



TANZANIA SOCIETY OF ANIMAL PRODUCTION (TSAP)

48th Annual Scientific Conference Olasit Garden Hotel, Arusha

From Wednesday 24th to Friday 26th September 2025

THEME

**INCLUSIVE COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS
FOR INCREASED NUTRITION AND ECONOMIC BENEFITS**



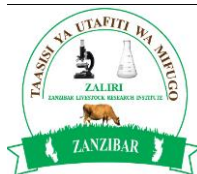
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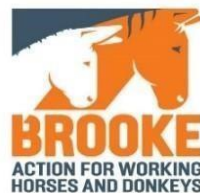


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TANZANIA SOCIETY OF ANIMAL PRODUCTION (TSAP)
48th Scientific Conference (Wednesday 24th – Friday 26th September 2025)

**INCLUSIVE COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS
FOR INCREASED NUTRITION AND ECONOMIC BENEFITS**

CONFERENCE PROGRAM

IMPORTANT NOTICE AND CONTACTS FOR THE 48th CONFERENCE

- Society matters e.g. membership: Dr Zabron Nziku +255 742 808 703 czabronn@gmail.com;
- Program, logistics, and accommodation: Ms Asha Maulidi +255 741 997 003 ashaitwanga@gmail.com, Ms Neema Kinyankwi +255 689 179 446 kinyankwineema12@gmail.com, Mr Gilbert Msuta +255 655 420 703 gmsuta@gmail.com;
- Registration: Dr Athuman Nguluma +255 755 528 687, Ms Patricia Ngoda +255 682 594 294 peterpatricia78@yahoo.com, Ms Laura Mahava +255 759 625 811 lauramahava@gmail.com;
- Conference recommendations: Dr Augustine Mwandya; Dr Eliamon Lyatuu; Dr Salim Nandonde; Mr Jeremiah Temu; Mr Hamdu Maulid.

DAY 1 Wednesday 24th September 2025

SESSION 1: OPENING CEREMONY

Chairperson: DR JONAS KIZIMA **Vice-Chairperson:** DR AUGUSTINE MWANDYA

Rapporteurs: Dr Zabron Nziku; Mr Gilbert Msuta

Time	Activity/Title	Responsible Person(s)
0830 – 0845	Arrival of Guest of Honour at Olasit Garden Hotels	TSAP Chairperson and Vice Chairperson
0845 – 0855	Briefing about TSAP, the 48 th Conference and brief introductions	TSAP Chairperson and Vice Chairperson
0855 – 0900	Arriving in the conference venue and start of opening session	TSAP Chairperson and Vice Chairperson
0900 – 0915	Welcome Remarks, Introductions, Chairperson's address, and inviting guest of honour	TSAP Chairperson and Secretary General
0915 – 0920	Stakeholders and sponsors remarks	Vice Chairperson (TSAP), TADB, CRDB, ASAS Dairies
0920 – 0925	Remarks from Ministry of Livestock and Fisheries	Director of Animal Production and Marketing/Patron
0925 – 0935	Remarks from Arusha Regional Commissioner's office	Regional Commissioner/Representative
0935 – 1000	Speech of Guest of Honour and Opening	GUEST OF HONOUR

1000 – 1030	Group Photograph/COFFEE/TEA BREAK	ALL
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SESSION 2: PLENARY PRESENTATIONS

Chairperson: DR AUGUSTINE MWANDYA **Rapporteurs:** Ms Martha Jilala, Mr Fadhili Chamwazi

Time	Activity/Title	Responsible Person(s)
1030 – 1045	Plenary I: A need for an impactful Livestock Sector of Tanzania: Review of the past, touch base with the present, and foreseeing the future	GC Kifaro Professor of Animal Breeding at SUA
1045 – 1100	Plenary 2: Framing the national food system within the Agricultural Sector Development Programme (ASDP II): Implementation Outlook for 2025/2026	S Nandonde, Coordinator of ASDP II, Office of the Prime Minister, Tanzania
1100 – 1110	Discussion	Session Chairperson/Presenters

SESSION 3: PAPER PRESENTATIONS

Chairperson: DR RUTH WAINEINA **Rapporteurs:** Ms Shangwe Fabian; Ms Neema Kelya

SUB-THEME 1: PRODUCTION FACTORS AND ENABLING ENVIRONMENT TO ACCELERATE COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS		
Time/Duration	Presentation Title	Presenting Author
1110 – 1120	GL Chasama, HF Massawe, N Felix, AC Mwang'imba, CJ Niyofasha, AN Francis, P Rukiko, WV Kikoti, AR Kamugisha Investigation of breeding objective for Tanzania cattle: A case of Ankole herd at TALIRI – Mabuki	GL Chasama
1120 – 1130	JM Mwabili, TK Muasya, CB Wasike Genetic and phenotypic correlations among lactation curve traits in Sahiwal cattle	JM Mwabili
1130 – 1140	CB Wasike Does Studbook registration process confer improved milk production performance in dairy cattle populations in Kenya?	CB Wasike
1140 – 1150	DK Mulupi, F Chelangat, PBK Mose, CB Wasike Regenerative agricultural practices and their adoption levels in dairy farming systems in Kenya	DK Mulupi
1150 – 1200	A Michael, CY Masagati Nutritional quality differences in wild and farmed Tilapia in Tanzania: Impacts of feed type and habitat variation	A Michael
1200 – 1210	F Kabi, P Lutakome Effect of harvesting Gliricidia sepium at different cutting intervals on quantity and quality of herbage biomass for dairy cattle nutrition	F Kabi

1210 – 1240	Discussion	Session Chairperson/Presenters
1250 – 1400	LUNCH BREAK	ALL

SESSION 4: 49th ANNUAL GENERAL MEETING/SELF TOUR OF ARUSHA

Chairperson: DR JONAS KIZIMA **Secretary General:** Prof George Msalya; **Assistant Secretary General:** Dr Zabron Nziku

Time/Duration	Activity/Title	Responsible Person(S)
1400 – 1700	ANNUAL GENERAL MEETING/Tour of Arusha for non-members	TSAP Chairperson, Vice Chairperson, EXCO, AGM Members, [Tour (non-members)]
1700 – 1730	EVENING COFFEE/TEA BREAK/END OF DAY 1	ALL

DAY 2 Thursday 25th September 2025

EDUCATIONAL AND RECREATIONAL TOUR: 07:00 AM – 06:00 PM (WHOLE DAY INCLUDING BREAK)

SOCIETY DINNER: 1800 – 2100

OLASIT GARDEN HOTEL

DAY 3 Friday 26th September 2025

EXERCISE: 0600 – 0700

OLASIT GARDEN HOTEL

SESSION 5: PAPER PRESENTATIONS

Chairperson: DR CHRILUKOVIAN WASIKE **Rapporteurs:** Ms Asha Maulidi, Ms Neema Kinyankwi

SUB-THEME 1: PRODUCTION FACTORS AND ENABLING ENVIRONMENT TO ACCELERATE COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS		
Time/Duration	Presentation Title	Presenting Author
0830 – 0840	J Kizima, Z Nziku, V Urassa, W Manesho, S Mngulu, S Kafuku, H Lugundi, P French, M Kabululu Assessment of growth performance and nutritional quality of promising forage species in Tanga Region, Tanzania	J Kizima
0840 – 0850	RW Waineina, SI Mwangi, JM Mwabili, SM Mbuku Influence of Breed, Parity, and Lactation Stage on Milk Composition in Dairy Cows under a Semi-Intensive Production System in Kenya	RW Waineina
SUB-THEME 2: DIGITALIZATION AND TECHNOLOGICAL NEEDS FOR COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS		

0850 – 0900	M Mwanibanza, F Guni, E Goromela, M Chando, F Thabiti Quantifying semen production and fertility rates in poultry breeding at TALIRI Naliendele	F Thabiti
0900 – 0910	AB Burilo, IP Kashoma, MM Kichuki Exploration of semen cryopreservation protocol for Horasi chicken ecotype	AB Burilo
0910 – 0920	AI Hoka ¹ , M Gicheru ² , S Otieno ² , E Owiro ¹ Physiological status of Friesian dairy cows and the implications on conception rates after synchronization	AI Hoka
0920 – 0930	SF Mhanga, AW Mwandya Costs and benefits Analysis of solar tent, raised racks and bare sand methods for drying dagaa along Lake Victoria, Tanzania and potential market trend	AW Mwandya
0930 – 1000	Discussion	Session Chairperson/Presenters
1000 – 1030	COFFEE/TEA BREAK	ALL

