PARTICIPATING INSTITUTIONS & SCIENTISTS

Agri-GHG Newsletter

Issue One

RUFORUM — Capacity Building in Agriculture

Dr. Caroline C. Wambui
(Project Principal Investigator & Lecturer of Animal Nutrition,
Department of Animal & Fisheries Sciences)

Dr. Chrislukovian B. Wasike
(Senior Lecturer of Animal Genetics & Breeding,
Department of Animal & Fisheries Sciences)

Dr. Jennifer V. Atieno
(Lecturer of Environmental Sciences,
Department of Environmental Sciences)

GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

RUFORUM — Capacity Building in Agriculture

**RUFORUM - GRA GRADUATE
RESEARCH GRANT
MASENO UNIVERSITY
PRIVATE BAG, MASENO**

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

GFA Consulting Group

COUNTY GOVERNMENT OF KISUMU — HARBOUR OF PROSPERITY

BUSIA COUNTY — UNITED FOR DEVELOPMENT

BULALA FM 107.5 INDOLERO YEFWE

MASENO UNIVERSITY — FOUNTAIN OF EXCELLENCE

INCREASED MILK PRODUCTION, HIGH INCOME AND LOW GHGs EMISSION

By Raymond Kirui(*a student of MSc Animal Science (Animal Nutrition)*)

Dairy farming contributes to national food and nutrition security, agricultural domestic product and earns livelihood to majority of smallholder dairy households. However, it also contributes to greenhouse gases emission which is a major concern to climate change. Therefore, my hearty appreciation goes to Maseno University in collaboration with Global Research Alliance (GRA) for choosing me to take part of the project which builds capacity for mitigating greenhouse gas emissions and improved ruminant productivity through efficient feeding and manure management strategies in agro-pastoral systems. Climate change is currently a national threat in which all the sectors are required to set mitigation strategies in order to achieve the target of nationally determined contribution. Working with the project has actually assisted me with in-depth knowledge on quantification of GHGs emission in dairy production together with their possible mitigation measures.

Through the participation in this project, it has really uplifted me not only in supporting me partly in school fees but also in provision of monthly stipend which has ensured that I remain comfortable and focused towards achieving my academic goals. This could not have been possible with me alone. In addition, the project has wholly assisted me in developing a suitable data collection tool which has hasten my data collection process. Issuance of computers from the project has made my data entry,storage and processing easy to ensure that progress is made.

Through forums and conferences, I have indeed gained a lot both academically and networking which have contributed towards building my career. Moreover, the skills acquired from the seminars on dairy aspects such as GHGs emissions in dairy production and their possible mitigation strategies has made me as a prospective animal nutritionist.

Farmer trainings participation has enhanced my social life through direct interaction with the local farmers as well as demonstrating some of the sound dairy management practices which aims at increasing milk production, while reducing emissions and understanding the aspects of climate change respectively.
Contact: kraymond46@gmail.com

Experience of project beneficiary (dairy farmer)
Project trainings have been very beneficial in my endeavor to conserve fodder
By John Bosco Odongo

'I am a retired teacher and decided to venture into cattle farming. Currently, I own Arshire and Friesian crossbreed cattle under semi intensive system which give me an average of 17 litres of milk from each cow during peak months. I am happy to have been attending trainings on climate change and how it's affected by dairy cattle.

These trainings have benefited me especially in fodder conservation which aid in feeding of cattle during scarcity of feed. I have also learnt a lot about formulating feed using available feed resources hence the cost of feeding will be reduced. This is helpful since commercial feeds are very expensive. I am looking forward to improving milk production in my farm. I have also had the opportunity to interact with other farmers whom we can share ideas and be in business. My wish is to become a role model to my neighbors and to encourage young people that they don't need to look for employment yet they can still be self-employed.'

The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) is a consortium of 129 African Universities in 38 African countries with a mandate to oversee graduate training. RUFORUM supports universities to fulfil their role of contributing towards the well -being of small-scale farmers and economic development of countries throughout the sub-Saharan region.

In 2020, Maseno University in collaboration with GIZ-Green Innovations Centres for the Agriculture and Food Sector (GIZ-GIAE) and county governments of Busia, Kisumu and Kisumu Departments of livestock responded to the RUFORUM - Graduate Research Grant call for proposal funded by the Global Research Alliance (GRA) on greenhouse gases call for proposal. Our winning proposal titled "Capacity Building for Mitigation of GHG Emissions and Improved Ruminant Productivity through Efficient Feeding and Manure Management Strategies in Agro-pastoral Systems" was among the 8 selected for funding from a pool of 72 applicants from 21 countries. The project was awarded a total funding of 70 040 USD to facilitate the training of three postgraduate students to conduct applied research on the areas of livestock production and greenhouse gas (GHG) emissions.

