

College of Agriculture and Veterinary Sciences

Principals Message



The College of Agriculture and Veterinary Sciences, commonly referred to as CAVS is one of the six Colleges that make up the University of Nairobi. CAVS has continued to experience growth in various facets as it strives to fulfill its mandate of training human resource in the fields of agriculture, veterinary sciences and environmental studies. Apart from the professional aspect, we also offer all-round training that includes, but not limited to, mentorship and leadership as well as guidance and counseling, with the aim of producing graduates who will be responsible global citizens with the capacity to make positive contributions to society.

CAVS has played its strategic role in helping to realize national and international policy aspirations such as Kenya's Vision 2030 and the Big 4 Agenda, and the Sustainable Development Goals (SDGs). In this respect, the College has pioneered the breeding of new bean varieties, established the Seed Enterprise Management Institute (SEMI), established facilities for training on reducing post-harvest losses and offered higher training in veterinary sciences and environmental sustainability initiatives. All of these are crucial in, *inter alia*, alleviating food security challenges, reducing levels of excruciating poverty and promoting sustainable livelihoods. Our contribution to reducing impacts of the pangs of hunger allows people to engage in productive endeavours at the personal and national levels.

Our academic curricula are continuously and regularly reviewed in response to contemporary global trends, and because of this, the training that our graduates receive has enabled them to excel in diverse fields in different parts of the world. In this respect, several curricula were reviewed during the year.

CAVS does not operate in a vacuum but is fully involved in outreach activities that include corporate social responsibility. Members of staff and students regularly go out to meet farmers

to, among other things, train them in various fields and creating awareness on the latest trends in agriculture, veterinary and environmental issues, and vaccinating livestock. The students and staff in return also share experiential knowledge from the practitioners.

Following the Government of Kenya directive in early 2020 that all educational institutions should have at least 10% of their land under trees, CAVS was given the task of undertaking this responsibility on behalf of the University of Nairobi. As a first step towards this objective, and in liaison with our stakeholders, we planted 3,065 tree seedlings at the Veterinary Farm on November 20, 2020. Since then, a number of corporate organizations and the Indian High Commission in Kenya have expressed interest in partnering with us towards greening the University as part of national, if not global efforts, in environmental conservation and protection.

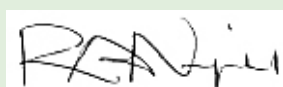
Despite our achievements, 2020 was a difficult year across the world mainly due to the outbreak of the COVID-19 pandemic and our College was not spared the impacts. However, due to the tenacity of members of staff and students, and the unwavering support of University Management, we managed to graduate 820 students, after successfully completing many of the programmes

on-line. We also held several webinars that attracted participants with different backgrounds from many parts of the world.

I therefore wish to thank all the staff and students, and all our partners and collaborators who stood with us during the difficult moments. Each one of us has a responsibility toward good health; I continue to urge all of you to adhere to the laid down protocols availed by the Ministry of Health, and tirelessly offer the College your invaluable support.

We appreciate the Government of Kenya for the continued support, this being a public institution. Our quest for world-class excellence is solid as we embrace measures in place to ensure sustainable and maximum utilization of our resources.

Once again, I thank all our stakeholders, and urge you not to waver in your support as we forge forward into 2021.

A handwritten signature in black ink, appearing to read 'R. Nyikal', enclosed within a white rectangular box.

**Prof. Rose Nyikal Ag. Principal,
College of Agriculture & Veterinary Sciences**

Department of Agricultural Economics

Introduction

The mandate of the Department of Agricultural Economics is Teaching and Learning, Research and Innovation, Consultancy and Community Service. It also provides project and supervision work, Youth internship, and Mentorship services

Its Vision is to be an international centre of excellence in agricultural and applied economics training, research and extension, and outreach for the realization of sustainable livelihoods for all.

Whereas the Mission is to be an international centre of excellence in agricultural and applied economics training, research and extension, and outreach for the realization of sustainable livelihoods for all.

The Department participates in the Collaborative Agricultural and Applied Economics MSc programme that is partially funded by Africa Economic Research Consortium (AERC) and it has been performing exceptionally very well in the third semester at the Shared Facility for Specialization and Electives (SFSE), University of Pretoria. For instance, with the exemplary performance of our students, University of Nairobi was ranked Position 1 overall out of eight (8) major universities in Eastern and Southern Africa and scored an average of 75.5%. This is a repeat of our performance and ranking in 2017 when the University also produced the top three students at the SFSE. In 2019 the Department also produced the second top student. It is also important to note that 8 out of 11 students (73%) scored over 70%, which has not been achieved in the past years.

Programmes Offered

- i) Bachelor of Science in Agricultural Education and Extension
- ii) Bachelor of Science in Agribusiness Management
- iii) Bachelor of Science (Economics Major)
- iv) Master of Science in Agricultural and Applied Economics
- v) Master of Science in Agricultural Information and Communication Management
- vi) PhD in Agricultural Economics
- vii) PhD in Agricultural and Applied Economics
- viii) PhD in Agricultural Information and Communication Management

Strategic Issues

The Department is guided by the following Strategic Objectives:

- i) To manage the Departmental resources efficiently;
- ii) To grow the Department resource base and enhance productivity;
- iii) To produce quality and holistic graduates in agricultural and applied economics including agribusiness management, agricultural extension and rural development;
- iv) To contribute to the development of society through creation, storage, application and dissemination of knowledge on agricultural and applied economics;
- v) To enhance the competitiveness and image of the Department as a centre of excellence in agricultural and applied economics training and research
- vi) To enhance strategic partnership and collaborations.

Major Achievements in the Year 2020

Student Numbers

Programme	No. of Students
Bachelor of Science in Agricultural Education and Extension	356
Bachelor of Science in Agribusiness Management	313
Master of Science in Agricultural and Applied Economics	175
Master of Science in Agricultural Information and Communication Management	40
PhD. in Agricultural Economics	13
PhD in Agricultural and Applied Economics	20
PhD in Agricultural Information and Communication Management	8

International Students

There were 41 students under this category from across African continent e.g. Liberia Malawi, Ghana, Nigeria, Botswana, Rwanda, Burundi, Tanzania, Uganda and South Sudan. The number increased by 5.6% from that of last year

The department was actively involved in the following research activities:

- i) Analysis of the Socio-Economic Contribution of Donkeys Ownership and Use to Household Livelihoods in Kiambu County
- ii) Impact of Rural and Community Bank Credit Access on Technical Efficiency of Smallholder Cassava Farmers in Fanteakwa District of Ghana
- iii) Assessment of Livestock Farmers' Preferences for Integration of Community-Owned Resource Persons and Interrelationships in Animal Trypanosomiasis Management Methods in Kwale County, Kenya
- iv) Assessment of the Effectiveness of Communication Channels Used in the Dissemination of Reproductive Technologies in Dairy Cattle in Kangema, Murang'a County
- v) Participation in Contract Farming and its Effects on Technical Efficiency and Income of Vegetable Farmers in Western Kenya
- vi) Comparative gendered assessment of productivity, technical efficiency and technology gaps of sorghum plots in three Districts of Uganda
- vii) An economic evaluation of the role of land and livestock dynamics in livelihood diversification in Baringo County, Kenya
- viii) Effects of Integrated Nutrition Education Approaches of the Production and Consumption of Orange-Fleshed Sweet potatoes in Homa Bay County, Kenya
- ix) An assessment of smallholder livestock keepers' willingness-to-pay for cattle insurance attributes in Botswana: the case of Central District
- x) An Economic Assessment of the Factors That Influence Smallholder Farmer Participation in Export Markets as a Case of High Value Mango Markets in Southern Ghana

Corporate and Community Outreach Activities

The Department was involved in tree planting and community projects such schools in a number of countries. Some staff members are in the school boards (BOMs) and other are involved in mentorship activities of students and pupils.

Staff Portfolio

Cadre	No. Male	No. Female	Total No.	Number of PhD Holders
Full Professors	3	0	3	3
Associate Professors	2	1	2	2
Senior Lecturers	2	2	4	4
Lecturers	5	1	6	6
Assistant Lecturers/Tutorial Fellows	2	1	3	1

Projections

- i) Increased staff motivation and commitment
- ii) Improved quality and delivery of teaching and learning programmes
- iii) Improved employability of graduates in diversified fields
- iv) Increased internationalization of the Department
- v) Increased number of graduate students in diverse fields
- vi) Increased visibility and uptake of Department research output
- vii) Enhanced student satisfaction
- viii) Improved staff satisfaction
- ix) Increased staff productivity

Any Other Pertinent Information/Issue in the Year 2020

The Department participated in a workshop organized AERC at Egerton University whose main purpose is to disseminate research findings on the area of technology adoption, gender and trade for rural development. The Department had three students presenting workshop papers in this workshop.

Department of Animal Production

Introduction

The Department of Animal Production is the oldest departments of the University of Nairobi. Located in Upper Kabete Campus, it was part of the then Royal College of East Africa, later University of East Africa, Makerere in 1962.

The Department of Animal Production belongs to both faculty of Veterinary Medicine and Faculty of Agriculture. The Department has participated in the production of several veterinarians, agriculture graduates, food technologists, range managers, agricultural engineers in addition to several Masters of Science in Animal Nutrition, Animal Genetics and Breeding and Management of Livestock production systems as well as many PhDs in specific aspects of Animal science Academic programmes. The Department offers courses in animal production to undergraduates of the faculties of Agriculture and Veterinary Medicine. The year 2020/2021 has seen the department undertake has been very good.

Programmes Offered

- i) Bachelor of Veterinary Medicine
- ii) Bachelor of Science in Agriculture (Animal Science Major)
- iii) BSc. (Fisheries and Aquaculture Management)
- iv) BSc.(Wildlife Conservation Management)
- v) MSc. (Animal Genetics and Breeding)
- vi) MSc. (Animal Nutrition and Feed Science)
- vii) MSc. (Livestock Production Systems)
- viii) PhD. (Various fields in Animal Sciences)

International Students

We have international eight (8) students pursuing MSc. in Livestock Production Systems drawn from Somalia, DR Congo, and Southern Sudan and one student from DR Congo pursuing PhD in Animal Genetics and Breeding.

Number of Graduates

Postgraduate Students who Graduated in 2020:

MSc. Animal Nutrition and Feed Science	- 1
MSc Animal Genetics and Breeding	- 2
MSc Livestock Production Systems	- 2
PhD animal Genetics and Breeding	- 1

Undergraduate Students who Graduated in 2020:

Bachelor of Science in Fisheries and Aquaculture Management	- 27
Bachelor of Science in Agriculture (Animal Science Major)	- 14

Collaborations

Currently the department is involved in among other collaborations the following:

Project	Collaborators
Effect of feeding Black Soldier Fly Larvae to Broilers and Layers.	Kalro ICIPE
Climate and Change Adaptation for Sustainable Beef Production in Tana River County.	Kalro KCSAP
Use of Mushroom Substrate as Animal Feed	Kalro KCSAP
Adoption and Impact of Sahiwal Dairy Cattle in Kajiado and West Pokot	Kalro KCSAP
Scaling up Dorper Sheep Production through Climate – Smart Targeted Breeding, Heath Management and Feeding Strategies in Kenya	Kalro KCSAP
Environment Project on Wildlife Conservation; Alabama A&M University-Fulbright Project on Agriculture Extension.	KWS UN