SESSION 6: PAPER PRESENTATION (PARALLEL SESSION)

Chairperson: PROF FRED KABI **Rapporteurs:** Frida Mlowe; Joyce Oscar

SUB-THEME 2: DIGITALIZATION AND TECHNOLOGICAL NEEDS FOR COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS		
Time/Duration	Presentation Title	Presenting Author
1030 – 1040	WC Wilson Application of Feed Calculator Mobile App in feed gap analysis in locally-formulated chicken feeds in the Southern Highlands of Tanzania	WC Wilson
1040 – 1050	ET Lyatuu, E Komba, G Msuta, N Kelya, R Mrode, J Ojango The future of Tanzania dairy farming in the digital economy	ET Lyatuu
1050 – 1100	N Kelya, E Komba, G Msuta, ET Lyatuu, J Ojango, R Mrode, G. Gebreyohanes Evaluating a mobile platform for digital transformation in the Dairy Sector: A case study of the AADGG App in Tanzania	N Kelya
SUB-THEME 3: CHANGING PERCEPTIONS OF STAKEHOLDERS TO IMPROVE NUTRITION AND ECONOMIC GAIN		
1100 – 1110	J Nicodemus, BM Masuruli, C Bukula, G Pharles, M Kivuyo Livestock commercialization and the African Union's ban on donkey trade	J Nicodemus
SUB-THEME 4: CROSS-CUTTING ISSUES AND THEIR ROLES IN COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS		
1110 – 1120	ET Lyatuu, E Komba, G Msuta, N Kelya, R Mrode	ET Lyatuu

	The economic impact of methane production on dairy farming in Tanzania	
1120 – 1130	FO Agutu, MM Mugendy, SM Mbuku The impact of utilizing forage-based technologies in climate resilience among smallholder dairy farmers in Nakuru and Nyandarua counties	FO Agutu
1130 – 1140	NS Urassa, Z Nziku, S Kafuku, W Mangesho, A Majoya, V Urassa, F Urassa, H Ihagura Maziwa Faida Dairy Project leaves no one behind	NS Urassa
1140 – 1200	Discussion	Session Chairperson/Presenters
1200 – 1400	LUNCH BREAK	ALL

SESSION 7: PAPER PRESENTATION (PARALLEL SESSION)

Chairperson: DR RENALDA MUNUBI **Rapporteurs:** Ms Asha Maulidi, Ms Neema Kinyankwi

SUB-THEME 4: CROSS-CUTTING ISSUES AND THEIR ROLES IN COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS		
Time/Duration	Presentation Title	Presenting Author
1030 – 1040	MM Mugendy, FO Agutu, SM Mbuku Socio-economic drivers and constraints in climate-smart forage-based dairy systems: Baseline evidence from smallholder farmers in Kenya	MM Mugendy
1040 – 1050	K Geremew, MS Chelangat, O Ouko, T Yemane, VO Ouko, A Odiwour, PA Alaru, S Mbuku, T Dessie Dietary diversity of women in Kakamega and Bomet Counties, Kenya	MS Chelangat
1050 – 1100	GK Korir, PB Mose, CC Wambui Factors influencing the willingness of dairy farmers to adopt climate resilient nutrient-rich forages in Kenya	PB Mose
1100 – 1110	CB Wasike, F Chelangat Protein and fat percentage vary between dairy cattle of different breeds exposed to thermal stress	CB Wasike
1110 – 1120	M Mwanibanza, E Lyatuu, D Komwihangilo, R Mrode, G Msuta, A Ngesi, S Dawite, N Kelya, E Komba, F Guni Seasonal trends in methane emissions and milk production in urban and peri-urban dairy systems of Northern Tanzania	M Mwanibanza
SUB-THEME 2: DIGITALIZATION AND TECHNOLOGICAL NEEDS FOR COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS		
1120 – 1130	A Nguluma, R Loina, R Pelle, C Tiambo Complementary phenotypic and SNP-Based characterization of indigenous goat populations in Tanzania: Implications for breeding and conservation	A Nguluma

1130 – 1200	Discussion	Session Chairperson/Presenters
1200 – 1400	LUNCH BREAK	ALL

SESSION 8: SPONSORS AND EXHIBITIONS SESSION (PARALLEL TO SCIENTIFIC SESSIONS) 1030 – 1200

Chairperson: DR ZABRON NZIKU **Rapporteurs:** Frida Mlowe; Joyce Oscar

Time/Duration	Presentation Title	Presenting Author
1030 – 1130	CRDB BANK, ASAS DAIRIES, TIB Bank, UTT AMIS, INADES-Formation	Sponsors
1130 – 1200	Discussion	Session Chairperson/Presenters
1200 – 1400	LUNCH BREAK	ALL

SESSION 9: OFFICIAL CLOSING

Chairperson: DR JONAS KIZIMA **Rapporteurs:** Dr Zabron Nziku; Mr Gilbert Msuta

Time/Duration	Activity Title	Responsible Person(S)
1400 – 1415	Arrival of Guest of Honour at Olasit Garden Hotel	TSAP Chairperson and Vice Chairperson
1415 – 1425	Briefing about TSAP, the 48 th Conference, and introductions	TSAP Chairperson and Vice Chairperson
1425 – 1435	Introductions, Chairperson's address, and inviting guest of honour	TSAP Chairperson
1435 – 1445	Remarks from Sponsors (TADB and ASAS Dairies), and International Participants,	Sponsors and International Participants
1445 – 1505	Remarks from TSAP, Arusha RS and Ministry of Livestock and Fisheries	RAS/Representative, other Representatives
1505 – 1510	Remarks from Ministry of Livestock and Fisheries and welcome Guest of Honour	Ministry of Livestock and Fisheries
1510 – 1540	Speech of Guest of Honour and Closing of the conference	GUEST OF HONOUR
1540 – 1545	Award of Best Papers	Guest of Honour
1545 – 1550	Group Photographs	ALL
FREE TIME IN ARUSHA FOR ALL PARTICIPANTS		

SESSION 10: EXTRA ORDINARY MEETING OF EXCO

Chairperson: DR JONAS KIZIMA **Secretary General:** Prof George Msalya; **Assistant Secretary General:** Dr Zabron Nziku

Time/Duration	Activity/Title	Responsible Person(S)
16:30 – 17:30	EXTRA ORDINARY MEETING OF EXCO	TSAP Chairperson, Vice Chairperson, EXCO Members, Zonal Representatives and New Leaders



PLENERAY PAPERS

Plenary paper 1: A need for an impactful Livestock Sector of Tanzania: Review of the past, touch base with the present, and foreseeing the future

GC Kifaro

Department of Animal, Aquaculture, and Range Sciences (DAARS), SUA, PO Box 3004, Chuo Kikuu, Morogoro, Tanzania. Correspondence: kifaro@sua.ac.tz

Livestock farming traditionally including poultry and pets is among the valuable socio-economic sectors of humankind since time immemorial. Its contribution to socio-cultural, nutrition, and economic activities has been significant at all times. In Tanzania like in many other tropical countries, contribution and performance of the livestock can be phased into the past (periods such as pre, during, and post colonialism) as well as the present (since the 20th century). During these time, various development can be traced and the same can serve as an information tool for present and future plans for the sector. The aim of this TSAP annual scientific conference 2025 key note paper is to review the past, look at the present, and advice about its future for young generation of livestock scientists and prospective stakeholders. This work is based on past literature and good knowledge of the author who has spent good years in the fields of animal science and production, the larger part being training, research, and consultancy. It is clear that, the sector was mainly traditional managed in the cultural production systems based on indigenous technical knowledge (ITK). The number of animals were little and possibly sufficient for the then populations. For example, there were about 8.1 million heads of cattle in 1962 comparable to population of slightly above 9.8 million people

around the same time. Total slaughters were 75,000 cattle, 42,000 goats, 3,100 sheep, and 700 pigs and total contribution the agriculture GDP reached 19 percent. This was followed by pre and post-independence times when there was significant involvement in several research for development of the sector and appreciable investment. There are a lot of good stories to tell the young people, despite the challenges which faced the sector at that time. At present, there are recommendable progress with contribution increasing many folds e.g. about 7 percent of the GDP in Tanzania. Various practices and engagements in other East African countries can also be narrated in a similar way. Expectation for the future, is seeing significant growth that will be based on advanced technologies.