The project has been running for a year now (Nov 2020 – Nov 2021) and has achieved most of the activities as envisaged in the year one workplan. The journey has however not been without hitches, especially the cessation of movement, curfews, and high cost of living that has been occasioned by the Covid 19 Pandemic. This delayed the progress of students especially in proposal processing and onset of survey data collection. High inflation costs negatively impacted on the number of activities and the few equipment that the project was to buy to facilitate data collection.
To highlight just a few of the project milestones;

- Student progress: the three postgraduate students have successfully presented their proposals through the laid down procedures required before proceeding for data collection
- Situation analysis: Baseline survey has been completed in the project counties. Data from these will be used in characterisation of the feeding systems and computation of GHG from the cattle production systems
- Farmer training: in collaboration with GIZ-GIAE, approximately 50 farmers have been trained on two modules covering diverse topics in dairy nutrition and reproductive and health.
- A stakeholder's forum: bringing together project partners and farmers has been conducted to share experiences and forge the way forward
- Online training: students and research team have benefited from trainings on livestock and GHG organised by project partners (ILRI, GIZ-GIAE, GRA)

I wish to thank all the project partners for their support in the implementation of the project activities which has been instrumental in achieving the projects objectives. This project has provided a platform for building and expanding of networks within the project partners and other partners that has made it possible to conduct project activities beyond the scope of the initial plan.
To the students, I hope that you will take advantage of the exposure, resources a conducive environment that the project has provided not only to finish your studies on time but impact the community positively, as our ambassadors.
I urge all of us to continue working together for the benefit of our students, farmers and communities depending on cattle as a source of food and livelihoods.
I wish you an enjoyable read and Merry Christmas and a Happy and Prosperous 2022

Application of geographical Information System in Dairy production
By Herbert L. Chamwada.

(GIS Specialist and a Lecturer of Environmental Science, Dept. Environmental Sciences)

Geographic Information Systems (GIS) has become an indispensable technology in many areas of life including animal science. It encompasses the capture, querying, retrieval and classification, manipulation and analysis, and visualization of spatial data in order to help make informed decisions. This coupled with Remote Sensing and Global Positioning System (GPS), has enabled complex analysis and modeling to be carried out in various disciplines. Remote sensing provides the digital geographic data that is required for spatial analysis. The data ranges from aerial photographs to satellite imagery. These technologies are very powerful tools for monitoring natural resources. In animal science they can be used in simulations, risk assessment and mapping out animal behaviour, disease, forage abundance and spatial distribution.

In this project, GIS is being used to map forage in the study area. GPS coordinates of areas with fodder have been collected and a land use map showing areas with pasture will be generated using the supervised classification method. Spatial interpolation techniques will be used to create temperature and rainfall maps for the different study zones. The Normalized Difference Vegetation Index (NDVI) will be derived from satellite data.

This is strongly correlated with above ground biomass production; as such it is often used as a tool to estimate available forage. The nutrition content of the forage determined by laboratory tests will be assigned to the specific location. The NDVI values will be used to perform a regression analysis between the two variables to determine their relationship. An optimal regression model will be developed for each zone and biomass maps prepared using these models. The relationships will be applied to each pixel identified as forage to help in mapping out forage spatial distribution in the study area. The output will be very useful in guiding animal husbandry in the study areas.

STUDENT EXPERIENCES

"Its interesting to see extensively grazed animals wearing electronic gadgets"
By Anne Ochieng*(Student of MSc. Animal Science (Animal Nutrition)*

"Climate change is currently a focused topic since its affected by agricultural activities such as cattle keeping. Cattle contributes to greenhouse gas (GHG) emission through feeding and management practices. This project has helped me academically to understand and broaden my view on the aspect of GHG and the measures that need to be adopted to reduce emissions. During fieldwork such as survey and training, I have been able to interact directly with farmers especially

during discussions and demonstrations. I have also been able to learn on how to interact with farmers of different age groups during training. I have also had the opportunity to attend online training, workshops and conferences to learn more on climate change and its role on cattle production. This project has brought a lot of imaginations to life. Such for instance include the idea of digitally monitoring energy expense by the animals when they are out grazing. I found it interesting fitting GPS enabled activity monitors on the animals and capturing data on their activity on a smart phone. I have also had interesting moments sampling feed resources using quadrants and interacting with livestock keepers.
Contact: Email: nepalanne@gmail.com

Crop residue utilization and manure management practices on greenhouse gas emission and mitigation in peri-urban dairy cattle production systems:
*My experience By Brenda J. Kipkorir**(Student of MSc Environmental Science)*

The topic of greenhouse gas emission and climate change and its relation to dairy farming in terms of crop residue utilization and manure management practices is fascinating. Working on this project has brought many issues to my attention. Climate change is a complex subject currently being debated globally, and therefore it is necessary for all its dimensions to be foregrounded. The project has helped broaden my perspective on aspects of climate change in the dairy sector and appreciate the dire need to adopt greenhouse gas (GHG) mitigation measures in dairy production systems to reduce climate change. It has helped me to appreciate that crop residue is not just an agricultural waste but an important resource with various uses to farmers especially in the dairy farming unit. Through the project, my knowledge on different manure management practices and its influence on climate change and greenhouse gas emission has been expanded. Previously, I had no clue on how manure from dairy systems was handled and managed by dairy keepers in urban and peri urban settings, but after the

survey I became more informed. Additionally, the project has also positively influenced my social life and career. Through fieldwork during survey and farmer training sessions, I have been able to meet and directly interact with various local farmers who have enlightened me on their dairy farming practices and various holistic aspects of life, it is amazing to learn how much informed these farmers are. I have also gained many opportunities to attend numerous training, conferences, and workshops sessions both locally and internationally, majorly on climate change and the dairy sector.

Through these sessions, I have heard from and interacted with many experts from various fields who have inspired me and helped in shaping my career foundation. The project has catered for my second-year school fees and to top it up it has supported me financial through a monthly stipend. I want to extend my sincere gratitude to Maseno University and Ruforum for giving me a chance to be part of this project.
Contact: brendakipkorir@gmail.com