Layers in the Poultry Unit



Poultry Hatchery



Egg Production

Publications for the Year

Journals Produced July 2020/2021

1. Trends and Constraints in Guava (*Psidium Guajava* L.) Production, Utilization, Processing and Preservation in Kenya by Duke Gekonge Omayio, George O Abong', Michael W Okoth, Charles K Gachuiri, Agnes W. Mwang'ombe Publication date 2020/7/9. *International Journal of Fruit Science*, Pages 1-12. Taylor & Francis
2. Production Systems, Genetic Diversity and Genes Associated with Prolificacy and Milk Production in Indigenous Goats of Sub-Saharan Africa: A Review by Simon Patrick Baenyi, Joseph Owino Junga, Christian Keambou Tiambo, Ahadi Bwihangane Birindwa, Katcho Karume, Getinet Mekuriaw Tarekegn, Joel Winyo Ochieng. *Publication*: date 2020/8/15. *Open Journal of Animal Sciences* Volume 10, Issue 4, Pages 735-749. Scientific Research Publishing
3. Urea-molasses Pre-treatment to Enhance Nitrogen Gain, Digestibility, Intake and Milk Yield from Crop-Residues in Smallholder Dairy Farms in Eastern Africa by Ongadi Patrick Mudavadi, Mpolya Abraham Emmanuel, Lukuyu Adubwa Bernard, Haule Alphonse, David Peter Ngunga, Gachuiri Charles, Muyekho Francis Namasake, Endalkachew Wolde-meskel. 2020/8/27. *Asian Journal of Research in Animal and Veterinary Sciences*, Pages 28-43
4. Effects of Season Variation on Water, Feed, Milk Yield and Reproductive Performance of Dairy Cows in Smallholder Farms in Eastern Africa by Mudavadi Patrick Ongadi, Emmanuel A Mpolya, Charles Gachuiri, Francis Namasake Muyekho, Adubwa Bernar Lukuyu. 2020/8/28. *Journal of Agriculture and Ecology Research International*
5. Assessment of methods practiced in the disposal of solid waste in Eastleigh Nairobi County, Kenya [J] by Joseph Muiruri, Raphael Wahome, Kiemo Karatu. 2020/10/16. *AIMS Environmental Science*; Volume 7, Issue 5; Pages 434-448. Aims Press
6. Co-occurrence and Levels of Mycotoxins in Fish Feeds in Kenya by Evalyn Wanjiru Mwihi, Jan Ludvig Lyche, Paul Gichohi Mbuthia, Lada Ivanova, Silvio Uhlig, James K Gathumbi, Joyce G Maina, Eric Emali Eshitera, Gunnar Sundstøl Eriksen. 2020/10. *Toxins*. Volume 12, Issue 10, Pages 627. Multidisciplinary Digital Publishing Institute
7. Nutritive value of selected preferred forage species by lactating camels in the peri-urban area of Marsabit town, Kenya by J.I Sagala, C.K Gachuiri, S.G Kuria, MM Wanyoike. 2020. *Indian Journal of Animal Nutrition*; Volume 37 Issue 3 Pages 18-226. *Animal Nutrition Society of India*
8. Rabbit production practices in Kiambu County, Kenya by Abraham Kipchumba Cherwon, Margaret Mwihiaki Wanyoike, Charles Karuku Gachuiri. 2020/10/31. *International Journal of Livestock Production*. Volume 11, Issue 4, Pages 114-121. Academic Journals
9. Analysis of the benefits and production challenges of working donkeys in smallholder farming systems in Kenya by Mary Gichure, Joshua Onono, Raphael Wahome, Peter Gathura. 2020/11/1. *Veterinary World*. Volume 13, Issue 11
10. Whole Genome Sequence Analysis of Porcine Astroviruses Reveals Novel Genetically Diverse Strains Circulating in East African Smallholder Pig Farms by Joshua O Amimo, Eunice M Machuka, Edward O Abworo, Anastasia N Vlasova, Roger Pelle. 2020/11. *Viruses* Volume 12, Issue 11, Pages 1262. *Multidisciplinary Digital Publishing Institute*.
11. Mining impact on communities' livelihoods: A case study of Taita Taveta County, Kenya by Irene Mwakesi, Raphael Wahome, Daniel Ichang'i. 2020. *AIMS Environmental Science*; Volume 7, Issue 3; Pages 286-301.
12. Evaluation of Dairy Cattle Productivity in Smallholder Farms in Nyeri County, Kenya by Peter Aweer Duot Ajak, Charles K Gachuiri, Margaret MM Wanyoike. 2020/12/11. *East African Journal of Science, Technology and Innovation*. Volume 2, Issue 1.
13. A Comparison of Two DNA Metagenomic Bioinformatic Pipelines while evaluating the Microbial Diversity in feces of Tanzanian smallholder dairy cattle by Felix M Kibegwa, Rawlynce C Bett, Charles K Gachuiri, Francesca Stomeo, Fidalis D Mujibi. 2020/4/23. *BioMed research international*; Volume 2020. Hindawi.

Staff Portfolio

Academic Staff

Designation	No. in Position
Professor	1
Associate professor	4
Senior lecturer	1
Lecturer	3
Ass. Lecturer	0
Tutorial fellows	2
Total	11

Non-Academic Staff

Designation	No. in Position
Principal Technologist	1
Chief Technologist	1
Senior Technologist DEF	4
Secretary	1
Technologist ABC	4
Assistant Technologist Grade III	2
Animal Attendant	3
Cleaner	3
Total	19

National Development

In addition to training of graduates in various aspects of nation building, the Department actively participates in the animal industry. The key areas of involvement include:

Formulation of Animal Feeds and Feeding Standards

- Bull evaluation for the Kenya Animal Genetic Resources Centre (KAGRC) at Lower Kabete and Agricultural Development Cooperation (ADC) Semen Production Centre in Kitale.
- Training of livestock extension officers.
- Participation in various national committees that formulates policies in improvement of livestock industry
- Collaborative research in Animal

Corporate Social Responsibility

The department continues to execute its corporate responsibility in various areas of Animal Production as exemplified by our role in the society.

Consultancies

The Department has expertise in all areas of livestock enterprises and many of the staff has veterinary medicine and agriculture backgrounds. It also enjoys good relations with departments in faculties of Agriculture and Veterinary Medicine. It is, therefore, well placed to consult in all areas of livestock production. Past consultancies were in the following areas:

Establishment of:

- Commercial Animal Feed Factories
- Commercial Poultry Production Systems
- Feed Formulation
- Livestock Housing Structures
- Aquaculture and Mariculture Production
- Commercial Poultry Hatcheries
- Commercial Dairy Production Systems
- Livestock Farm Layout
- Apiculture and other Emerging Livestock

In addition, we offer the following services:

- Livestock enterprise and production system advisory services
- Evaluation of genetic worth of livestock species
- Genetic fingerprinting
- Establishment of herd breeding programmes
- Planning of animal genetic improvement programmes
- Short term training on specific topics in Animal Science

Department of Food Science, Nutrition and Technology

Introduction

Department of Food Science, Nutrition and Technology (DFSNT) was established in 1973 as the Department of Food Science and Technology. This was later on changed to Department of Food Technology and Nutrition prior conversion to its current name in 2005. At the time of establishment, the department only offered Bachelor of Science Degree in Food Science and Technology. The first batch of students graduated in BSc. Food Science and Technology (FST) in 1976. The first Master of Science Degree programme, FST, was developed between 1982 and 1984 after which the first batch of students were admitted in 1984. In this same year, the MSc. Programme in Applied Human Nutrition curriculum was developed and the first lot of students were admitted in 1985. The mounting of the MSc Degree in ANH led to the renaming of the department to Food Technology and Nutrition.

The Department administrative structures include Sections units headed by an academic member of staff although the pilot plant is headed by a manager, a Technologist. The five sections include:

- | | |
|------------------------------|-----------------------------|
| i) Food Microbiology | iv) Applied Human Nutrition |
| ii) Food Chemistry | v) Pilot Plant |
| iii) Food safety and quality | |

Programmes Offered

- DFSNT currently offers nine-degree programmes:
- Bachelor of Science in Food Science and Technology (BSC-FST)
- Bachelor of Science in Food Nutrition and Dietetics (BSC-FND)
- Postgraduate Diploma in Food Safety and Quality (PGD-FSQ)
- Master of Science in Food Safety and Quality (MSC-FSQ)
- Master of Science in Applied Human Nutrition (MSC-AHN)
- Master of Science in Food Science and Technology (MSC-FST)
- Doctor of Philosophy in Food Safety and Quality (PHD-FSQ)
- Doctor of Philosophy in Applied Human Nutrition (PHD-AHN)
- Doctor of Philosophy in Food Science and Technology (PHD-FST)

Students Enrolment

i) Undergraduates

Food Nutrition and Dietetics	Food Science and Technology	Total
31	39	70

ii) Postgraduates

b) Master's Programmes

Food Safety and Quality	Food Science & Technology	Applied Human Nutrition	Total
9	4	2	15

c) PhD Programme

The Department offers PhD in FSQ, FST and AHN. The total number of enrolled PhD students was 2.

d) International Students Component

The Department has seven (7) international students undertaking Msc. in Food Science and Technology

Number of Graduates Year 2020

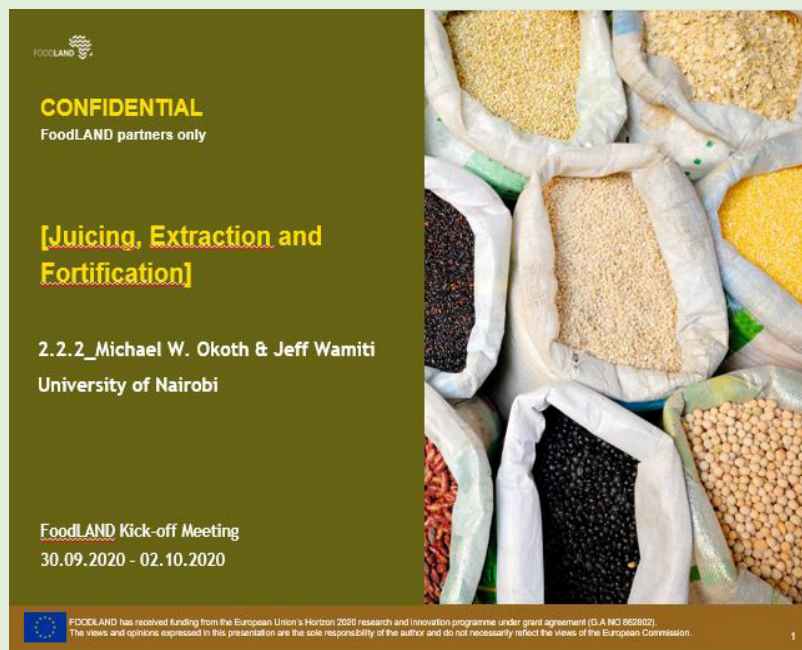
December, 2020	Count
BSc. Food Science and Technology (FST)	33
BSc. Food Nutrition and Dietetics (FND)	32
MSc. Food Science and Technology(FST)	1
MSc. Food Safety and Quality (FSQ)	10
MSc. Applied Human Nutrition (AHN)	11
PhD. Applied Human Nutrition (AHN)	1
PhD. Food Safety and Quality	1
PhD. Food Science and Technology	1
Total	90

Research Activities

Title: *FOOD and Local, Agricultural, and Nutritional Diversity (FoodLAND)* **Scientific Area:** Food security.
Discipline theme: Food Science and Technology, Human nutrition, Economics, Agronomy. **Collaborating Institutions:** University of Bologna, Italy. **Team:** Prof Wambui Kogi-Makau, Prof Michael Okoth, Dr Sophia Ngala, Dr Jeff Wamiti, Dr Lucy Njue, and Dr Dasel Kaindi

International Links and Collaboration

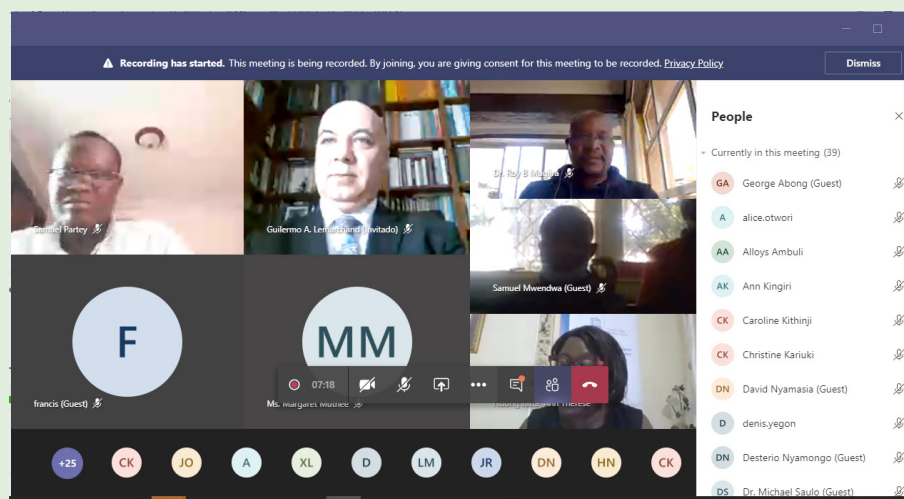
1. The FOOD and Local, Agricultural, and Nutritional Diversity (FoodLAND)



The FOOD and Local, Agricultural, and Nutritional Diversity (FoodLAND) project aims at enhancing the diversity of food production and consumption in six African countries displaying different stages of the nutrition transition.

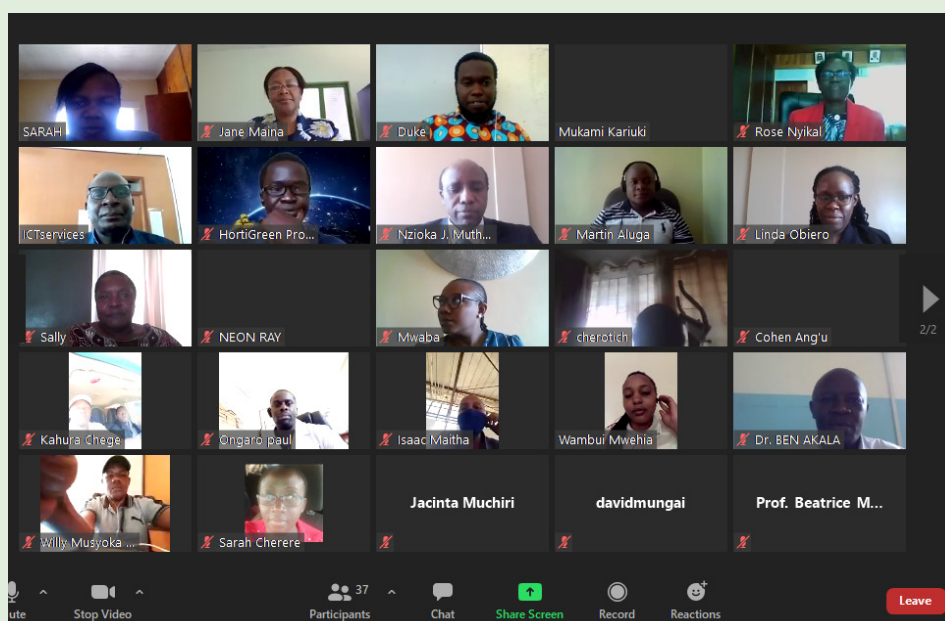
2. Gospin Training October, Virtual

DFSNT faculty and PhD students participated in the Go-spin training program held virtually in October 2020.



THE UNESCO's Global Observatory of Science, Technology and Innovation Policy Instruments (GO-SPIN) programme designed to expose — through the rigorous application of an assessment lens — usable insights about science, engineering, technology and innovation (SETI) policies and their context launched a week-long training in Kenya that saw DFSNT faculty and students participate in this critical workshop. The purpose of this programme is to help UNESCO Member States to create local capacity for analysing SETI evidence-based policies in order to detect gaps and introduce reforms and upgrades to their national innovation systems and its governance.