Keywords: Advanced technologies, Cultural production systems, GDP, Indigenous knowledge, Livestock research.

Plenary paper 2: Framing the national food system within the Agricultural Sector Development Programme (ASDP II): Implementation Outlook for 2025/2026

S Nandonde

Office of the Prime Minister, Government City Mtumba, PO Box 980, 40480 Dodoma, Tanzania. Correspondence: salim.nandonde@pmo.go.tz

The Agricultural Sector Development Programme Phase Two (ASDP II), initiated in 2018/19, has undergone a mid-term review and subsequent refinements aimed at aligning it with global food system transformation agendas. These adjustments emphasize sustainable development, stakeholder inclusivity, and effective resource management to ensure societal well-being through agricultural advancement. ASDP II now integrates critical food system considerations such as biodiversity conservation, food security, nutrition quality, renewable energy integration, and sustainable value chain development. These elements are intended to guide sectoral transformation through to 2029/2030 and support the realization of Tanzania's Vision 2050. The program mobilizes contributions from the Government, Development Partners, and the Private Sector, with an estimated investment exceeding TZS 65 trillion by 2030. Of this, the private sector is expected to play an increasingly dominant role, bolstered by financial institutions' growing readiness and ongoing policy reforms supporting agricultural financing. Resource allocation indicates that agribusiness and value addition receive the largest share of the budget, followed by sustainable land, water, and environmental management. For the fiscal year 2025/2026 alone, the total projected investment in ASDP II implementation stands at TZS 5.3 trillion. Contributions are segmented as follows: Government (TZS 2.27 trillion), Development Partners (TZS 668.7 billion), and the Private Sector (TZS 2.33 trillion). This implementation plan addresses core program components, sector-specific

interventions, and six national food system pathways. It seeks to harmonize with national needs and regional frameworks, notably the Comprehensive Africa Agriculture Development Programme (CAADP). Sectoral budgets are heavily weighted toward production and distribution, with relatively limited allocation toward demand-side priorities such as food quality, nutrition, and public health—indicating the need for greater budgetary emphasis on these critical dimensions. **Keywords:** Agricultural Sector Development Program, Food systems transformation, Sustainable development, Public-Private Partnership, Nutrition and Food Security.

ABSTRACTS

SUB-THEME 1: PRODUCTION FACTORS AND ENABLING ENVIRONMENT TO ACCELERATE COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS

1. Investigation of breeding objective for Tanzania cattle: A case of Ankole herd at TALIRI – Mabuki

GL Chasama, HF Massawe, N Felix, AC Mwang'imba, CJ Niyofasha, AN Francis, P Rukiko, WV Kikoti, AR Kamugisha

Tanzania Livestock Research Institute (TALIRI), Lake Zone Research Centre – Mabuki, PO Box 124 Misungwi, Mwanza, Tanzania. Correspondence: chasamagod@yahoo.co.uk

Economic and animal performance data collected from Ankole herd of Tanzania Livestock Research Institute (TALIRI)-Lake Zone and the institute's outreach farmers were used to analyse economic values of traits in order to identify target traits for beef productivity improvement. Sequential bio-economic modelling methodology involving formulation and stochastic simulation of profit function was used to estimate economic values of traits influencing investment and revenues of beef production. Fecundity trait studied was calving interval which generated economic value of 833.15. Developmental traits analysed were age at maturity and age at first calving, which generated economic values of 83.86 and 19, respectively. Weaning weight generated very high positive economic value of 1496.18 contrarily to other studied growth traits (body weight and post-weaning daily gain which generated economic values of -6.09 and -53.69, respectively). Longevity displayed a negative economic value of lowest magnitude (-4.03). Therefore, under the prevailing conditions, selective breeding for growth traits improvement, which is normally prioritized in beef herds breeding, showed low potential of impacting profitability improvement. Lowering of the herd mean for calving interval owes to be among the key productivity enhancement strategies for the farm. It was concluded that, in order to realize the benefits of selection in growth traits, there is the need to parallel the breeding strategy with other interventions which can lowering production costs, especially feeds costs. **Keywords:** Bio-economic modelling, Beef productivity, Economic values, Stochastic simulation, Selective breeding.

2. Genetic and phenotypic correlations among lactation curve traits in Sahiwal cattle

Lactation curves (LC) represent the physiology of the udder and lactation ability of dairy cattle. Dairy cattle in Kenya are selected for increased milk production. This influences their lactation physiology and ultimately LC. Estimates of correlation that indicate the impact of selection of animals for milk production on LC parameters are lacking. This study aimed to estimate genetic and phenotypic correlations among LC traits in Sahiwal cattle. Test day milk records were obtained from the National Sahiwal Stud (NSS) in Naivasha. Lactation curve traits peak yield (PY), days in milk at peak (DIMP) and persistency (PS) were derived using the incomplete gamma function. A multivariate repeatability animal model was used to estimate correlation between LC traits. Fixed effects included parity, year, season, lactation length, and age at calving. Heritability estimates for LC traits ranged from low to moderate and were 0.09, 0.16, 0.17 and 0.18 for PS, PY, Total Milk Yield (TMY) and DIMP, respectively. Repeatability estimates for LC traits were moderate and ranged from 0.24 to 0.56. Positive genetic (0.652) and phenotypic (0.548) correlations were observed between TMY and PY, indicating that animals with high peak yields tend to have high TMY. Negative genetic (-0.412) and phenotypic (-0.212) correlations were exhibited between PY and DIMP. Genetic and phenotypic correlations between DIMP and PS were 0.891 and 0.832, respectively, indicating that cows that attain PY later tend to have flatter and more persistent LCs. This is desirable in dairy production systems that benefit from steady milk production over time, rather than sharp peaks followed by rapid declines. Genetic correlations between PS and both PY and TMY were positive but low and were 0.011 and 0.031, respectively, indicating slow and limited genetic progress in persistency through selection for PY or TMY alone. While high PY is strongly associated with increased TMY, it may adversely affect PS, a trait essential for sustainable lactation performance, especially in low-input production systems. These results highlight the need for balanced selection strategies that optimize both PY and LC stability to enhance long-term productivity. **Keywords:** Milk production, Dairy cattle, Lactation curve, Genetic relationships.

3. Does Studbook registration process confer improved milk production performance in dairy cattle populations in Kenya?

CB Wasike

Dairy cattle improvement program in Kenya is an upgrading scheme, where local cows are crossbred with superior exotic dairy bulls to achieve near-purebred or purebred status. The process begins with identification, inspection, and registration of the cow in the herd register. The aim is to identify and select animals that are true to breed type for the studbook. Consequently, animals in the Kenya studbook are classified in order of breed purity as foundation, intermediate, appendix, and pedigree. The producer and breeder perception is that pedigree animals are superior milkers relative to other classes, thereby resulting in their higher pricing on the market. However, there is no empirical evidence to support this perception. This study investigates the scope of variation in milk production performance of dairy cattle in the national dairy Stud. Dairy cattle studbook registration and milk production data were obtained from the Kenya Livestock Breeders Association database. Records consisted of test day milk yield (TDMY) and 305-day lactation milk yield (MY305) from first lactation of Ayrshire, Holstein-Friesian, Jersey, and Guernsey. A total of 12489 TDMY and 1360 MY305 records from 1360 animals were considered. A model fitting breed and registration class as fixed effects and contemporary groups of herd-year-month of birth (HYMoB), calving (HYMoC), and test (HYMoT) as contemporary groups was fitted to the data and Analysis of Variance performed to determine the variation in TDMY and MY305 traits. Mean MY305 was 4455.53, 3763.58, 3704.69 and 3254.48 for HF, Ayr, Jer, and Gue; and 4011.36, 4433.05, 4380.16 and 4167.80, for foundation, intermediate, appendix and Pedigree classes, respectively. Mean TDMY was 15.76, 13.17, 13.61 and 11.44 for HF, Ayr, Jer and Gue. Among the registration classes, the mean TDMY was 14.24, 15.83, 15.48 and 14.73 for foundation, intermediate, Appendix, and pedigree, respectively. There was significant variation ($P < 0.005$) in MY305 in registration class, Breed, HYMoB, and HYMoC. Significant variation ($p < 0.005$) was also observed in TDMY in registration class, breed, HYMoB, HYMoT and DIM. Inspection and classification of dairy cattle during registration are meant to ensure breed purity and true-to-type breed characteristics and should not be used for the valuation of milk production ability of the registered cows. **Keywords:** Pedigree recording, Animal registration, Test day milk yield, Total milk yield, Dairy improvement program.

