyesasa Incubation Center and the Biosecurity Center.

(3) There is need to secure government subvention to fully operationalize the newly established strategic research and development service centers.

(4) There is need for the University to provide short term remedial measures to address critical activities and needs of emerging research and development service centers.

(5) There is need to secure partnerships and collaboration beyond government support to drive the college initiatives through Academic-Community-Public-Private Partnerships (ACPPP).

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