3. E-Conference on SCP Practices in the Horticultural Sector, 5-7 October 2020



The conference brought together micro, small and medium enterprises currently under Hortigreen project, academia, NGO and other stakeholders in horticulture and related food sub-sectors. The key sub-themes that were tackled included: green financing opportunities, sustainable water and energy management, certification, eco-labelling and current innovation, consumer and civil mobilization, sustainable consumption and practices and zero waste economy. This conference was graced by among others, the dean faculty of agriculture, Director Wangari Maathai Institute and Principal of the College of Agriculture and Veterinary Science

DFSNT Participants: Prof. M.W. Okoth, Dr. G.O. Abong', Mr. D. Gekonge, Mr. J. Ouma

Publications for 2020

AUTHOR	TITLE	JOURNAL	PERIOD*
George Ooko Abong, Jackline Akinyi Ogolla, Michael Wandayi Okoth, Bruno De Meulenaer, Jackson Ntongai Kabira, Paul Karanja, Jacxsens Liesbeth	Dietary acrylamide intake by potato crisps consumers: A case of Nairobi County.	Open Agriculture	December 2020
George Ooko Abong', Tawanda Muzhingi, Michael Wandayi Okoth, Fredrick Ng'ang'a, Phillis E. Ochieng', Daniel Mahuga Mbogo, Derick Malavi, Machael Akhwale, and Sita Ghimire	Processing methods affect phytochemical contents in products prepared from orange fleshed sweetpotato leaves and roots.	Food Science and Nutrition	December 2020

AUTHOR	TITLE	JOURNAL	PERIOD*
Aftin HA, Abong GO and MW Okoth.	Quality characterization of bread retailed in nairobi county, kenya: physico-chemical and microbial profiles.	African Journal of Food, Agriculture, Nutrition and Development.	October 2020
Jere GM, Abong' GO, Njue LG, Masamba K and DG Omayio.	Exposure of school children to aflatoxins and fumonisins through maize-based diets in school meals programme in Salima district, Malawi.	African Journal of Food, Agriculture, Nutrition and Development.	October 2020
Jeff Wamiti, Wambui Kogi-Makau, Sophia Ngala and Francis E. Onyango	Development and packaging of a leucine-rich composite flour for treatment of moderate wasting in children aged 6 – 24 months.	African Journal of Food, Agriculture, Nutrition and Development.	January 2021
Ouma JO, Abong' GO and Ngala S	Contribution of cassava and cassava-based products to food and nutrition security in Migori County, Kenya.	African Journal of Food, Agriculture, Nutrition and Development.	January 2021
Sanya Emmaculate, Okoth Michael Wandayi, Abong George Ooko and Mugalavai Violet Kadenyeka.	Consumers' acceptability of extruded maize-sorghum composite flours fortified with grain amaranth, baobab and orange fleshed sweet potatoes	African Journal of Food Science	October 2020
Sanya Emmaculate, Okoth Michael Wandayi, Abong George Ooko and Mugalavai Violet Kadenyeka	Nutrient and Anti-Nutrient Composition of Extruded Cereal Flours Fortified with Grain Amaranth, Baobab and Orange-fleshed Sweet Potato Powder	Journal of Food Research	October 2020
Derick Nyabera Malavi, George Ooko Abong', Tawanda Muzhingi	Effect of food safety training on behavior change of food handlers: A case of orange-fleshed sweetpotato pur'ee processing in Kenya.	Food Control	July 2020
Duke Gekonge Omayio, George O. Abong', Michael W. Okoth, Charles K. Gachuri and Agnes W. Mwang'ombe.	Trends and Constraints in Guava (Psidium Guajava L.) Production, Utilization, Processing and Preservation in Kenya. July 2020.	International Journal of Fruit Science	July 2020
Samuel O. Onyango, George O. Abong, Michael W. Okoth, Dora Kilalo and Agnes W. Mwang'ombe	Physico-chemical properties and sensory quality of cassava-cowpea-millet composite flours.	African Crop Science Journal	October 2020
Beinah, A., Kunyanga, C., and Ngugi, K	Utilization and Processing of Sorghum by Small Holder Farmers in Drought Prone AgroEcological Zones of Kenya.	Advances in Social Sciences Research Journal	2020

AUTHOR	TITLE	JOURNAL	PERIOD*
Ogumo EO, Kunyanga CN, Kimenju JW, Okoth MW	Performance of a fabricated solar-powered vapour compression cooler in maintaining post-harvest quality of French beans in Kenya	African Journal of Food Science	2020
Gichure, J. N., Kunyanga, C.N. Imungi, J.K.	Processing Variations, Nutritional and Sensory Quality of Ethnic Deep-Fried Meats from Kenyan Pastoral Communities.	African Journal of Food, Agriculture, Nutrition and Development	2020
Vila-Real, C., Pimenta-Martins, A., Magu, J., Kunyanga, C., Mbugua, S., Katina, K., Pinto, E.	A culture-sensitive semi-quantitative FFQ for use among the adult population in Nairobi, Kenya: Development, validity and reproducibility.	Public Health Nutrition	2020
Mbugua, M., Nzuma, J., Muange, E. & Kunyanga, C.N.	Social networks and household food consumption smoothing in the presence of idiosyncratic shocks: insights from rural Kenya	Development in Practice	2020
Muthike, C., Imungi, J., and Makau, W. K.	Cancer Chemoprevention through Consumption of African Leafy Vegetables: A review	Journal of Nutrition and Dietetics	January 2019
Joyce W. Wanjiru, Jasper K. Imungi, Lucy G. Njue	Moisture and Aflatoxin Contents of Kenyan Market Peanuts and Decontamination with Water, Lime and Ultraviolet Radiation Treatments	Asian Food Science Journal	2020
Gibson Mapopa Jere, George O. Abong', Lucy G. Njue, Kingsley Masamba and Duke G. Omayio	Postharvest Handling Knowledge and Practices among Food Handlers on Mycotoxigenic Molds Contamination in Maize Based Diets in School Meals Programme Salima District, Malawi	Asian Food Science Journal	2020
Beatrice J. Birgen, Lucy G. Njue, Dasel W.M. Kaindi, Fredrick O. Ogutu and Joshua O. Owade	Quantitative versus qualitative risk assessment of meat and its products: what is feasible for Sub-Saharan African Countries?	Critical Reviews in Food Science and Nutrition	August 2020

Papers Presented at Conferences

Invited Staff	Theme	Place	Period*
Benson Ouma. N, Michael W. Okoth, Nzioka J. Muthama, George Abong', M. Villacampa	Capacity building influence on waste management among horticultural processing medium and small microenterprises in Kenya	Virtual-Zoom	5-7 October 2020
Benson Ouma. N, Michael W. Okoth, Nzioka J. Muthama, George Abong', M. Villacampa.	Knowledge, attitudes and practices synthesis of waste management among horticultural processing msme in Kenya	Virtual-Zoom	5-7 October 2020
Obiero L. Maryanne, George Abong', Michael W. Okoth, Nzioka J. Muthama, M. Villacampa.	Energy and water use for processing by horticultural processing micro, small and medium enterprises in Kenya	Virtual-Zoom	5-7 October 2020
George Abong', Gekonge Duke, Elmah Geoffrey, Marion Villacampa	Energy and water use for processing by horticultural processing micro, small and medium enterprises in Kenya	Virtual-Zoom	5-7 October 2020

Consultancies

1. SUN Business Network - Basic Nutrition Training

The Global Alliance for Improved Nutrition's (GAIN) Marketplace for Nutritious Foods (the Marketplace) is a platform that strengthens networks, fosters innovations and promotes investment to transform local agriculture into accessible and nutritious foods. The Marketplace offers networking and knowledge sharing opportunities, business planning support, and access to financial grants and investment to local companies looking to turn their innovative and nutrition-enhancing concepts into sustainable products. The ultimate goal of the Marketplace is to create local markets full of diverse, nutritious, and affordable foods for the consumers.

To contribute towards this goal GAIN developed a curriculum of training content that was delivered between June 3rd – June 5th 2020 through joint training, to small and medium-sized enterprises (SMEs) involved in the production of nutritious foods. Members of DFSNT involved were Dr Catherine Kunyanga and Dr Jeff Wamiti.



Major Achievements

1. Fruit Processing Line at the Pilot Plant



2. Renovation of the Applied Nutrition Programme Conference Room

Before and after photographs of the conference room



Staff Establishment

Designation	No. of Staff
Associate Professor	2
Senior Lecturer	2
Lecturer	4
Assistant Lecturer	1
Tutorial Fellow	1
Part-time Staff	3
Dietetic Preceptors	2
Chief Technologist	1
Senior Technologist	4
Technologists	6
Technical Assistant	2
Secretary	1
Office Assistant	2
Drivers	2
Support staff	5
Total	38

Department of Land Resources and Management and Agricultural Technology

Introduction

The Department of LARMAT has a unique heritage; it was established in 2005 following the merger of two previously full-fledged departments and an Institute. The departments were Soil Science and Range Management, and the Institute for Dryland Research Development and Utilization. The Department is the second largest and dynamic in the Faculty of Agriculture, College of Agriculture and Veterinary Sciences. The Department of Land Resources and Management and Agricultural Technology (LARMAT), through training, research and community service aims at enhancing sustainable natural resources management and development of technologies suitable for sustainable livelihoods and informing policy.

Programmes Offered

Doctoral	Masters	Bachelor
Doctor of Philosophy in Agroforestry	Master of Science in Agro forestry	Bachelor of Science in agriculture (Land resources Major)
Doctor of Philosophy in Dryland Resource Management	Master of Science in Management of Agroecosystems and Environment	Bachelor of Science (Land economics and agro-ecosystem management)
Doctor of Philosophy on Management of Agroecosystem and Environment	Masters of Science in Land and Water Management	Bachelor of Science in Range Management
Doctor of Philosophy in Range Management	Masters of Science in Range Management	Bachelor of Science in Management of Agro-Ecosystems and Environment
Doctor of Philosophy in Soil Science	Masters of Science in Soil Science	
Doctor of Philosophy in Sustainable Soil Resource Management	Masters of Science in Sustainable Soil Resource Management	

Services Offered

1. Legume inoculants production-Bio fix fertilizer
2. Soil Testing, plant analysis and interpretation to farmers
3. Herbarium Management
4. Hydrology and water quality assessment

Strategic Issues

1. Resources and Governance
2. Teaching and Learning
3. Research, Innovation and Technology
4. Competitiveness of the University

Major Achievement in the Year 2020

In 2020, the Department was Ranked 7 out of 66 teaching departments in the University of Nairobi Performance Contract Ranking.

Number of Graduates

In the year 2020, the Department graduated the following numbers in various programmes

Programmes	No of Graduates
Bachelor of Science in Range Management	20
Bachelor of Science in Management of Agro-Ecosystems and Environment	23
Bachelor of Science in Agriculture (Land resources Major)	2
Masters of Science in Land and Water Management	1
Masters of Science in Range Management	1
Masters of Science in Soil Science	4
Doctor of Philosophy in Dryland Resource Management	1
Doctor of Philosophy in Range Management	2
Doctor of Philosophy in Soil Science	1
Doctor of Philosophy in Sustainable Soil Resource Management	1
Total	56

Enrolled Students in Undergraduate and Post Graduates

In the year 2020, the Department enrolled the following numbers

Programme	No of Students
Bachelor of Science in Management of Agro-Ecosystems and Environment	21
Master of Science in Management of Agroecosystems and Environment	2
Masters of Science in Land and Water Management	4
Masters of Science in Range Management	8
Masters of Science in Soil Science	1
Total	36

Research Activities

In the year 2020, nine (9) staff members won various grants for project work as PIs

Research Project	PI
DOWN2EARTH: Translation of climate information into multilevel decision support for social adaptation, policy development, and resilience to water scarcity in the Horn of Africa Drylands	Dr. Oliver Wasonga
Socially inclusive adaptation knowledge for resilient livelihoods in Northern Kenya.	Dr. Staline Kibet
Drought Resilience in East African Dryland Regions (DRIER)	Dr. Oliver Wasonga
Governing Economic hubs and flows in Somali East Africa (GOVESEA)	Dr. Oliver Wasonga

Research Project	PI
Economic valuation of selected sustainable rangeland management practices in Isiolo County, Kenya	Dr. Oliver Wasonga
Studying the use of Mezquite to improve welfare of communities in Arid and Semi-arid zones of the World	Dr. Oscar Koech:
Arid ethno-forestry food systems: A wellbeing alternative for communities living in drylands of the world	Dr. Oscar Koech:
Understanding the Contribution of Atmospheric Nitrogen to the Increasing Nitrogen Levels in Lake Victoria, Kenya	Dr. Anne Karuma
Validate and promote grass-based diets for low enteric methane emissions for finishing steers.	Prof. Moses M. Nyangito
Enhancing cassava production, adoption and utilization for improved food security in Kenya	Dr. Judith Mbau
Building on CARIAA learning on Women entrepreneur, Migration and climate – resilience development	Dr. Oliver Wasonga
“Provide training, research and community services, including technological transfer, transmission of information, simulation of intellectual life and cultural development”	Dr. Oliver Wasonga
Supporting the elaboration of a national strategy for the management of <i>Prosopis</i> in Kenya	Dr. Staline Kibet
“Climate Smart Technologies for restoration of degraded ASALS and enhancement of communities resilience in south eastern Kenya”	Prof. Geoffrey Kironchi
Climate-smart adaptive technologies for sustainable production and postharvest management and utilization of ware potato in Kenya.	Prof. Nancy Karanja
Escaping the pastoralist paradox in the face of climate change: A comparative analysis of different tenure systems and their implications for climate vulnerability in semi-arid Sub-Saharan African.	Dr. S.M. Mureithi