4. Regenerative agricultural practices and their adoption levels in dairy farming systems in Kenya

DK Mulupi¹, F Chelangat², PBK Mose¹, CB Wasike²

¹Department of Agricultural Economics and Rural Development, School of Agriculture, Food Security, and Environmental Science, Maseno University, Kenya; ²LEEG, Department of Animal and Fisheries Science, School of Agriculture, Food Security, and Environmental Science, Maseno University, Kenya. Correspondence: wasikebwire@gmail.com

The dairy sector plays a crucial role in enhancing food security and household livelihoods in the sub-Saharan region. Over the years, there has been an increase in the number of dairy herds; however, the productivity of animals has remained constant, and in some instances, declined. This has resulted in shortages of dairy products. Several interventions, including Regenerative agricultural practices (RAPs), have been proposed and promoted to enhance the productivity and ecological sustainability of dairy systems. However, there is a paucity of information on the extent of RAP adoption and the drivers of adoption. This study determined RAPs in dairy systems and factors driving their adoption. A cross-sectional questionnaire survey was conducted in Trans-Nzoia and Uasin Gishu Counties, Kenya, to collect primary data from 346 farms using a multi-stage sampling approach. Data on RAPs in livestock farming, their distribution, and drivers of adoption were collected. Key RAPs in dairy systems included high-yielding fodder production, rotational/managed grazing, use of alternative feed resources (crop residues), and dairy breed diversification. High adoption rates were observed in fodder production (66.5% of farms), rotational/managed grazing (73.3%), and the use of crop residue as feed (96.2%). Diversification of dairy breeds and composting manure used in fodder production were adopted by 5.87% and 19.9% of the farms, respectively. Livestock management was done through controlled open grazing (26.7% of farms), zero/semi-zero grazing (26.95%), paddocking (25.19%), and managed tethering (7.05%). Fodder production was established within crops (16.34%), along the farm boundaries (20.23%), in separate plots (82.5%), and on the terraces, ridges, and hedgerows of farms (10.89%). The dairy breeds reared on farms were categorized into crossbreeds (57.94%), exotic breeds (36.17%), and a combination of crossbreed and exotic (5.87%). The farmers' training, levels of benefits, land size, breed, and size of the herd, labor availability, and other farm activities influenced RAPs adoption. Therefore, to accelerate the adoption of RAPs in dairy systems, there is a need to demonstrate utility (both economic and ecological sustainability) derived from RAPs against conventional dairying. **Keywords:** Dairy production, Agro-ecological practices, Fodder production, Managed grazing.

5. Nutritional quality differences in wild and farmed Tilapia in Tanzania: Impacts of feed type and habitat variation

A Michael, CY Masagati

Tilapia is one of the most widely consumed fish species globally, and it plays a pivotal role in addressing nutritional deficiencies and supporting livelihoods, particularly in low- and middle-income countries. In Tanzania, tilapia production encompasses both wild-capture fisheries and the rapidly expanding aquaculture, yet, empirical nutritional comparisons between wild-caught and farmed varieties are limited. This knowledge gap hinders optimal value chain design and remains a subject of debate with majority of communities residing near water bodies prioritizing wild-caught fish as the nutritional superior over farmed ones. This study compared the nutritional composition (proximate analysis, and essential amino acids) of mature tilapia (*Oreochromis spp*) from representative sites: four commercial farms in Dodoma Region using different feeds and three wild sites (Lake Victoria, Mtera Dam, Hombolo Dam). Results revealed significant variations influencing commercialization strategies. Wild tilapia exhibited superior protein content (57.0-65.6% dry weight) compared to most farmed fish (45.5-54.2%). Essential amino acid profiles also favoured wild fish, showing significantly higher lysine (4.5-5.1 mg/g vs. 3.6-3.8 mg/g) and methionine (2.1-2.6 mg/g vs. 1.6-1.9 mg/g) concentrations, reflecting natural versus formulated diets. Conversely, most farmed tilapia possessed substantially higher fat content (24.9-27.4%) compared to wild fish (5.9-11.4%), offering different nutritional benefits. These findings demonstrate that feed type and habitat significantly influence nutritional quality. Understanding these differences is critical for designing value chains that prioritize both nutritional quality and economic viability while ensuring food security, and promoting evidence-based consumer choices. **Keywords:** Wild-caught, Farmed, Tilapia, Nutritional composition, Feed type.

6. Effect of harvesting *Gliricidia sepium* at different cutting intervals on quantity and quality of herbage biomass for dairy cattle nutrition

F Kabi, P Lutakome

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Besides being resistant to defoliating psyllid pest (*Heteropsylla cubana*) that devastated *Leucaena leucocephala* in the region, *Gliricidia sepium* is capable of producing sprouts that not only grow vigorously but also tolerates repeated cutting frequency while retaining green leaves during the dry seasons. Herbage quantity and quality response of *Gliricidia sepium* (*G. sepium*) to harvesting

intervals (1.0 to 6.0 months) was evaluated. Chemical composition as well as biomass yield of coppice re-growth was estimated and the herbage was incubated in three rumen fistulated Friesian steers for 3, 6, 12, 24, 48, 72, 96 and 120 h. Herbage biomass data, nutritional composition and rumen degradability was analysed using SAS PROC MIXED model considering harvesting frequency as fixed effects and trees within the blocks as random effects. Least square means of all parameters were then analysed using polynomial contrasts with linear and quadratic trends to examine the impact of cutting frequency of *G. sepium* on biomass quantity and quality. Herbage dry matter yield tended to follow linear response ($P = 0.0689$) with increasing coppice re-growth maturity and ranged between 36.2 tones/ha/year to 49.1 tones/ha/year. Protein content (291 g/kg DM to 220 g/kg DM) decreased following a quadratic trend. However, fibre content increased following a curvilinear trend as herbage matured but levels of lignification increased linearly with delayed harvesting. Additionally, fraction 'b' of dry matter degradability (548 to 716 g/kg DM) decreased linearly with herbage maturity. Herbage potential degradability (a+b) (926 to 785 g/kg CP) was indicative of high protein solubility and rumen degradable protein (RDP) decreased with increasing maturity. Consequently, microbial protein synthesis and net energy of lactation (NEL) decreased linearly while rumen undegradable protein (RUP) and digestible undegradable protein (DUP) increased linearly with increasing herbage maturity. These results are interpreted to mean that *G. sepium* herbage quantity and quality is influenced by pruning management. **Keywords:** Herbage lignification, Intensive dairy farming, Metabolisable energy, Metabolisable protein, Milk productivity, Multi-purpose trees, Net energy of lactation, Rumen degradable protein, Rumen undegradable protein.

7. Assessment of growth performance and nutritional quality of promising forage species in Tanga Region, Tanzania

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Forage crops are fundamental to sustainable livestock production, particularly in regions where feed availability limits productivity. In Tanzania, the adoption of improved forage varieties remains low, hindering efforts to establish a reliable and climate-smart nutritious feed base for ruminant livestock. This study assessed the growth performance and nutritional quality of ten forage species in the Tanga

Region, aiming to identify the most promising forage candidates for direct grazing, cut-and-carry systems and hay production to support dairy production. The evaluation was conducted on-station at Tanzania Livestock Research Institute (TALIRI), Tanga. The trial involved forage species (registered and unregistered varieties), including *Cenchrus ciliaris* cv. 'TALIRICENCHI', *Chloris gayana* cv. 'TALIRI CHLOI', *Brachiaria* cv. 'Mulato', *Brachiaria* local variety, *Macroptilium atropurpureum* cv. TALIRI MACROI, *Neonotonia wightii*, *Medicago sativa* cv. 'TALIRI ALFAI', sorghum-sugar graze, Napier cv. Ouma, and millet. Agronomic parameters included biomass yield, plant height, and regrowth ability to assess survival rates for the next growing season without irrigation. Alongside proximate nutritional analyses, including fibre fractions such as neutral detergent fibre and acid detergent fibre were considered. Data were analysed using R software, with descriptive statistics used to summarize forage height, yield and fibre content. A linear mixed-effects model assessed the influence of species and time, with replication treated as a random effect. Significant differences among species were determined using Tukey's HSD test, and results were visualized through bar and line plots. By visual assessment conducted by the forage team, *C. ciliaris* demonstrated a high survival rate (90%) and regrowth ability as compared to *Brachiaria* local cultivar (70), *C. gayana* (60%), *Brachiaria* cv. 'Mulato' (60), when recovering from the dry season. Legumes were also assessed for recovery by assessing regrowth after dry season, where *M. atropurpureum* showed high recovery 80% as compared to other species of *M. sativa* (60), and *N. wightii* (60). The same was done for the category of Napier cv. 'Ouma' (80%), Sorghum-sugar graze (40) and millet (30). This helped to assess the species which can be perennial over the drought stress highlighting its potential as a climate-resilient forage option. When comparing the forage biomass production for direct grazing and hay production, *C. gayana* yielded the highest in 8 weeks (8,184 kgDM/ha), followed by *Brachiaria* cv. *Mulato* (7,291.1 kgDM/ha), *C. ciliaris* (6,998.2) and *Brachiaria* Local 4,378.2. With the intention of selecting the best forage to support fresh forage feeding and silage making, Napier cv. 'Ouma' yielded the highest in 8 weeks (20,416.8 kgDM/ha) as compared to sorghum-sugar graze (17,081.9) followed by Millet (14,516.5). For the tested legumes, forage biomass production *M.atropurpureum* cv. TALIRI MACROI' yielded the highest (4781.1 kgDM/ha), followed by *N. wightii* (4722.5) and *M. sativa* cv. 'TALIRI ALFAI' (2942.9). Considering the combination of criteria of specie availability as certified seeds in the market, yield, regrowth ability and survival rate due to drought challenges in relation to climate change, *C. ciliaris* cv. 'TALIRICENCHI' was selected for initial grazing trials and other further related studies to support dairy farming in Tanga region. Napier cv. 'Ouma' was also selected for producing high-quality fresh forage and silage-making grass. The findings show promising results for the importance

of *Cenchrus ciliaris* cv. TALIRICENCH1, Napier cv. ‘Ouma’ and *M. atropurpureum* cv. ‘TALIRIMACRO1’ as potential forages for on-station further studies, grazing, silage, hay production and dissemination efforts in Muheza district and other districts in outreach programs of Tanga region to enhance livestock productivity and resilience in the face of climate variability. **Keywords:** Forage evaluation, *Cenchrus ciliaris*, Biomass yield, Nutritional quality, Climate-Smart Agriculture, Sustainable Livestock Systems.

8. Influence of Breed, Parity, and Lactation Stage on Milk Composition in Dairy Cows under a Semi-Intensive Production System in Kenya

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Dairy production in semi-intensive system is constrained by seasonal feed availability, variable management practices, and diverse genetic backgrounds, leading to fluctuations in milk quality. Understanding how various factors such as breed, parity, and lactation stage interact can guide genetic selection and nutritional strategies to optimize milk solids in such systems. This study evaluated the effects of breed, parity, year of milking, and lactation stage on milk composition traits in dairy cattle under extensive production systems. A total of 909 test-day records from 80 cows (18 Friesian, 18 Jersey, 21 Sahiwal, and 25 Sahiwal × Friesian cross) were analysed after excluding records beyond 350 days in milk (DIM) and cows with fewer than five records per parity. A linear mixed-effects model was fitted with breed, parity, year, and month in milk as fixed effects and cow as a random intercept, while DIM was modelled using a natural cubic spline to account for the non-linear lactation curve. Breed significantly influenced milk fat and total solids but had minimal effect on protein, lactose, and solids-not-fat (SNF). Sahiwal milk had the highest fat (3.20%) and total solids (11.8%), while Jersey had the lowest fat (1.73%) but slightly higher protein (3.16%). Fat percentage declined from 2.85% in 2024 to 1.78% in 2025, whereas protein, lactose, and SNF were stable across years. Multiparous cows exhibited slightly higher fat and protein than primiparous cows. Fat percentage varied across months in milk, peaking in seventh month (3.22%) and dropping in 12th month (0.94%), consistent with days in milk spline trends showing lowest fat in mid-lactation and higher values in late lactation. Protein, lactose, and SNF remained relatively stable across lactation stages. These findings highlight the influence of genetic and physiological factors on milk

composition and underscore the importance of considering breed composition, parity, and lactation stage in herd management. **Keywords:** Breed, Days in milk, Parity, Milk quality.

SUB-THEME 2: DIGITALIZATION AND TECHNOLOGICAL NEEDS FOR COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS

9. Quantifying semen production and fertility rates in poultry breeding at TALIRI Naliendele

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Artificial insemination is a crucial method for efficiently transmitting desired genetic traits in chickens while minimizing the number of cocks required in the flock. This study evaluated the effectiveness of artificial insemination (AI) techniques in servicing hens and improving fertility rates in the Horasi chicken ecotype. Semen was collected from 29 cocks maintained under optimal management conditions and used to inseminate 200 hens, grouped at a ratio of seven hens per cock. To ensure accurate data collection, both cocks and hens were identified using wing tags. Semen extraction and insemination were performed within 30 minutes after collection, between 14:00 and 17:00, throughout the study period. The collected eggs were incubated in an automatic incubator for 21 days, with candling performed on day 18 to assess fertility. The study recorded semen volume, the number of hens inseminated, and performed fertility tests. Data analysis was conducted using JMP ®Pro 18 version 2024 of SAS. Results demonstrated significantly lower semen volume ($P < 0.0001$) in weeks 45 to 48, averaging 0.12 ml, compared to weeks 56 to 60, where semen volume increased to 0.51 ml. Additionally, fewer hens were inseminated ($P < 0.0001$) at the beginning of the experiment, with only 1.6 hens inseminated per cock in week 45, compared to 5.3 hens per cock by week 60. As hens aged, egg production declined. However, fertility rates showed an upward trend with age. Conclusively, the study demonstrates the importance of considering the age of the chicken in practising AI techniques. Furthermore, mature cocks produce large volume of semen while mature hen has higher fertility rate when breeding using AI techniques. **Keywords:** Horasi chicken, Semen volume, Artificial insemination, Egg production, Fertility rate.

10. Exploration of semen cryopreservation protocol for Horasi chicken ecotype

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To establish the most effective cryopreservation protocol for the Horasi chicken ecotype semen, sperm traits such as viability, motility, and normalcy were examined under various settings using different extenders (BPSE, LAKE, and CARI), cryoprotectants (DMSO, DMA, and DMF), concentrations for each cryoprotectant (4%, 8%, and 12%), equilibration conditions (4°C for 30 minutes and then placed 4cm above liquid nitrogen gas for 10 minutes, 4°C for 2 hours and then placed 4cm above liquid nitrogen gas for 30 minutes, 4°C for 3 hours and then placed 4cm above liquid nitrogen gas for 2 hours), and thawing conditions (5°C for 100 sec, 35°C for 1min, and 37°C for 30 sec). Between 12 December 2024 and 19 March 2025, a total of 243 protocols with 3 replicates each, making a total of 729 semen samples were tested. The highest values for total motility (92.68 ± 2.46), progressive motility (70.31 ± 1.24), viability (91.67 ± 2.88), and normalcy (88.33 ± 2.88) were obtained in semen samples extended by BPSE with 4% DMSO, equilibrated at 4°C for 2 hours and then placed 4cm above liquid nitrogen gas for 30 minutes, and thawed at 5°C for 100 seconds, whereas the lowest semen quality parameters were recorded in semen diluted with LAKE extender containing 12% DMA, equilibrated at 4°C for 3 hours and then placed 4cm above liquid nitrogen gas for 2 hours, and thawed at 37°C for 30 seconds. To sum up, our findings demonstrate critical procedural stages and optimal conditions for advancing cryopreservation techniques for Horasi chicken ecotype semen. **Keywords:** Horasi chicken semen, Cryopreservation, Extenders, Cryoprotectants, Equilibration, Thawing temperature.