International Links and Collaborations

In the year 2020, the department had the following links:

Initiative	Collaborators
Down2earth Project to tackle climate change resilience in the Horn of Africa Led by Dr. Oliver Wasonga	<ul style="list-style-type: none"> - Cardiff University, - University of Bristol, - Stirling VU - Ghent University, - University of East Anglia, - University of Hohenheim, - Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC), Water and Land Information Management, - Climate Analytics gGmbH, Addis Ababa University, - BBC Media Action

Initiative	Collaborators
Building on CARIAA learning on Women entrepreneur, Migration and climate – resilience development Led by Dr. Oliver Wasonga	<ul style="list-style-type: none"> - The University of East Anglia, - University of Cape Town (UCT), - Indian Institute for Human Settlements (IIHS) - International Water Management Institute (IWMI) - University of Nairobi (UoN) - Kenya Markets Trust (KMT)
Provide training, research and community services, including technological transfer, transmission of information, simulation of intellectual life and cultural development Led by Dr. Oliver Wasonga	<ul style="list-style-type: none"> - University of Nairobi and - Centre for research and Development in Drylands
Supporting the elaboration of a national strategy for the management of Prosopis in Kenya” Led by Dr. Staline Kibet	<ul style="list-style-type: none"> - CABI Switzerland - Centre for training & Integrated research in ASAL (CETRAD) - CABI Kenya - Kenya Forestry Research Institute (KEFRI)
Climate smart technologies for restoration of degraded ASALs and enhancement of communities resilience in south Eastern Kenya Led by Prof. Geoffrey Kironchi	<ul style="list-style-type: none"> - University of Nairobi - Kenya Agricultural and Livestock Research Organization (KALRO)
Validate and promote grass-based diets for low enteric methane emissions for finishing steers. A Research Project: funded by Kenya Climate Smart Program (KCSAP) Led by Prof. Moses Nyangito	<ul style="list-style-type: none"> - University of Nairobi - Kenya Agricultural and Livestock Research Organization (KALRO)
Use innovative approaches in dryland borders of Kenya and Uganda focusing on livelihood improvement through rangeland (grazing areas) restoration and governance interventions Led by Dr. Stephen Mureithi	<ul style="list-style-type: none"> - University of Nairobi - School of Global Studies, Gothenburg University, - Umeå, University, - Makerere University, - IGAD - ICRAF
Studying the use of Mezquite to improve welfare of communities in arid and semi-arid zones of the world”- Equipment hand over and training on use and maintenance Led by Dr. Oscar Koech	<ul style="list-style-type: none"> - University of Nairobi - Global Challenge research fund - University of Nottingham
Escaping the pastoralist paradox in the face of climate change: A comparative analysis of different tenure systems and their implications for climate vulnerability in semi-arid Sub-Saharan African Led by Dr. Stephen Mureithi	<ul style="list-style-type: none"> - Swedish University of Agricultural Sciences - The University of Nairobi

Initiative	Collaborators
Innovative EO- Based drought model for African pastoral areas to improve sovereign disaster risk management under African Risk Capacity(ARC)' (EOPAM-ARC) <i>Led by Dr. Stephen Mureithi</i>	- University of Nairobi - African Risk Capacity (ARC) - ILRI - Government of Kenya - National Drought Management Authority (NDMA)
Training on Indigenous Knowledge documentation, preservation and practice in preparation for the implementation of Traditional Knowledge, cultural expression and folklore, 2016 Act <i>Led by Dr. Staline Kibet</i>	- National Museums of Kenya, - University of Nairobi
African Risk Capacity Programme in Kenya Technical Workshop on Contingency Planning. <i>Led by Dr. Oscar Koech</i>	- University of Nairobi, - National Drought Management Authority (NDMA)
Regional Drought Resilience Research Collaborative Network Pathways <i>Led by Dr. Oliver Wasonga</i>	- University of Nairobi, - IGAD Drought Disaster Resilience Initiative (IDDRSI), - IGAD Food Security, Nutrition and Resilience Analysis Hub (IFRAH) - Resilience Analysis Unit - (RAU) and USAID

Publications

In the year 2020, the Department's scholars published thirty-eight (38) articles in various Journals

1. Fungomeli, M., Cianciaruso, M., Zannini, P., Githitho, A., Frascaroli, F., Fulanda, B., **Kibet, S.**, Wiemers, M., Mbuvi, M.T., Matiku, P. and Chiarucci, A., 2020. Woody plant species diversity of the coastal forests of Kenya: filling in knowledge gaps in a biodiversity hotspot. *Plant Biosystems-An International Journal Dealing with all Aspects of Plant Biology*, 154(6), pp.973-982.
2. Galvin, K.A., Even, T., Reid, R.S., **Njoka, J.**, de Pinho, J.R., Thornton, P., & Saylor, K. (2020). Understanding Climate from the Ground Up: Knowledge of Environmental Changes in the East African Savannas. In *Changing Climate, Changing Worlds* (pp. 221-242). Springer, Cham.
3. Gitari, H. I., **Nyawade, S.O.**, **Kamau, S.**, **Karanja, N.N.**, **Gachene, C.K.**, Raza, M.A., & Schulte-Geldermann, E. (2020). Revisiting intercropping indices with respect to potato-legume intercropping systems. *Field Crops Research*, 258, 107957.
4. Harmsen, H., Wang'ondou, V.W., **Mbau, J.S.**, & Muthama, N.J. (2021). Randomized hotspot strategy is effective in countering bushmeat poaching by snaring. *Biological Conservation*, 253, 108909.
5. **Ichami, S.M.**, Shepherd, K.D., Hoffland, E., **Karuku, G.N.**, & Stoorvogel, J.J. (2020). Soil spatial variation to guide the development of fertilizer use recommendations for smallholder farms in western Kenya. *Geoderma Regional*, 22, e00300.
6. **J. Chepkemai, R.N.** **Onwonga, R.N.** Nyakanga, (2020) Soil Organic Carbon Stocks as Influenced by Topography and Vegetation Cover Types at Different Soil Depths, *Journal of Agriculture and Sustainability*

7. **Kamau, H.N., Koech, O.K., Mureithi, S. M., Wasonga, O.V., & Gachene, C.K.K.** (2020). Grass species for range rehabilitation: Perceptions of a pastoral community in Narok North sub-county, Kenya. *African Journal of Agricultural Research*, 16(8), 1204-1212.
8. **Kamau, S., Barrios, E., Karanja, N.K., Ayuke, F.O., & Lehmann, J.** (2020). Dominant tree species and earthworms affect soil aggregation and carbon content along a soil degradation gradient in an agricultural landscape. *Geoderma*, 359, 113983.
9. **Kamau, S., Barrios, E., Karanja, N.K., Ayuke, F.O., & Lehmann, J.** (2020). Short-term casting activity of earthworm *Pontoscolex corethrurus* (Oligochaeta: Glossoscolecidae) after biochar additions. *Soil Biology and Biochemistry*, 143, 107736.
10. **Kamau, S., Barrios, E., Karanja, N.K., Ayuke, F.O., & Lehmann, J.** (2020). Short-term casting activity of earthworm *Pontoscolex corethrurus* (Oligochaeta: Glossoscolecidae) after biochar additions. *Soil Biology and Biochemistry*, 143, 107736.
11. **Karuma, A.N., Gicheru, P.T., & Gachene, C. K.** (2020). Financial Returns of Maize and Bean Production under Selected Tillage Practices in Semi-arid Area of Mwala Sub County, Kenya. *Asian Journal of Agricultural Extension, Economics & Sociology*, 11-23.
12. **Lutta, A.I., Wasonga, O.V., Nyangito, M.M., Sudan, F. K., & Robinson, L. W.** (2020). Adoption of water harvesting technologies among agro-pastoralists in semi-arid rangelands of South Eastern Kenya. *Environmental Systems Research*, 9(1), 1-12.
13. **Lutta, A.I., Wasonga, O.V., Robinson, L. W., Nyangito, M.M., & Sircely, J.** (2020). Determinants of livestock market participation among pastoral communities of Tana River County, Kenya. *Environment, Development and Sustainability*, 1-19.
14. **Lutta, A., Wasonga, O.V., Nyangito, M., Sudan, F.K., & Robinson, L.** (2020). Determinants of Adoption Decisions of Water Harvesting Structures among Pastoral Areas of Kenya.
15. Maina J, Wandiga S Gyampoh B and **Gachene CKK** (2020) Assessment of Land Use and Land Cover Change Using GIS and Remote Sensing: A Case Study of Kieni, Central Kenya, *Journal of Remote Sensing & GIS*
16. Mugo, J.N., **Karanja, N. N., Gachene, C.K.**, Dittert, K., **Nyawade, S.O.**, & Schulte-Geldermann, E. (2020). Assessment of soil fertility and potato crop nutrient status in central and eastern highlands of Kenya. *Scientific reports*, 10(1), 1-11.
17. **Musa, A.M., Wasonga, O.V., & Mtimet, N.** (2020). Factors influencing livestock export in Somaliland's terminal markets. *Pastoralism*, 10(1), 1-13.
18. **Mwendwa, S.M., Mbuvi, J.P., Kironchi, G., & Gachene, C.K.** (2020). A Geopedological Approach to Soil Classification to Characterize Soils of Upper Kabete Campus Field, University of Nairobi, Kenya. *Tropical and Subtropical Agroecosystems*, 23(2).
19. **Nabintu, N.B., Ndemo, O.R., Sharwasi, N.L., Gustave, M.N., Muzee, K., & Okoth, K.S.** (2020). Demographic factors and perception in rhizobium inoculant adoption among smallholder soybeans (*Glycine max* L. Merrill) farmers of South Kivu Province of Democratic Republic of Congo. *African Journal of Agricultural Research*, 16(11), 1562-1572.
20. **Ng'asike, O.A.P., Hagmann, T., & Wasonga, O.V.** (2021). Brokerage in the borderlands: the political economy of livestock intermediaries in northern Kenya. *Journal of Eastern African Studies*, 15(1), 168-188.
21. **Nyawade, S.O., Karanja, N.N., Gachene, C.K., Gitari, H.I., Schulte-Geldermann, E., & Parker, M.** (2020). Optimizing soil nitrogen balance in a potato cropping system through legume intercropping. *Nutrient Cycling in Agroecosystems*, 1-17.
22. **Nyawade, S., Gitari, H.I., Karanja, N. N., Gachene, C.K.K., Schulte-Geldermann, E., Sharma, K., & Parker, M.** (2020). Enhancing climate resilience of rain-fed potato through legume intercropping and silicon application. *Front. Sustain. Food Syst.* 4: 566345. doi: 10.3389/fsufs.

23. Nyilitya, B., **Mureithi, S.**, & Boeckx, P. (2020). Land use controls Kenyan riverine nitrate discharge into Lake Victoria—evidence from Nyando, Nzoia and Sondu Miriu river catchments. *Isotopes in environmental and health studies*, 56(2), 170-192.
24. Nyilitya, B., **Mureithi, S.**, & Boeckx, P. (2020). Tracking sources and fate of groundwater nitrate in Kisumu City and Kano Plains, Kenya. *Water*, 12(2), 401.
25. Nyilitya, B., **Mureithi, S.**, Bauters, M., & Boeckx, P. (2021). Nitrate source apportionment in the complex Nyando tropical river basin in Kenya. *Journal of Hydrology*, 594, 125926.
26. **Onwonga, R.N., Sitienei, R.C.**, Lelei, J.J., & Kamoni, P. (2020). Complementary effects of legume integration and fertilizer application on soil moisture and long-term carbon stocks in maize systems of Kabete sub-county, Kenya. *Tropical and Subtropical Agroecosystems*, 23(1).
27. **Osaliya, R., Wasonga, O.V.**, Mwanjalolo, J.M., MacOpiyo, L., **Kironchi, G.**, & Adipala, E. (2020). Predicted land use and land cover outlook for semi-arid Lokere and Lokok catchments in Karamoja region, Uganda. *African Crop Science Journal*, 28(4), 595-616.
28. **Osaliya, R., Wasonga, O.V.**, Mwanjalolo, J. M., MacOpiyo, L., **Kironchi, G.**, & Adipala, E. (2020). Predicted land use and land cover outlook for semi-arid Lokere and Lokok catchments in Karamoja region, Uganda. *African Crop Science Journal*, 28(4), 595-616.
29. Otieno, H.M.O., Chemining'wa, G.N., Zingore, S., & **Gachene, C.K.** (2020). Tillage Method and Residual N, P, K, Zn, B, Mg, Ca, and S Nutrients Effect on Growth and Yield of Dry Bean Grown after the Harvest of Maize. *Turkish Journal of Agriculture-Food Science and Technology*, 8(1), 18-26.
30. **S. Muwanga, R. Onwonga**, S. O. Keya2 & E. Komutunga 2020. Sedentary Agriculture and Its Implications on Soil Quality in Agro-pastoral Semi-arid Karamoja, Uganda. *Journal of Agricultural Science*; Vol. 12, No. 4; 148-162
31. **S. Muwanga R.N. Onwonga**, S.O. Keya & E. Komutunga, (2020), Influence of Agro-pastoral Activities on Land Use and Land Cover Change in Karamoja, Uganda, *Journal of Agricultural Science*. Vol. 12, No. 9; 266-278
32. **Sala, S.M.**, Otieno, D.J., Nzuma, J., & **Mureithi, S.M.** (2020). Determinants of pastoralists' participation in commercial fodder markets for livelihood resilience in drylands of northern Kenya: Case of Isiolo. *Pastoralism*, 10(1), 1-16.
33. **Senda, T.S.**, Robinson, L. W., **Gachene, C.K., Kironchi, G.**, & Doyo, J. (2020). An assessment of the implications of alternative scales of communal land tenure formalization in pastoral systems. *Land Use Policy*, 94, 104535.
34. **Senda, T. S.**, Robinson, L. W., **Gachene, C. K., Kironchi, G.**, & Doyo, J. (2020). An assessment of the implications of alternative scales of communal land tenure formalization in pastoral systems. *Land Use Policy*, 94, 104535.
35. Siminyu, P., **Mbau, J.**, & Oluoch-Kosura, W. (2020). The Contribution of Climate Smart Agriculture Practices in Mitigating Farmers against Maize Yield Losses, a Case of Bukembe ward in Bungoma County. *Journal of Sustainability, Environment and Peace*, 3(2), 41-45.e.
36. **Wairimu Ng'ang'a, T.**, & Crane, T.A. (2020). Social differentiation in climate change adaptation: One community, multiple pathways in transitioning Kenyan pastoralism. *Environmental Science & Policy*, 114, 478-485.
37. Wairimu Ng'ang'a, T., Coulibaly, J.Y., Crane, T.A., **Gachene, C. K., & Kironchi, G.** (2020). Propensity to adapt to climate change: insights from pastoralist and agro-pastoralist households of Laikipia County, Kenya. *Climatic Change*, 161(3), 393-413.
38. Warui, M.W., Mburu, J., **Kironchi, G.**, & Gikungu, M. (2020). Existing value addition initiatives enhancing recognition of territorial traits of three Kenyan honey. *The Journal of World Intellectual Property*, 23(3-4), 598-605.

Policy Briefs

In 2020, the Department produced seven (7) Policy briefs

1. Dr. Stephen Mureithi, *Dr. David Jakinda and Dr. Jonathan Nzuma*, (2020) Regreening the Drylands: Fodder Groups as potential pathway for up scaling commercial fodder production, **AgriFoSe2030 Brief**
2. Eschen, R., Ehrensperger, A., Kaaya, O.E., **Kibet, S.**, van Wilgen, B. (2020). Risks associated with promoting alien tree species for social benefits. The Woody Weeds Project. Policy Brief
3. **Ng'asike, O Philemon** (2020). Making devolution work for livestock trading in Northern Kenya. African Drylands Institute for Sustainability. Policy Brief
4. **Oliver V. Wasonga** and IGAD, (2020), Towards Sustainable Rangeland Management in IGAD Region, *Policy Brief No. ICPALD25/CLE/2/2020*
5. **Oliver V. Wasonga, Alphayo Lutta1, Staline Kibet**, Ahmed Bakari Maunguja1, Hassan Guyo Roba, (2020), Traditional Climate Early Warning: Enablers and Opportunities for Its Application of Weather Forecasting Practices in Pastoral Kenya, *Policy paper*
6. **Ouna, E., Njoka, J.**, Keya, S., & Wanjogu, R. (2020). Converting Agro-Waste into Biochar: Improving Soil Fertility and Productivity in ASAL Ecosystems. *Kenya Policy Briefs*, 1(1), 7–8.
7. Per Knutsson, Barbara Schumann, Agneta Hörnell, Kristina Lindvall, **Stephen Mureithi**, Dennis Mpairwe, Alice Turinawe, Dereje Wakjira, Leigh Winowiecki, Tor-Gunnar Vågen (2020), SLU granted for innovative research to achieve the Global goals in East Africa, *SLU Policy brief*

Papers Presented

In 2020, the Department presented ten (10) Papers

1. Lutta I.A., Wasonga V.O., Karanja R., Saalu F., Njiru J. (2020), Costs and Benefits of Sustainable Rangeland Management Practices in Northern Kenya, *The Economics of Land Degradation* workshop.
2. Oliver Wasonga (2020), CELEP Webinar “Lessons learnt from Participatory Rangelands Management in Eastern Africa” *CELEP Webinar*
3. Oliver Wasonga (2020), From Crisis to Action; Global Agenda for Sustainable Livestock, *Webinar*
4. Oliver Wasonga (2020), Promoting Innovation to Build Resilience Against Climate Shocks, *Webinar on Knowledge Share Fair*.
5. Oliver Wasonga (2020), The Regional International Year for Rangelands and Pastoralists Support Group (RISG), *Global Rangeland Webinar*
6. Oliver Wasonga and Dr. Staline Kibet, (2020), Under project: Socially inclusive adaptation knowledge for resilient livelihoods in northern Kenya (SOAK) project, *Knowledge Brokering Learning Exchange Workshop (CDKN)*
7. Oliver Wasonga and Mr. Alpha Lutta (2020), Sub-Saharan Africa Dialogue – Dasgupta Review on the Economics of Biodiversity, *Webinar: Dasgupta Review of the Economics of Biodiversity*
8. Oliver Wasonga, (2020), Drought – Covid-19 Interface-Insight for post pandemic recovery in pastoral systems, *WASAG-webinar*.
9. Sharon Teyie and Fredrick Otieno, Oliver Wasonga, (2020), “Investigating the charcoal value chain and the impacts of the production process on soil and vegetation properties”, *Workshop in Marich Pass*
10. Stephen Mureithi, (2020), “Innovative EO-based drought model for African Pastoral areas to improve sovereign disaster risk Management under African Risk Capacity (EOPAM-ARC)” project, African Risk capacity (ARC)

Corporate and Community Outreach Activities

In 2020, the Department conducted the following community outreach activities:

1. Improve the welfare of less advantaged community groups in the drylands of developing countries, including Mexico, Kenya and Tanzania using *Prosopis* resource, 11th – 14th January 2020



Different Methods of Drying Prosopis Juliflora Pods

2. Organized a community and stakeholders' workshop on the use of *Prosopis juliflora* (Mezquite) to improve welfare of communities in the arid Baringo County, 18th – 24th January 2020

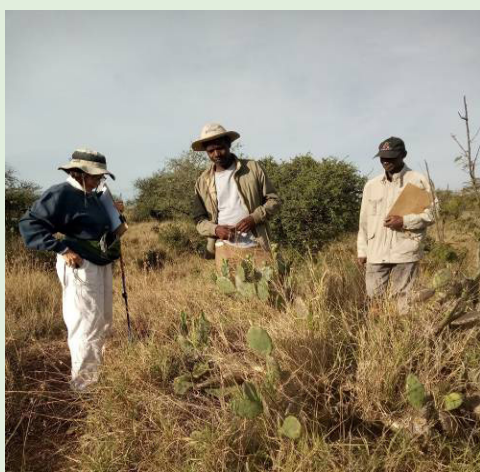


Dr. Oscar Koech from the Department organized a workshop under the project “Studying the Use of Mezquite to Improve Welfare of Communities in Arid and Semi-arid Zones of the World”



Dr. Oscar Koech and Dr. Staline Kibet with a community in Baringo while being trained on use of Prosopis juliflora

3. Assessment of Effects of Cochineal Bugs Release on *Opuntia Stricta* in Northern Laikipia County, on February 24, 2020



Dr. Staline Kibet a lecturer from LARMAT joined Prof. Shirley Strum and Mr. Patrick Mwangi of ENBP to assess the effects of Cochineal bugs damage to Opuntia stricta invasive weeds after unusually prolong rainy season in late 2019 at Oljogi Ranch, Laikipia County (left) and Dr. S Kibet inspecting Manual removal of Opuntia stricta in Laikipia (right)

4. A Workshop on Service Provider Sensitization on ASDSP II Capacity Building and Innovations Grant Mechanism, 4th-5th March, 2020



Dr. Oscar Koech from the University of Nairobi (UoN), Department of Land Resource Management and Agricultural Technology (LARMAT) on 4th and 5th March, 2020 participated in a workshop held Kaputiei Safariland Hotel, Kitengela

5. Assessment of Status Of Gef- Sgp Funded Projects; Butterfly Farming, local community of Kilifi county, 6th October, 2020



Dr Judith Mbau (fouth right) with some Kaya elders from Kilifi County and Mr Kamau (far left) from Institute of Culture and Ecology (ICE)



Dr. Judith Mbau assessing the progress made by farmers who have embraced butterfly farming within the buffer zone of Kaya Kauma in Kilifi County. Both the youth and women have embraced the income generating via butterfly farming

6. Building Drought Resilience in Samburu through Sustainable Rangelands Management (DR-SRM) Project, Scoping Mission in Preparation for Dr-SRM Project Kick-off in Samburu County, Nov. 2, 2020



The DR-SRM project team takes a photo after a briefing meeting with the Deputy Governor, Samburu County in his office on Monday Nov. 2, 2020. Present in the meeting were (from right) His Excellency Deputy Governor, Julius Leseeto, Dr. Stephen Mureithi (University of Nairobi), Daniel Lesaigor, CO Special Programmes, Dr. Davis Ikiror, Country Director VSF-Suisse, Eric Rosana, VSF –Suisse, Hon. Irene Senei, CEC Environment, Water and Natural Resources, Tyson, Ag. CO, Agriculture, Livestock and Fisheries, and Joseph Kilonzo, DLPO Samburu County (not in the picture).

Staff Portfolio

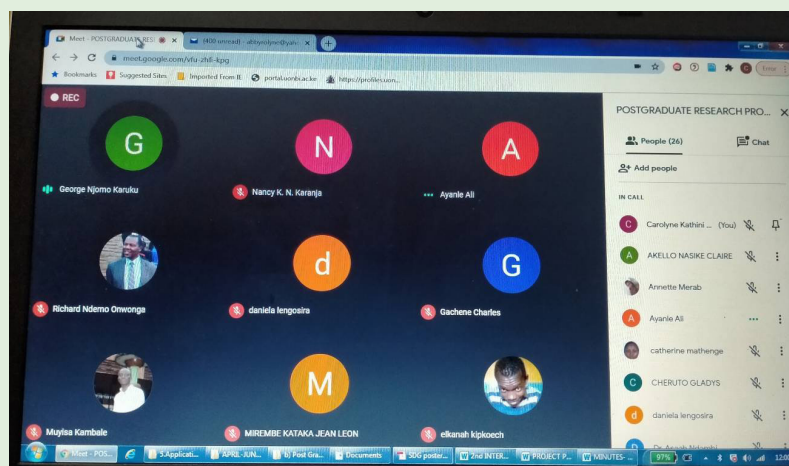
Designations	Establishment	Occupied
Full professors	3	2
Associate professors	6	4
Senior lecturers	11	3
Lecturers	15	7
Tutorial fellow	7	1
Principal Technologist	1	0
Chief Technologist	1	1
Assistant Chief Technologist	4	2
Senior Technologist	8	2
Technologist	11	1
Driver, Grade IV	1	1
Technical Assistant (III)	7	2
Field Assistant (II)	5	0
Subordinate Staff	9	2
Total	89	28

Strategic Projections

- Participate in Covid-19 Webinar and write projects in relation to Covid-19
- Seeking more research funds through calls/project proposal to assist both our graduate students and for the farmers through
- More publications both articles/books and teaching modules with emphasis on e-learning platforms
- Revise curriculum of various programmes
- Prepare a draft on departmental strategic plan
- Ensure GIS lab is full in operation with adequate softwares installed

Any Other Relevant Information

Post Graduate Students Proposal Presentations Held Virtually on Thursday, 26th November 2020



Virtual presentations on progress via Google meet

2. LARMAT PhD & MSc Project Proposal Presentation on 12th March 2020



Student presenting her research proposal to supervisors and students

3. The 18TH PHD student seminar on 27th Feb 2020



PhD Student presenting research progress to faculty members

Department of Plant Science and Crop Protection

Introduction

The Department of Plant Science and Crop Protection started as two departments, Department of Crop Production and Department of Applied Science in the Faculty of Agriculture in 1970/71 within the College of Agriculture and Veterinary Sciences (CAVS), Upper Kabete Campus. The two departments were later re-organized, merged and renamed the Department of Crop Science. In 1997, the Department of Crop Science was split into two departments namely, Department of Crop Science and Department of Crop Protection. In 2005, the two departments were merged to form the Department of Plant Science and Crop Protection.

After the merger, the Department was re-organized into two sections; namely Crop Science and Crop Protection. The Crop Science Section is made up of the following units: Agronomy, Horticulture, Plant Breeding and Biometry. While the Crop Protection Section is made up of Plant Pathology and Entomology Units. The Department teaches most of the courses for the BSc Agriculture and offers 51 service courses to BSc Agricultural Education and Extension, BSc Agribusiness Management, BSc Management of Agroecosystems & Environment, BSc Range Management, Food Science, Nutrition & Dietetics, Food Science & Technology in the Faculty of Agriculture. It offers a BSc course in Horticulture, Diploma in Crop Protection and postgraduate programmes at masters and PhD in Agronomy, Plant Breeding and Biotechnology, Plant Pathology, Crop Protection, Horticulture, Seed Technology and Business Management and Agricultural Resource Management.

The Department undertakes rigorous training for both Undergraduate and Postgraduate levels and conducts research geared towards solving national and international problems. The Department also undertakes consultancies, advisory services and encourages both national and international collaboration. The Department has strong linkages with national, regional and international research institutions and universities.