11. Physiological status of Friesian dairy cows and the implications on conception rates after synchronization

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Reproductive efficiency continues to be a major problem in lactating dairy cows. Improved procedures for detection of physiological status of lactating dairy cows will increase farm income by increasing milk production, through reduced days open and genetic improvement. Synchronization is used to increase submission rates in heifers and cows. However the protocol is

used as a blanket therapy for all the cows without regard for physiological state. Therefore the objective of this study was to monitor the physiological state of the cows using milk progesterone levels at; synchronization, AI, day 10 and day 21 after AI. Thirty, randomly selected milking cows were monitored for progesterone levels using radioimmunoassay techniques, then were each synchronized using 2 mls of PGF₂ intramuscularly. Individual cow record was kept containing details on parity, body condition score (BCS), amount of milk, time served, and progesterone profile. Data collected was subjected to analysis of variance and means separated. Milk production averaged 23 l/day. Body condition score ranged from 2-4. Heat detection was done visually by using one person. Progesterone at synchronization ranged from 0-4 nm/l. Sixty percent of the cows showed heat with an average of 10 days post-synchronization and they were inseminated at different hours after exhibiting standing heat. There was 50% conception with lower parity and BCS 3 cows having significantly higher conception rates. There was significant variation in conception rates with cows having threshold progesterone at synchronization not conceiving whereas conception increased with increased progesterone. Cows that had 4nm/l of progesterone at synchronization had the highest conception rates. Conception significantly increased with reduced progesterone at insemination. Levels of progesterone of 4 nm/l on day 10 indicated an involvement of corpus luteum in the production of progesterone and progesterone above 7 nm/l on day 21 indicated pregnancy. Higher parity cows produced significantly higher amount of milk than lower parity cows. Progesterone increased as pregnancy advanced but was erratic in control cows. Physiological state of the cows at synchronization determined the response to synchronization and AI success. Adoption of the findings in breeding protocols will increase cow productivity. **Keywords:** Physiological state, Synchronization, AI outcome, Friesian cows.

12. Costs and benefits Analysis of solar tent, raised racks, and bare sand methods for drying *dagaa* along Lake Victoria, Tanzania and potential market trend

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Dagaa (*Rastrineobola argentea*) has been the major commercial fishery of Lake Victoria contributing 67.4% of total fish catch. In Tanzania it constitutes over 38% of the total fish landings from the lake. However, there is a high level of post-harvest loss of about 59%. To minimize the losses, various solar post-harvest innovations for *dagaa* processing have been developed but there

is limited empirical evidence showing costs and benefits of these innovations to justify their adoption. The present study assessed the economic viability of three drying methods of *dagaa* namely, solar tent, bare sand and raised racks in Mwanza. Cost benefit analysis was employed to determine the economic viability of the three drying methods. Furthermore, trend analysis was employed to determine the future market of dried *dagaa*. Data were collected by using simple random sampling of *dagaa* from fishers (boats), key informant interviews and desk review of secondary data. The results showed that solar tent achieved the highest Net Present Value (NPV) of TZS 68,069,703 at the Internal Rate of Return (IRR) of 341% and Benefit Cost Ratio (BCR) of 1.38 meaning that solar tent is economically viable compared to bare sand and raised racks. The Market trend analysis augmented with key informant interviews indicated that domestic market for *dagaa* is rising. Based on the findings the study recommends solar tent innovation should be promoted to commercial scale to contribute to increased income and livelihoods of fishers and processors as well as overall revenue. **Keywords:** *Rastrineobola argentea*, Value addition, Solar drying.

13. Application of Feed Calculator Mobile App in feed gap analysis in locally-formulated chicken feeds in the Southern Highlands of Tanzania

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The potential production and productivity of chickens is highly determined by feed quality and quantity for the respective age group, among other factors. The present study focused on exploring the feed gap and how the feed gap can be closed. The study involved a cross-sectional survey of 101 poultry keeping households, followed by quantification of feed offered to chickens and feed sampling for quality assessment by laboratory analysis. The quality and quantity of the feed supplied were further compared to the standard recommendations and Feed Calculator App guidelines. Of the 101 interviewed farms, the majority of farmers raised chickens in semi-intensive systems (81%) while some farms were practising intensive systems (19%) where their flock comprised 64% indigenous and 36% improved crossbred chickens. The results show that chicken farmers relied on locally-formulated feed since the commercial feeds were expensive, mostly packed in large quantities of 50 kg bags. The main feed ingredients used in formulating local feed rations include maize bran, sunflower seedcake and fishmeal. The findings shows that the locally formulated feeds were not only of low quality for all breeds but also of insufficient quantity, especially for indigenous chickens. Most feeds were of low nutritional quality lacking the essential nutrients particularly crude protein and essential amino acids. Moreover, poor quality of the

feed revealed in the present study was partly due to the prices of feed ingredients, whereby the most important ingredients i.e. the protein sources, essential amino acids, and pre-mixes were expensive. The study highlight the importance of closing feed gaps (both quantity and quality) and ensuring the availability of suitable and safe feed formulations to reach the potential production of dual-purpose chickens to meet the increasing demand for chicken meat and eggs. **Keywords:** Productivity, Feed gap, Feed ingredients, Feed quantity.

14. The future of Tanzania dairy farming in the digital economy

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Dairy farming in Tanzania is a significant part in the national economic development and food security systems. In recent years there has been transformation of dairy farming from traditional to business by considering productivity per cow. It is important to note that most rural household in Tanzania own livestock and they derived on average of 22% of their income from livestock by producing an average of 2000 litres/cow/year, with at least one calves each year. However, without proper records, it hard for them to keep tab on the events that happening in their herd, hence importance of digital records. Research shows digital economy evolved in early 2000 while dairy digital recording that provide digital feedback started in 2016. Therefore, this study investigated the impact of digital records on dairy farming and how it has enabled farmers to acquire digital economy. The study used Stata in one-way ANCOVA in multivariate polynomial regression in python function to analyse digital data collected from 2016-2024 in AADGG database. The findings show that 14 million dairy farmers are in digital economy doing all their dairy business using their mobile phone. The study found that 67% of dairy farmer enjoying interaction in digital records that enable them to make informed decisions. The study proved that amount of milk yield, quality of the milk produced, amount of feed taken by a cow, treatment and disease control require digital data that are in real time. However, to maintain digital economy, data security, farmer consent, two ways traffic feedback are important, but it is necessary to have consistency records. **Keywords:** AADGG, Dairy, Digital economy, Tanzania.

15. Evaluating a mobile platform for digital transformation in the Dairy Sector: A case study of the AADGG App in Tanzania

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The digital transformation of the agriculture sector, particularly in livestock production, is increasing across sub-Saharan Africa, with mobile platforms offering practical solutions to persistent challenges in smallholder systems. This study evaluates the use of the Africa Asia Dairy Genetic Gains (AADGG) mobile application as a digital livestock management tool in Tanzania's dairy sector. The app, developed by the International Livestock Research Institute (ILRI), was designed to improve herd data collection, support decision-making, and enhance service delivery. A qualitative case study approach involving semi-structured interviews with 33 stakeholders across seven regions was used, with participants including farmers, enumerators, data scientists, and a project leader, all had hands-on experience using the app. Thematic analysis revealed that the AADGG platform significantly improved herd management, data accuracy, and access to extension services. Farmers reported increased milk production, better breeding outcomes, improved record keeping, and better health of their animals. Despite these successes, a few challenges, such as poor connectivity, GPS limitations, and language barriers were noted, especially in remote mountainous, rural areas. Stakeholders recommended strengthening offline capabilities, expanding functionalities, enhancing user training, and restoring SMS-based feedback features. The findings demonstrate the AADGG app's strong potential to transform smallholder dairy systems through digital innovation. This study offers practical lessons for scaling mobile livestock platforms and supporting sustainable animal production in Tanzania and beyond. **Keywords:** Digital transformation, AADGG, Mobile platform, Smallholder dairy farming, Livestock data, Tanzania.

SUB-THEME 3: CHANGING PERCEPTIONS OF STAKEHOLDERS TO IMPROVE NUTRITION AND ECONOMIC GAIN

16. Livestock commercialization and the African Union's ban on donkey trade

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Commercialization of livestock value chains remains a pertinent issue in improving nutrition and economic benefits for stakeholders. The African Union (AU) adopted a continental wide 15 year ban on the commercial slaughter of donkeys for their skin and meat to protect donkey populations from extinction. The question from all animal welfare practitioners is whether donkey commercialization can continue in a manner that aligns with the African Union's directive? The answer is certainly Yes. It is essential to explore alternative avenues for the inclusive commercialization of livestock value chains without violating the AU's decree by protecting livelihoods while preserving donkey populations. The solution lies in practical, welfare conscious solutions through breeding programs, improved harnessing and cart making enterprises, and donkey powered transport services for water, goods, and agriculture. Commercialization efforts must embrace sustainability of the donkey population. In Africa and Tanzania in particular, donkeys are an integral to rural livelihoods, serving as vital assets in agriculture, transport, and income generation. Recognizing their significance, INADES-Formation Tanzania, Brooke East Africa and the Ministry of Livestock and Fisheries have implemented various interventions to enhance donkey welfare. These include veterinary care, awareness campaigns, and community engagement initiatives aimed at improving the health and productivity of donkeys. Despite national 15 year ban on donkey slaughter in Tanzania and Kenya, local and international trade on donkey meat and skins still presents significant challenges. Porous borders between these two countries, inadequate law enforcement and cross border dynamics have permitted illegal trading, smuggling, threatening donkey populations and undermining efforts to protect these now endangered animals. The Second Pan African Donkey Conference (PADCo-2), held in Abidjan in June 2025 underscored the importance of cross border collaboration, policy harmonization, and community engagement in implementing the AU's moratorium on donkey skin trade. **Keywords:** Donkey welfare, AU on ban, Cross border trade, Sustainable commercialization, PADCO-2.