The Department has qualified staff and thus able to deliver quality training and research in all areas of its mandate

Programmes and Services Offered

- Diploma in Crop Protection
- BSc. in Horticulture
- BSc. Agriculture (Crop Science Major)
- BSc. Agriculture (Crop Protection Major)
- MSc. Agricultural Resource Management
- MSc. Agronomy
- MSc. Horticulture
- MSc. Plant Breeding and Biotechnology
- MSc. Crop Protection
- MSc. Plant Pathology
- MSc. Seed Technology and Business Management
- PhD. Agricultural Resource Management
- PhD. Horticulture
- PhD. Plant Breeding and Biotechnology
- PhD. Crop Protection
- PhD. Plant Pathology
- PhD. Seed Technology and Business Management
- Services Rendered
- Online and Face-to-Face Teaching
- Consultancy and Research
- Agricultural Extension Services
- Community Outreach

Strategic Issues

1. Management of the Departmental resources efficiently by utilizing the allocated funds on the programmed activities.
2. To produce quality and holistic graduates in plant sciences through curriculum design, quality teaching, supervision and mentorship.
3. To contribute to the development of society through participation in outreach activities
4. To enhance the competitiveness and image of the Department as a centre of excellence in plant sciences by increasing openness and presence on the Departmental website,
5. To increase and enhance strategic partnerships and collaboration by establishing multi-stakeholder projects.
6. Improve student and employee satisfactions
7. Increase the students enrolment and completion rate in all degree programmes
8. Increase number of publications and Google Scholar citations

Major Achievements in the Year 2020

Journal Publications

Author	Title	Journal	Month & Year
Nyangena I., Owino W., Imathiu S., and Ambuko	Effect of pretreatments prior drying on antioxidant properties of dried mango slices	Scientific African	26 th August 2020
Tirra N., Oluoch-Kosura W., Nyanganga H. and Mwang'ombe A.	Factors influencing the level of commercialization among smallholder cassava farmers in Taita-Taveta and Kilifi counties, Kenya	African Journal of Agricultural Research	September 2020
Owade J., Abong G., Okoth M., and Mwang'ombe A.	A review of the contribution of cowpea leaves to food and nutrition in East Africa	Food Science and Nutrition	9 th November 2020
Mujuka E., Mburu J., Ogutu A. and Ambuko	Returns to investment in postharvest loss reduction technologies among mango farmers in Embu County, Kenya	Food and Energy Security https://doi.org/10.1002/fes3.195	26 th November 2020
Were S.A, Narla R.D, Thies J.E., Mutitu E.U, Muthomi J.W. et al	Identification and quantification of soil borne root rot pathogens communities in smallholder agro-ecosystems of Kenya.	International Journal of Microbiology and Mycology 11(1): 1-17	January 2020
Atsango E., Muiru W., Mwang'ombe A. and Gaoqiong L.	Use of amino oligosacharins and Alternaria fine protein in the management of crown gall disease on roses	Research Journal of Agriculture	January 2020

Author	Title	Journal	Month & Year
Kanyenji G.M., Oluoch-Kosura W., Onyango C.M. and Ng'ang'a S.F.	Prospects and constraints in smallholder farmers' adoption of multiple soil carbon enhancing practices in Western Kenya	Heliyon 6 (2020) e03226 www.cell.com/heliyon	January 2020
Aluka P. and Ngugi K.	The diversity of Green Bean biochemical compounds in Robusta Coffee (<i>Coffea canephora</i> Pierre ex A. Foechner) as evaluated by near infrared spectroscopy	DOI: 10.9734/bpi/atias/v3	January 2020
Sokame B.M., Rebaudo F., Malusi P., Subramanian S., Kilalo D.C., Juma G. and Calatayud P.A.	Influence of temperature on the interaction for resource utilization between fall armyworm and a community of lepidopteran maize stemborers larvae	Insects 11(73) doi:10.3390/insects11020073	21 st January 2020
Mulenga R., Miano D., Kaimoyo E., Akello J., Mbuta F., Rwahnih M., Chikoti P., Chiona M., Simulundu E. and Alabi J.	First report of Southern Bean Mosaic Virus infecting common bean in Zambia	Plant Disease	6 th February 2020
Bii, L.C., Ngugi, K., Kimani, J.M. and Chemining'wa, G.N.	Genotype by environment analysis of rice (<i>Oryza sativa</i> L.) populations under drought stressed and well-watered environments	Australian Journal of Crop Science	March 2020
Sokame B.M., Subramanian S., Kilalo D.C., Juma G., Calatayud P.A.	Larval dispersal of the invasive fall armyworm, <i>Spodoptera frugiperda</i> , the exotic stem-borer <i>Chilo partellus</i> , and indigenous maize stemborers in Africa	Entomologia Experimentalis et Applicata 168 (4) 322-331 https://doi.org/10.1111/eea.12899	11 th April 2020
Wanjala B., Ateka E., Miano D., Low W. and Kreuze J.	Storage root yield of sweet potato as influenced by sweet potato leaf curl virus and its interaction with sweet potato feathery mottle virus and sweet potato chlorotic stunt virus in Kenya	Plant Disease https://doi.org/10.1094/PDIS-06-19-1196-RE	May 2020
Cheserek J.J., Ngugi K., Muthomi J., and Omondi C.	Assessment of Arabusta coffee hybrids [(<i>Coffea canephora</i> L. × Tetraploid Robusta (<i>Coffea canephora</i>)] for green bean physical properties and crop quality.	African Journal of Food Science Vol. 14 (5) pp 119-127 Doi 10.10.5897/AJFS 2019.1852	June 2020

Author	Title	Journal	Month & Year
Mureithi P.M., Kavoi B.M., Onyango C.M. and Mathiu M.P.	Antiulcerogenic effects of selected African nightshades (<i>Solanum nigrum</i> Linn.) genotypes on the rat stomach: A morphologic and morphometric study	International Journal of Morphology 38 (4): 940-946	6 th June 2020
Ngugi K. & Aluka P.	Genetic and Phenotypic diversity of Robusta Coffee (<i>Coffea canephora</i> L.)	Caffeinated and cocoa based beverages https://doi.org/10.1016/B978-0-12-815864-7.00003-9	July 2019
Teresa Nyambura Kinyungu, James Wanjohi Muthomi, Sevgan Subramanian, Douglas Watuku Miano & Florence Mmogi Olubayo	Transmission of viruses causing maize lethal necrosis disease through seed in commercial hybrids and effect on growth in the subsequent crop	Archives of Phytopathology and Plant Protection	7 th October 2020
Bellancile U., Mupenzi M., Muthomi J., Mwang'ombe A. & Ghimire S.	Disease surveillance and farmers' knowledge of <i>Brachiaria</i> (Syn. <i>Urochloa</i>) grass diseases in Rwanda	African Journal of Range & Forage Science	13 th October 2020
Enock Mosenda, Jane Ambuko, Willis Owino Jomo	Assessment of Agronomic Traits of Selected Spider Plant (<i>Cleome gynandra</i> L.) Accessions	Journal of Medicinally Active Plants. Volume 9 Issue 4 Vol 9 Issue 4-African Indigenous Plants III.	December 2020
H. Wagaba, P. Kuria, P. Wangari, J. Aleu, H. Obiero, G. Beyene, T. Alicai, A. Buaa, W. Esuma, E. Nuwamanya, S. Gichuki, D. Miano, P. Raymond A. Kiggundu, N. Taylord, B.M. Zawedde, C. Taracha and D.J. MacKenzie d	Comparative compositional analysis of cassava brown streak disease resistant 4046 cassava and its non-transgenic parental cultivar	GM CROPS & FOOD 2020, VOL. 12, NO. 1, 158–169 https://doi.org/10.1080/21645698.2020.1836924	1 st October 2020
Jaoko V., Taning N.T., Backx S., Mulatya J., Abeele J., Magomere T., Olubayo F. et al	The Phytochemical composition of <i>Melis volkensii</i> and its potential for insect pest management	Pesticidal Plants: From Smallholder Use to Commercialization. MDPI, Basel, Switzerland pg. 111-121. Eds. Stevenson P.C., Belmain S.R. and Isman M.B.	May 2020

Author	Title	Journal	Month & Year
Jane Jerono Cheserek, Kahi Ngugi, James Wanjohi Muthomi and Chrispine Ogutu Omondi.	Genetic variability, heritability and correlation of quantitative traits for Arabusta coffee (C. arabica L. X Tetraploid C. canephora Pierre)	Journal of Plant Breeding and Crop Science, 12(1): 50-57	March 2020
Geraldin M.W. Lengai, James W. Muthomi, Ernest R. Mbega	Phytochemical activity and role of botanical pesticides in pest management for sustainable agricultural crop production. Scientific African	https://doi.org/10.1016/j.sciaf.2019.e00239	January 2020

Policy Brief

Kenya Policy Briefs: Towards Realization of Vision 2030. Volume 1 Issue 1, January 2020; Prof. Jane Ambuko featuring in the editorial team

New Partnerships

Empowering Kenyan Women in Agriculture and Nutrition	University of Cambridge	The Cambridge-Africa ALBORADA Research Fund	01/04/2019 to 31/12/2019	ACTIVE Signed MoU
Inter-University collaboration	Stellenbosch University	MoU	28 th January 2020	Signed document

Active Grants

Project Title	Project Objectives	Funding Institution	Project Partners	PI or UoN Co-PI
Identification, development and formulation of biological control agents and metabolites in integrated plant disease management	Overall objective To increase crop productivity by developing alternative, environmentally friendly, effective strategies that can be applied in an integrated approach in the management of important plant diseases.	NRF	Pest Control Products Board	Prof. E. Mutitu
Climate-smart adaptive technologies for sustainable production and postharvest management and utilization of ware potato in Kenya	To validate IPM technologies for management of aphids and potato tuber moth in Nyandarua County	KCSAP	KALRO; University of Nairobi; MOI University; Eldoret University	Dr Kinyua/ Prof. John Nderitu

Project Title	Project Objectives	Funding Institution	Project Partners	PI or UoN Co-PI
Synergistic Climate-smart Technologies, Innovations and Management Practices for Sustainable Greenhouse Tomato Production in Kenya	<p>Goal: To enhance food and nutritional security, and income for smallholder farmers through validation and scaling up of sustainable greenhouse tomato production technologies in Kenya.</p> <p>Objectives</p> <ul style="list-style-type: none"> - To validate the performance of selected improved tomato varieties under diverse agronomic practices and greenhouse conditions. - To validate and promote integrated pest and disease management practices for greenhouse tomato production. - To validate and promote a diverse range of post-harvest handling technologies for fresh tomatoes. 	KCSAP	KALRO and University of Nairobi	Prof. John Kimenju
Towards Gender Mainstreaming and Social Inclusion In Climate Smart Agriculture Selected TIMPS Value Chains In Selected Counties In Kenya	<ul style="list-style-type: none"> - To examine women, youth and VMGs concerns, demands and needs in the validation, dissemination and adoption of CSA selected TIMPs value chains in selected counties in Kenya - To analyze opportunities and benefits for women, youth, men and VMGs in CSA selected TIMPs in selected counties in Kenya - To empower women, youth, and VMGs in order to improve their agricultural productivity and enhancement of their resilience 	KALRO-Kenya Climate Smart Agriculture Project (KCSAP)-world bank	KALRO and University of Nairobi	Dr. Jessica Ndubi (KALRO)/ Dr. Juliana Cheboi (UoN Co-PI)

Project Title	Project Objectives	Funding Institution	Project Partners	PI or UoN Co-PI
Validation of climate smart Pigeon pea Agronomic practices in Baringo, Elgeyo Marakwet, Machakos, Tharaka and Kabete	<ul style="list-style-type: none"> - To validate the potential use of selected hormones in seed priming in economically important pigeon pea - To determine the effect of seed priming hormones on the physiological responses of the selected varieties and the effect growth and yield under drought stress conditions. - To validate nitrogen and phosphorus fertilizer micro-dosing and rainwater harvesting practices under varied pigeon pea and cereal inter-cropping systems - To validate an effective IPM strategy combining host plant resistance, bio-control and selective insecticide spraying regime(s) against the pigeon pea insect pest complex. 	KALRO-Kenya Climate Smart Agriculture Project (KCSAP)-world bank	University of Nairobi and Egerton University	Prof. Paul Kimani (UoN PI)
Strengthening Kenyan Small-Scale Processors to Access Market and Reduce Losses (SAP) Project	<ul style="list-style-type: none"> - To establish “hub and spoke” fruit processing incubators for dissemination and adoption of food processing technologies and innovations - To train fruit processors on good food processing practices, product development and food processing entrepreneurship 	Rockefeller Foundation/ Purdue University	University of Nairobi Purdue University, USA Technoserve Kenya Smallholder farmers/ processors	Prof. Jane Ambuko
Adaptation and upscaling of tested and applicable postharvest technologies for smallholder horticultural farmers to reduce postharvest losses	To conduct adaptive research for cold storage technologies and promote their adoption among smallholder farmers and other practitioners in horticultural value chains	National Research Fund (NRF-Kenya)	University of Nairobi KALRO JKUAT Ministry of Agriculture Community Based Organizations	Prof. Jane Ambuko