SUB-THEME 4: CROSS-CUTTING ISSUES AND THEIR ROLES IN COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS

17. Seasonal trends in methane emissions and milk production in urban and peri-urban dairy systems of Northern Tanzania

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Methane emissions from dairy cows arise naturally during digestion and contribute to greenhouse gas accumulation. This methane production also leads to a loss of gross energy that could otherwise be utilized for milk yield. However, there is limited information on how different dairy farming systems and seasonal variations shaped by management practices and climatic conditions impact productivity and associated outputs from dairy cows. This research investigated methane emissions and milk yield in urban and peri-urban dairy farming systems across both dry and wet seasons. Employing a longitudinal survey approach, we studied 193 lactating cows, of which 109 were from peri-urban areas and 84 from urban settings across 74 households, comprising 43 from urban and 31 from peri-urban dairy farms. Methane concentrations were measured using a laser methane detector (in ppm*m and converted to gCH₄/day), while milk components and feed quality (crude protein-CP, neutral detergent fiber-NDF) were assessed. The result was analyzed using JMP[®] Pro 18 Version 2024 of statistical analysis software. Peri-urban forages showed higher CP than urban systems in both seasons (dry: 4.965% vs. 4.464%; wet: 7.643% vs. 5.642%), though NDF levels were comparable (58.726–52.19% vs. 57.08–54.89%). Conversely, urban concentrates had superior CP (dry: 16.482% vs. 12.789%; wet: 14.907% vs. 13.075%) and higher NDF (39.664–35.733% vs. 27.985–32.25%). Wet seasons significantly boosted milk yield ($P<0.05$) and milk solids (fat, protein, lactose), while peri-urban systems produced higher-quality milk ($P<0.05$) despite similar yields. Methane emissions (gCH₄/day and per liter of milk) peaked in dry seasons ($P<0.05$), with wet-season feed improvements linked to lower emissions. The findings emphasize that nutrient-rich wet-season feeds enhance milk output while reducing methane intensity. The study recommends optimizing peri-urban feeding strategies to balance productivity and sustainability, particularly through seasonal adjustments to forage and concentrate quality. **Keywords:** Methane emission, Milk production, Dairy cows, Urban farming, Peri-urban farming, Seasons.

18. The impact of utilizing forage-based technologies in climate resilience among smallholder dairy farmers in Nakuru and Nyandarua counties

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Application of dairy technologies offer a promising strategy in building climate resilience, boosting productivity and improving household income among smallholder dairy farmers in Kenya. These forage-based technologies including animal genetics and utilization of novel climate smart forage feeding systems on-farm offer avenues for technological advancement in improving economic returns from dairy farming. However, uptake of these forage-based technologies aimed at improving dairy productivity still remains low thereby limiting optimal production potential within the dairy farmers. The study assessed impacts of applying forage-based dairy technologies on milk production and income amongst beneficiaries of Dairy Kenya Ireland project in Nakuru and Nyandarua Counties in Kenya. Primary data both in qualitative and quantitative form were collected through longitudinal evaluation survey involving observations, interviews and focus group discussions from smallholder dairy farmers applying the technologies. Data were analysed using Ms Excel and SPSS to generate multivariate analysis and casual relationship between adoption of promoted forage-based technologies and changes in milk production and income. Results indicated a gradual decrease in variances of milk production during peak (wet) and off (dry) seasons. Lead dairy farmers recorded the highest and positive impact during the dry season at 102% increase in milk production. This was mostly attributed to improved dairy resilience through adoption of improved forage species, fodder conservation and application of novel climate smart feeding practices. In conclusion, applying forage-based technologies and practices are inevitable in boosting feed resource base (quantity and quality) for improved herd productivity and income. The study recommends continuous sensitization and adoption of technologies for increased dairy productivity and economic returns amongst dairy farmers. Policy direction need to invest in easy access of forage- based dairy technologies for resilience building amongst smallholder dairy farmers. **Keywords:** Adoption, Dairy, Forage-based technologies, Milk, Smallholder.

19. Socio-economic drivers and constraints in climate-smart forage-based dairy systems:

Baseline evidence from smallholder farmers in Kenya

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As Kenya's dairy industry continues to grow in strategic importance for food systems transformation, sustainable intensification models are increasingly needed to address systemic constraints around feed, productivity, and climate resilience. The study assessed the socio-economic and production systems characteristics, capturing household-level data on demographics, land use, dairy herd structure, breeding objectives, forage production, input access, extension service utilization, and gender/youth participation. The study also sought to identify structural barriers and opportunities for inclusive and climate-resilient transformation of the dairy value chain. A mixed-methods approach involving household baseline surveys (n=347), focus group discussions, and key informant interviews was used in Nakuru and Nyandarua Counties, Kenya. Descriptive statistics were computed from the quantitative data while qualitative analysis assessed cross-tabulations, and logistic regression to explore adoption patterns and service access. Rotational and mixed grazing systems were common, as land fragmentation and feed scarcity persist as major constraints. Household herd sizes averaged five cows. Breed preferences were shaped by agro-ecological context: productivity traits such as milk yield are prioritized in highland zones, while resilience and low maintenance costs are valued more in semi-arid areas. Although forage production and conservation are practiced, adoption of climate-smart innovations remains low, particularly among women and youth, who face structural barriers to land, finance, and decision-making. Access to veterinary services, AI, and advisory systems is uneven, pointing to systemic service delivery gaps. The findings suggest that low adoption of forage-based technologies may stem from limited awareness, access, and technical support, highlighting the need for targeted extension, training, and input delivery mechanisms to accelerate uptake. The findings offer policy-relevant insights for the design of inclusive dairy development strategies, targeted extension models, and scalable innovation support systems. Further disaggregation, comparative analysis, and modelling of intervention scenarios to support evidence-based policy and programming is recommended. **Keywords:** Adoption, Mixed methods, Smallholder dairy, Logistic regression.

20. Dietary diversity of women in Kakamega and Bomet Counties, Kenya

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Micronutrient deficiencies are a critical concern for women in low-and middle-income countries, impacting their health and potentially hindering child development. Dietary diversity, a measure of food variety, reflects nutrient adequacy. This study, designed as a cluster-randomized controlled trial (RCT), aimed to improve dietary diversity by introducing new food items, such as chicken products, and providing nutrition education. The trial included three arms: chicken alone, chicken plus nutrition education, and control. Dietary diversity was assessed using the Minimum Dietary Diversity for Women (MDD-W) score, considering ten food groups. The mean dietary diversity score of women who participated in this study was low (4.27 ± 1.25), falling short of the recommended five out of ten food groups. Most women (64.50%) did not meet the minimum dietary diversity threshold, while only 35.00% achieved it, highlighting a significant disparity in dietary intake. The most consumed food groups were cereals (21.58%), dairy products (20.00%), and dark green leafy vegetables (16.74%), while nuts and seeds, meat, eggs, vitamin A-rich fruits and vegetables, and other fruits and vegetables were the least consumed. ANOVA analysis revealed significant differences in dietary diversity scores among intervention groups in Kakamega County, with the "Chicken plus Nutrition" group showing a notable improvement over the "Chicken Alone" and control groups (mean difference: 0.323, $p = 0.002$). In contrast, no significant improvement was observed for Bomet County. In Kakamega County, 62.00% of women fell short of the minimum dietary diversity requirement, primarily consuming cereals (22.00%), dairy products (18.96%), and dark green leafy vegetables (17.37%). Bomet County exhibited slightly lower dietary diversity, with 67.80% of women not meeting the minimum requirement. Dairy products were the most consumed food group (22.99%), followed by cereals (22.41%). Diets were dominated by cereals (maize), with limited protein sources (nuts, seeds, meat, and eggs) and vitamin A-rich fruits and vegetables, leading to potential micronutrient deficiencies. This study underscores the urgent need for interventions to improve dietary diversity. A multi-pronged approach is recommended, including nutrition education to promote balanced diets rich in protein sources, vitamin A-rich produce, and other essential food groups, alongside agricultural practices to enhance the production and consumption of diverse, nutrient-dense foods. The findings provide a framework for understanding how introducing new food items and integrating nutrition education can address dietary inadequacies and mitigate micronutrient deficiencies in similar settings. **Keywords:** Dietary diversity, Food group, Micronutrients, Nutrient, Variety, Women.