Project Title	Project Objectives	Funding Institution	Project Partners	PI or UoN Co-PI
Innovations in Post-Harvest Loss and Food Waste Reduction in the Global Food System	Establish the Consortium for Innovation in Postharvest Loss and Food Waste Reduction to advance a common research agenda for gaining efficiencies in global food systems Develop academic and entrepreneurial capacity in the next generation talent	Foundation for Food and Agriculture Research (FFAR)	University of Nairobi Iowa State University, USA Stellenbosch University, South Africa Volcani Institute, Israel	Prof. Jane Ambuko
Capacity building in food security, CaBFoodS-Africa	Create awareness about the problem of high food losses and waste in the food supply chain To train (build capacity) of practitioners in the food supply chain including farmers, traders, transporters on best practices in postharvest management to reduce food losses and waste	UK Research Innovation (UKRI)	University of Nairobi University of Pretoria University of Ghana	Prof. Jane Ambuko
Food Systems Research Network for Africa (FSNet-Africa)	<ul style="list-style-type: none"> - Create structured opportunities for Early Career Research Fellows (ECRF) in the focus countries to conduct impact-focused interdisciplinary research, build lasting research networks and develop their skills to design and implement gender sensitive research with non-academic stakeholders. - Set up carefully matched, formal mentorship relationships between ECRF and established scientists in the UK and Africa to form interdisciplinary research-triads to create long- term collaborations and networks 	UK Research and Innovation (UKRI) Global Challenges Fund (GCRF) Partnership Programme	University of Nairobi University of Pretoria ARUA Partner Universities	Prof. Jane Ambuko – UoN Institutional Champion

Project Title	Project Objectives	Funding Institution	Project Partners	PI or UoN Co-PI
Solar Powered Cold Food Chains for Food Waste Reduction and Value Addition (SolCool)	<ul style="list-style-type: none"> - Create structured opportunities for Early Career Research Fellows (ECRF) in the focus countries to conduct impact-focused interdisciplinary research, build lasting research networks and develop their skills to design and implement gender sensitive research with non-academic stakeholders. - Set up carefully matched, formal mentorship relationships between ECRF and established scientists in the UK and Africa to form interdisciplinary research-triads to create long-term collaborations and networks 	Innovate UK	University of Nairobi Phase Change Material Products Ltd Tanzania Horticultural Association Ltd Brunel University London	Prof. Jane Ambuko
Evaporative Cooling Technologies for Vegetable Preservation in the Kenya	Evaluation of various materials and designs in evaporative cooling technologies to optimize performance in preservation of postharvest quality of vegetables	Massachusetts Institute of Technology, USA	D-Lab Massachusetts Institute of Technology	Prof. Jane Ambuko/ Dr. Duncan Mbuge
Harnessing the genetic resources of Sorghum (<i>Sorghum bicolor</i> L) in Kenya to improve drought tolerance and Striga resistance of farmer preferred cultivars for climate change adaptation by utilizing innovative genomic, value chain and participatory approaches	<ul style="list-style-type: none"> - To conserve and exploit the biodiversity of wild relative genetic resources of sorghum - To identify striga resistance and drought tolerance genes by use of genomic technologies and transfer Striga resistance and drought tolerance genes from wild relatives into cultivated farmer - To strengthen the existing sorghum value chains, improve processing methods and promote innovative and diversified sorghum product - To enhance stakeholder capacity to produce, process and market sorghum through innovative participatory approaches and avail information 	NRF	KU, ICRISAT, KALRO	K NGUGI

Project Title	Project Objectives	Funding Institution	Project Partners	PI or UoN Co-PI
Validation Of Climate-Smart Sorghum Technologies For Increased Productivity And Improved Livelihoods	<ul style="list-style-type: none"> - To validate and promote Climate Smart sorghum technologies - To validate and promote diversified sorghum based products. - To validate and promote pre- and post-harvest loss reducing technologies. 	Kalro-World Bank	Egerton University	K. Ngugi
Cassava Sustainable Advancement & Nurturing by discovery of Disease Resistance Alleles	<ul style="list-style-type: none"> - Identification and characterization of natural virus resistance in the cassava germplasm - Characterization of genes conferring natural resistance against cassava geminiviruses - Development of methods for on field sanitation of cassava seeds - Implementation of results in the cassava seed system and dissemination to farmers 	EU	University de Liege-Belgium University of Witwatersrand, SA INRA-France	Prof Herve Vander Schuren
Validation and promotion of integrated climate-smart green gram technologies for improved livelihoods in Kenya	<ul style="list-style-type: none"> - To validate and disseminate adoption of farmer and market-preferred green gram varieties - To validate and promote integrated soil water harvesting and conservation practices - To validate and promote integrated soil fertility management practices - To validate and promote proven and sustainable IPM technologies for key pests and diseases - To validate and disseminate appropriate post-harvest handling and value addition technologies 	World Bank	UoN KALRO	Dr. Onesmus Kitonyo

Project Title	Project Objectives	Funding Institution	Project Partners	PI or UoN Co-PI
Improving Farm Profitability and Household Incomes of Mango Farmers in Kenya with Silicon	<ul style="list-style-type: none"> - Optimize the silicon treatment effect by investigating whether combined soil and foliar application can improve on pathogen resistance, fruit yield and quality. - Understand the fate of the applied silicon in the mango plant. - Evaluate consumer acceptability and market competitiveness of the harvested fruits. 	GCRF	UoN University of Cambridge	Co-PI's Dr Kitonyo Dr Nzuve Dr Kilalo Prof Miano
Synergy for mass propagation of elite <i>Melia volkensii</i> clones and exploiting its derived bio pesticides.	Develop a good rooting system and reducing losses during acclimatization of elite clones and indigenous hardwood tree	Government of Belgium	University of Gent, University of Nairobi, Kenya Forestry Research institute, Better Globe Forestry (BGF)	Prof. Florence Olubayo

Staff Portfolio

Designation	Number of Staff
Professor	12
Assoc. Prof.	6
Senior Lecturer	3
Lecturer	6
Chief Technologist	1
Senior Technologist	8
Technologist	7
Secretary	2
Asst. Tech	1
Subordinate	4
Office Asst.	1
Stores Clerk	1
Seed Tech.	1
Office Asst.	1
Total	54

Any Other Pertinent Information/Issue in the Year 2020

1. The Department implemented online teaching and learning at all levels during the year.
2. For the first time, all the examinations were processed and administered online.
3. The Department lost one academic staff through death during the year.

Corporate and Community Outreach Activities

Activity	Focus Area	Date	Documentation
Mang'u Career Fair 2020 Dr. J. Cheboi	Promotion of Departmental programmes	8 th February 2020	Certificate of participation
Strengthening African Food Processors (SAP) project	Training of smallholder farmers, processors and entrepreneurs	20 th - 21 st February 2020	Signed attendance list
High avocado fruit quality	Promotion of good avocado quality	2020	Write up
Prof. Olubayo: spearhead on alumni for Horticulture in Kenya and Research Consortium	Horticultural waste management	2020	Published report
Prof. Miano: GM Cassava talk	Genetically modified cassava	May 2020	Webinar advertisement
Strengthening Kenyan Small-scale Mango Processors to Access Market and Reduce Losses (SAP) Project	Training for Kawala Horticultural Farmers from Makueni County	Collaboration between University of Nairobi (UON) and Purdue University (USA)	Food Processing Hub, CAVS 2 nd and 3 rd Feb. 2021
Strengthening Kenyan Small-scale Mango Processors to Access Market and Reduce Losses (SAP) Project	Training traders under the Association of Kenya Mango Traders (AKMT)	Collaboration between University of Nairobi (UON) and Purdue University (USA)	Food Processing Hub, CAVS 28 th and 29 th Jan. 2021
MoU	Qualibasic Seed Company	Collaboration	Date of Commencement 16 th October 2020
Inter-University collaboration	Stellenbosch University	MoU	28 th January 2020
Food security under Covid: Technical and legal considerations with a focus on Kenya	Food security	30 th April 2020	Webinar advert featuring Prof. Jane Ambuko
Webinar on Genetically Modified Cassava in Kenya	#ThinkCassava	28 th May 2020	Webinar advert by Prof. Douglas Miano

Major Achievements, Challenges and Strategic Projections

Achievements	Challenges	Projections
Increase in research activities	Industrial strikes	Great strides in research activities
Increase in outreach activities and CSR	Delay in delivery of lab materials by suppliers	More CSR and outreach activities
Increase in members with active projects	Renovation of major infrastructure	Faster procurement process
Increase in international students on postgraduate programmes	Replacement of retired staff	Hastened replacement of retired staff/successional plan
Commensurate increase in scientific publications in refereed journals	Inadequate funding	More funding
Increase in the number of scientific publication in refereed scientific journals	Some students publishing their research in very low impact factor journals	Encourage and target high impact journals
Increase in number of postgraduate students opting to register for ODeL mode in postgraduate programmes	Low completion rate for students registered under ODeL	Revise the ODeL schedules and approach to supervision of ODeL students
Increase in the number of postgraduate students' thesis research is supported by funded projects	Delay in postgraduate students in completion of thesis research	Schedule of postgraduate seminars for tracking student progress in research

Projections

1. To utilize 100% of the allocated funds
2. To grow the Departmental resource base by increasing academic revenue by 10% annually.
3. To hold at least six student mentorship sessions for students.
4. To participate in at least 10 outreach activities.
5. To increase departmental openness and presence on the website by 10%.
6. To establish at least two multi-stakeholder projects annually.
7. To increase postgraduate students completion rate by at least 10%
8. To implement and promote Open and Distance Learning (ODeL) for all postgraduate training programmes.
9. To review at least six (6) curricula during the year

Department of Veterinary Anatomy and Physiology

Introduction

The Department of Veterinary Anatomy and Physiology is a preclinical department located in Chiromo Campus along Riverside Drive, off Chiromo Road, 2 kilometers west of the Main Campus. The Department is the product of the notable merger of the two of the oldest and well-known departments in the Faculty of Veterinary Medicine –Veterinary Anatomy and Animal Physiology that occurred in 2005. The two departmental units had their origin within the establishment of the Faculty of Veterinary Medicine and were transferred from Makerere University College to the Royal College Nairobi in 1962. Veterinary Medicine and Wildlife Management students are prepared for various fields in the Veterinary Anatomy and physiology in the Department.

The Department teaches preclinical veterinary students Animal Physiology and Veterinary Anatomy. It offers courses to **BSc Wildlife students** specifically Veterinary Anatomy, Ecophysiology, Ornithology, Ichthyology, Herpetology and Wildlife Behavior. The Department also offers undergraduate courses to the Faculty of Agriculture and College of Health Sciences (*BSc. Biochemistry*). Postgraduate service courses are offered to the Department of Animal Production and the School of Biological Sciences (**MSc. Biology of Conservation**).

The Department instructs in the biomedical sciences related to animal anatomy and physiology. It also trains students in basic anatomy and physiology in the degree programs leading to Bachelor of Veterinary Medicine (BVM), Bachelor of Science in Agriculture, Range Management and Food Science and Technology (BSc. Agric.), BSc. Range Management, BSc. Food Science and Technology, Bachelor of Science in Biomedical Technology (BSc. BT), Bachelor of Science in Wildlife Management, and Conservation, Tourism Management, Fisheries and Wetlands Management (BSc. Wildlife Management and Conservation, BSc. Wildlife Conservation and Tourism Management, BSc Wildlife Conservation and Wetlands Management and BSc Wildlife Conservation and Fisheries Management. The Department also teaches mammalian histology to students of the BSc Biochemistry degree program and also trains students at post-graduate level in Masters of Science (MSc.).

Programmes Offered

1. Bachelor of Veterinary Medicine
2. Bachelor of Science in Wildlife Management and Conservation
3. Bachelor of Science in Fisheries and Aquaculture Management
4. Bachelor of Science in Agriculture, Range Management and Food Science and Technology
5. Bachelor of Science in Biomedical Technology
6. Master of Science in Reproductive Biology
7. Master of Science in Veterinary Anatomy and Cell Biology
8. Master of Science in Comparative Physiology
9. Doctor of Philosophy (PhD) in the Faculty of Veterinary Medicine
10. Doctor of Philosophy (PhD) degrees in Anatomical and Physiological Sciences

Major Achievements in 2020

1. Graduated 3 Masters' Students.
2. Managed to dispose old obsolete and unusable equipment and furniture, for the first time in two decades
3. Managed to promote 3 technologists to Assistant Chief Technologists.
4. Managed to secure three toxicological analysis projects from the industry.

Staff Portfolio

Designation	No. of Staff
Assistant Chief Technologist	3
Associate Professor	6
Chief Technologist	3
Cleaner	1
Lecturer	9
Principal Technologist	1
Senior Lecturer	4
Senior Technologist	6
Technical Assistant	2
Technologist	1
Trainee Technologist	2
Total	38

Corporate and Community Outreach Activities

- Establishment of COVID-19 mitigation infrastructure and logistics
- Due to the pandemic, outreach programs were suspended.

Projections

1. Increase in consultancy activities (both specimen preparation and toxicological analysis).
2. Increase in postgraduate student enrolment.
3. Improved mentorship of undergraduate students.
4. Increase in student progression to the subsequent year of study.

Wangari Maathai Institute for Peace and Environmental Studies

Introduction

The Wangari Maathai Institute for Peace and Environmental Studies (WMI) was established in 2009 as a center of excellence in environmental governance and its linkages with peace and democracy. The Institute was established in close collaboration with the 2004 Peace Nobel Laureate, the late Prof. Wangari Maathai. WMI aims to promote good environmental practices and to cultivate a culture of peace by shaping values, ethics and attitudes of its graduates through experiential learning, mentoring and transformational leadership.

Programmes Offered

In 2020, the Institute offered the following programs:

1. Master of Science in Environmental Governance
2. Doctor of Philosophy in Environmental Governance and Management.

Short Course

3. Environmental Impact Assessment and Environmental Audit Training

Enrolled Students in Postgraduate Programmes

In 2020, the Institute enrolled thirteen (13) students for Master of Science in Environmental Governance and nine (9) students for Doctor of Philosophy in Environmental Governance and Management.

Out of the 22 students, two (2) were International students.

Number of Graduates per Programme

In the year 2020, the Institute graduated the following:

Programme	No. of Graduates
MSc. in Environmental Governance	3
PhD. in Environmental Governance and Management	3

Research Activities Undertaken

Sustainable Land Use and Management Systems (SLUSE 2020)



Planting trees at Gatugi Primary School, Othaya

The Wangari Maathai Institute for Peace and Environmental Studies in collaboration with the University of Copenhagen and University of Roskilde, Denmark successfully implemented the 2020 experiential field learning course dubbed, “Sustainable land use management system - (SLUSE),” which is the 8th in series after the SLUSE in 2012, 2014, 2015, 2016, 2017, 2018 and 2019. The program was held in Othaya, Nyeri County, from February 28 - March 10, 2020. The SLUSE 2020 covered five (5) thematic areas i.e. Solid Waste Management, Crop Insurance, Soil fertility, Tea Certification and Karima Hill Community Forest. A total of twenty-three (23) students from both University of Copenhagen and Roskilde University and eleven (11) from the University of Nairobi-Wangari Maathai Institute were involved in the SLUSE 2020. A policy brief on “*Solid waste governance approaches to reduce conflicts and promote human and environmental health in Othaya Sub-County*” was produced by the group whose theme was solid waste management supervised by Prof. Mungai, Prof. Müller-Stöver and Dr. Karatu.



Students from the WMI-UoN, University of Copenhagen and Roskilde University, Denmark together with the supervisors during the SLUSE 2020 Closing ceremony on March 11, 2020

The Wangari Maathai Institute for Peace and Environmental Studies in conjunction with a representative from Tharaka Nithi County successfully conducted environmental sustainability-situational analysis in the County. The objective of the collaboration was to seek solutions towards achieving sustainable livelihoods through Integrated Environmental Restoration in the County. The institute appreciated the County for the collaboration and hoped to continue working together towards achieving the objective.

International Linkages and Collaborations

1. Visit by Senior High School Students from Linnankoski, Porvoo, Finland - 10/1/2020

The students were accompanied by Prof. Petri Pellika and their three teachers. The team was received by the Director, Prof. David Mungai. He gave them a lecture on climate change and its impacts particularly in Kenya/Africa. The visiting students were taken on a tour of the Campus which emphasized the various experiential learning platforms.



Senior High School Students from Finland Visiting the Institute on 10/1/2020

2. Visit by a Team of Scholars from Trent University, Canada - 14/1/2020

The team was led by Prof. Neil Emery, Vice President (Research). With the team was the Vice Chancellor, Prof. Stephen Kiama. The meeting discussed areas of collaboration between the two institutions and the need to have a MoU.

3. 9th February, 2020: The Vice Chancellor (Prof. Stephen Kiama) led a high-level team from the University of West Indies, Caven Hill which was led by the Prof. Vice Chancellor, Prof. Eudine Barribeau. Accompanying the team were senior officials from the Ministry of Education and Ministry of Foreign Affairs. The Vice-Chancellor was accompanied by the Principal, CAVS, Principal, CHS and the Deans the College of Agriculture and Veterinary Sciences. The meeting discussed areas of potential collaboration in teaching, research and students/staff exchange between the University of Nairobi and the University of West Indies.



Prof. Eudine Barriteau receiving a gift from the Vice Chancellor, Prof. Stephen Kiama at the Institute's Boardroom

4. Visit to WMI by Ms. Luisa Fragasa - Head of Mission, Portugal - on 25/6/2020

The Portuguese Head of Mission in Kenya was accompanied by the Vice Chancellor, Prof. Stephen Kiama, Principal, College of Agriculture and Veterinary Sciences and the Principal, College of Humanities and Social Sciences. The meeting explored potential areas of partnership between the University of Nairobi and like-minded Portuguese institutions.

5. The Institute continues to be one of the Centres of Excellence in Earth System Governance Research and Training. It is affiliated to the Earth System Governance Project which is based at the Utrecht University in the Netherlands.
6. The Institute continues to collaborate with the government of Kenya in sponsoring students to do their research under its sponsorship e.g. Kenya Climate Smart Agriculture Project (KCSAP), Kenya Forestry Research Institute (KEFRI) among others.

7. Mediation Training Workshop at the Wangari Maathai Institute

The Wangari Maathai Institute (WMI) hosted a mediation training workshop from February 10, 2020 to February 14, 2020. The event was conducted at the Wangari Maathai Peace Laboratory and involved representatives from Kenya Forest Service, Kenya Forest Research Institute and members of the Ngong Hills Forest Community Forest Association. The training was carried out by Professors Vibeke Vindelov, Jens Emborg, Wahome Karanja, Dr. Thuita Thenya and Dr. Joram Kagombe.



Dr. Karanja Njoroge and Prof. Jens Emborg during in one of the sessions of mediation training workshop, February 12, 2020

Publications and Presentations for the Year

1. Ang'u, C., Muthama, N.J., Oludhe, C., & Chitedze, I. (2020). The role of diversity, reserve margin and system structure on retail electricity tariffs in Kenya. *Heliyon*, 6(8), e04626.
2. E. Geoffrey, J. Mutune - Kenya Policy Briefs (2020) Revisiting Kenyan's Ban on Plastic Carrier Bags - Where was this submitted?
3. Edema, G.T.E., Karatu, K., & Edward, Aget the name of this author. (2020). An evaluation of the environmental impact assessment practice in Uganda: challenges and opportunities for achieving sustainable development. *Heliyon*, 6(9), e04758.
4. Harmsen, H., Wang'ondur, V.W. Mbau, J.S., & Muthama, N.J. (2020). Randomized hotspot strategy is effective in countering bushmeat poaching by snaring. *Biological Conservation*, 253, 108909.
5. Kumunga, E., Ndiwa, T.C., & Nzioka, J.M. (2020). Towards a framework for monitoring and communicating water resources sustainability: A case study of Rwamuthambi Sub Catchment area, Kenya. *Journal of Sustainability, Environment and Peace*, 3(1), 21-33.
6. Manoa, D. O., Mwaura, F., Thuita, T., & Mukhovi, S. (2020). A Review of the Visible and Hidden Opportunity Costs of Human-Wildlife Conflict in Kenya. *Biodivers Manage Forestry* 9, 2, 2.
7. Mwakesi, I.W., Wahome, R.G., & Ichang'i, D.W. (2020). Mining Impacts on Society: A Case Study of Taita Taveta County, Kenya. *Journal of Environmental Protection*, 11(11), 986-997.
8. Mwakesi, I., Wahome, R., & Ichang'i, D. (2020). Mining impact on communities' livelihoods: A case study of Taita Taveta County, Kenya. *AIMS Environmental Science*, 7(3), 286-301.
9. Togoch, H.K., Irandu, E., M., & Thenya, T. (2020). Patterns of Livelihood Diversification among Kamnarok National Reserve Adjacent Communities in Baringo County, Kenya. *Journal of Sustainability, Environment and Peace*, 3(2), 55-62.

Papers Presented at Conferences/Workshops

The Institute has held several webinars despite the Covid 19 Pandemic. The key ones include:

1. Prof. Stephen Kiama; Webinar, "My Reflections of Prof. Wangari Maathai"; Part of UoN at 50 Celebrations, the Wangari Maathai Institute Held on November 4, 2020.
2. Cohen Ang'u, Conference on "Role of Energy Sources on Rural Electricity Tariffs in Kenya", Held between October 21- 23, 2020.
3. Prof. Nzioka John Muthama, Conference on "Women, Climate Change Indoor Environmental Quality and Covid- 19 Pandemic" held on October 14- 16, 2020
4. Prof. David N. Mungai, attended a Planning Workshop on: "Green Infrastructure for Sustainable Urban – Rural Development in Kenya (GI4SURD)" held on October 9, 2020.

5. Prof. Nzioka John Muthama; Conference Presentation; Transition to Green Growth in KENYA: Horticultural Productivity, Fuel Consumption and Short lived Climate Pollutant Nexus Held on October 5- 7, 2020.
6. Prof. Kahuziko Takeuchi; “Establishing a decentralized and connected society for localizing SDGs in the Face of Covid 19” held on September 23, 2020.
7. Muthama J. Nzioka. International Virtual Symposium on “Climatological, Meteorological and Environmental Factors in then COVID 19 Pandemic” held on 4th to 6th August, 2020.
8. Thuitha Thenya; Webinar on “Revival of Efforts for Nomination of Mt. Elgon as Transboundary Biosphere Reserve” held on July 2020.
9. Cohen Ang’u; 14th Kenya Meteorology Society International Conference on “Energy Resources Resilience Approach to Modeling Electricity in Kenya” held between April 28-30, 2020.
10. Prof. David N. Mungai; Webinar on “Earth Day, Citizen Action Towards Securing our Future”, held on April 16, 2020.
11. Prof. J. Muthama; Workshop on “Satellite and Weather information for Disaster Resilience in Africa” held between January 6- 8, 2020 in Addis Ababa, Ethiopia.

Staff Establishment

In 2020, the Institute had the following staff members including affiliated staff from other Departments.

Designation	No. of Staff
Associate Professor	5
Senior Lecturer	3
Lecturer	7
Tutorial Fellow	4
Graduate Assistant	2
Senior Admin. Assistant	1
Cleaner	1
Secretary	1
Total	25

Corporate Social Responsibility and Outreach Activities

1. Tree Planting Exercise

The University Management tasked the College of Agriculture and Veterinary Sciences to lead this noble initiative. The Wangari Maathai Institute for Peace and Environmental Studies coordinated this initiative through identification of appropriate sites and overall coordination including data management (area afforested, number of trees and spp., assessment of survival rates etc.). The College involved various stakeholders in the tree planting exercise, including the Green Belt Movement, Acorn Holdings (Qwetu Residences), Workmate (Virtual Jobs Finder), Hultz Prize UoN Campus, KEFRI and Dedan Kimathi Foundation. Twenty-one fruit trees comprising of *Macadamia Integrifolia* and *Persea americana* (Avocado) were planted at the Wangari Maathai Institute (WMI) and 3,000 tree seedlings at Kanyariri Vet. Farm. The exercise was led by Prof. Rose Nyikal, Principal, College of Agriculture and Veterinary Sciences (CAVS). Also present were Prof. David Mungai, Director WMI, and Prof. Moses Nyangito, Ag. Dean, Faculty of Agriculture and Johnson Ireri Kinyua, Dean of students. The event took place on November 20, 2020.



Prof. Rose Nyikal (Principal, College of Agriculture and Veterinary Sciences) assisted by Mr. Timona Onyango plants a fruit tree seedling (grafted avocado) at the Wangari Maathai Institute on 20th November, 2020. Also present were Prof. David Mungai (Director, WMI), Prof. Moses Nyangito (Ag. Dean, Faculty of Agriculture) and other stakeholders.



Tree planting exercise at the Kanyariri Vet Farm on 20/11/2020

2. The Wangari Maathai Institute in collaboration with the Green Belt Movement hosted a webinar on “Earth Day 2020: Citizen Action towards Securing Our Future” held on April 16, 2020 from 3pm.
3. The Wangari Maathai Institute for Peace and Environmental Studies, University of Nairobi (WMI, UoN) in collaboration with the University of Copenhagen (UC) and University of Roskilde (UR), Denmark conducted an outreach and extension programme on “Solid Waste Management in Othaya Town and Environs in Gatugi, Nyeri”, between February 27, 2020 and March 10, 2020. This was led by Prof. Mungai, Dr. Kiemo, Associate Prof. Müller-Stöver; A policy Brief “Solid waste governance approaches to reduce conflicts and promote human and environmental health in Othaya Sub-county” was produced.
4. The WMI in collaboration with the UC and UR, Denmark conducted an outreach and extension programme on “Soil Fertility and Water Management in Thuti, Nyeri” between February 27, 2020 and March 10, 2020. This was led by Dr. Onyango and Associate Prof. Müller-Stöver.

5. The WMI in collaboration with the UC and UR, Denmark conducted an outreach and extension programme on Crop insurance scheme for maize in Kianganda, Nyeri between February 27, 2020 and March 10, 2020. This was led by Dr. Mutune, Prof. Muthama, and Associate Prof. Christian P. Hansen.
6. The WMI in collaboration with the UC and UR, Denmark conducted an outreach and extension programme on Certification of tea in Gatuya-ini, Nyeri, between February 27, 2020 and March 10, 2020. This was led by Dr. Kiemo and Associate Prof. Christian P. Hansen.
7. The WMI, UoN in collaboration with the UC and UR, Denmark conducted an outreach and extension programme on Karima Hill community forest in Gakina, Nyeri, between February 27, 2020 and March 10, 2020. This was led by Dr. Thenya and Associate Prof. Christian P. Hansen.
8. WMI conducted a mentorship outreach at Gatugi Primary School, Othaya, Nyeri County on March 3, 2020 during SLUSE.
9. WMI co-hosted Green Belt Movement in the celebration of the African Environmental Day/Wangari Maathai Day March 3, 2020.
10. WMI co-hosted Conflict Mediation Training with Kenya Forest Service, Kenya Forest Research Institute and members of Ngong Hills Forest community service on February 14, 2020.

Major Achievements, Challenges and Strategic Projections

Major Achievements

Completion and occupation of the WMI Campus

Challenges

The year 2020 was encumbered with the COVID-19 Pandemic, which made it impossible to undertake some research activities/collaborative activities like the PACJA initiative.

Strategic Projections

The occupation of WMI building especially the business center, this will provide income for further expansion of the WMI.