21. Factors influencing the willingness of dairy farmers to adopt climate resilient nutrient-rich forages in Kenya

Kenya's dairy sector plays a vital role in the national economy, contributing 14% to agricultural GDP and supporting over one million smallholder farmers. With annual per capita milk consumption projected to double by 2050, demand for dairy products continues to rise. However, feed scarcity worsened by climate variability, remains a major production constraint. Climate-Resilient Nutrient-Rich Forages (CRNRF) offer a sustainable alternative to conventional feeds, yet adoption remains low. This study examined the drivers influencing dairy farmers' willingness to adopt CRNRF using a cross-sectional survey of 410 randomly sampled farmers across Nakuru, Kericho, and Uasin Gishu Counties. Data were collected using structured questionnaires, pretested for reliability (Cronbach's $\alpha > 0.5$) and validity. Descriptive results revealed only 27.4% adoption, with 94.7% reliant on on-farm feed. Adoption was highest for forage maize (64%), followed by lucerne (21.6%), sorghum (10.1%), and pearl millet (4.3%). Major barriers included high input costs (49.4%), limited seed availability (23.9%), and drought sensitivity concerns (17%). Principal Component Analysis (PCA) identified six underlying dimensions explaining 54.81% of the variance in adoption willingness. Perceived usefulness and self-efficacy emerged as the significant driver (19.03% variance), anchored by robust farmer beliefs that CRNRF significantly improve milk yields (loading = 0.774) and offer superior nutritive value (0.731). The second component, operational practicality (11.81%), reflected ease-of-use perceptions regarding feeding and ration formulation. Further significant dimensions included financial accessibility (9.22%), time and learning investment (5.61%), gender and cultural norms (4.87%), and environmental scepticism (4.29%). The study recommends targeted interventions including gender-responsive training, flexible seed packaging, and improved input access to enhance adoption and support the growing demand for dairy products in Kenya. **Keywords:** Beliefs, Climate variability, Conventional feeds, Perceptions, Uasin Gishu County.

22. Protein and fat percentage vary between dairy cattle of different breeds exposed to thermal stress

CB Wasike, F Chelangat

Dairy cattle is an important economic and livelihood activity in Kenya. The dairy system comprises of predominantly exotic dairy cattle breeds, namely Holstein Friesian, Jersey, Ayrshire, and Guernsey, and their crossbred genotypes. These cattle are mainly raised under extensive and semi-intensive systems which expose them to environmental vagaries. With evidence of climate change abound, these dairy cattle are affected. Effect of heat stress on milk yield has been studied. However, effects of thermal stress on milk components of the Kenyan dairy cattle population are not known. This study evaluated the effect of breed and thermal stress on milk protein and milk fat in the four main dairy breeds in Kenya. Data on milk composition for the first three lactations was obtained from the National Dairy performance database at the Livestock Recording Centre, Naivasha. A total of 719, 305d-fat and protein percentage records were considered. Thermal stress was modelled as temperature-humidity index (THI) and classified as thermo-comfort (THI 1- <72), mild thermos-stress (THI 2- 73-79), and severe thermos-stress (THI 3- >79). A model fitting breed, lactation number and THI as fixed effects and contemporary groups of herd-year-Season of birth (HYSoB) and calving (HYSoC) as contemporary groups was fitted to the data, and Analysis of Variance was performed to determine the effects of the fixed effects and contemporary groups on 305-d protein and fat percentage. Mean 305-d fat and protein percentage was 4.25% and 3.29%, respectively. Breed of the animals, THI, HYSoC, and HYSoB had a significant effect on 305-d fat % ($p < 0.05$). All factors and contemporary groups had a significant effect on 305-d protein percentage. 305-d fat percentage was highest in Jersey (5.11 ± 0.69) and lowest in Holstein-Friesian (3.95 ± 0.77). Cattle under severe thermo-stress had the highest fat composition (4.82 ± 0.58). 305-d protein percentage of Jersey was highest (3.46 ± 0.24) and differed significantly from the other breeds, while protein percentage for cattle under severe thermo-stress was the highest (3.94 ± 0.46) and differed from the other categories. Cattle in their second lactation had the highest protein percentage (3.34 ± 0.49), which was significantly different from first and third lactations. **Keywords:** Temperature humidity index, Thermo-stress, Milk composition, Dairy cattle breeds.

23. The economic impact of methane production on dairy farming in Tanzania

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Dairy farming is significant part of Tanzania economy. However, improving productivity per cow while reducing its impact on the environment is inevitable. Dairy cows emit methane that contribute to greenhouse gas emissions; therefore efforts have been made to minimize or eliminate its impact while increasing cows' productivity. This paper captured methane emitted from cows directly from nostril using laser methane detector (LMD). The amount of methane emitted is analysed using longitudinal/panel data to do multilevel mixed effect model for mixed effect linear regression to determine amount of milk produced versus the economic impact on dairy farming in Tanzania. Initial results show that daily methane emissions are reduced (18-24g per kilogramme) and at the same time milk yield is increased (8-10 litres) when a cow is fed nutritious feed. However, Hai shows to have efficiency in productivity as there is an increase in milk yield with control of methane emitted. The analysis indicates that milk increases by 0.542 as the time increase given methane is controlled well by quality feed. Hence quality food has benefit not only to the farmers' economy but to the environmental impact. This paper recommends farmers to improve quality of the feed to realize economic benefits. **Keywords:** Greenhouse gases, Laser methane detector, Milk, Panel data, Quality feed.

24. Maziwa Faida Dairy Project leaves no one behind

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Gender mainstreaming remains the cornerstone for driving meaningful advancements in gender equality and inclusion. States have worked on mainstreaming gender in research and development projects for poverty reduction, climate resilience, and improved food and nutrition security. Reports indicate that the community-level dairy projects in Tanzania have predominantly focused on enhancing milk quantity and quality to facilitate its commercialization within the formal markets. However, little is known about how men and women engaged in dairy value chain are involved in the implementation of dairy and pasture farming in Tanga region. Hence, Maziwa Faida Project (MFP) is a gender transformative dairy initiative that integrates inclusive research and multi-stakeholder collaboration, centred on empowering farmers in Muheza district while ensuring no one is left behind in the development process. A social study was conducted to assess social extension and gender inclusion practices carried out by the project regarding “gender reached” “access to resources and benefits” and control over decision making. Thus, data were collected from 142

respondents from the upper and lower lands in Muheza district between August and September 2024. Quantitative data were analysed using descriptive statistics and content analysis was used for qualitative data. Information regarding gender knowledge and skills among 28 project staff and partners was also summarised to understand the existing knowledge gaps. It was revealed that MFP employed capacity-strengthening strategies to increase knowledge and skills among various gender classes through training and demonstrations of pasture farming at satellite plots. The project provided gender training to all participating staff to deliver farmer-friendly innovative solutions that are gender-responsive. Moreover, female and male researchers have been supported in pursuing their higher studies as part of the project's empowerment achievements. It was concluded that MFP's integrated gender transformative approach has contributed to equitable gender participation, resource access, and empowerment in the dairy sector. **Keywords:** Gender inclusion, Knowledge, Reached, Access to resources and benefits.

ADDENDUM ABSTRACTS

SUB-THEME 2: DIGITALIZATION AND TECHNOLOGICAL NEEDS FOR COMMERCIALIZATION OF LIVESTOCK AND FISH VALUE CHAINS

25. Complementary phenotypic and SNP-Based characterization of indigenous goat populations in Tanzania: Implications for breeding and conservation

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Indigenous goats in Tanzania, primarily belonging to the Small East African (SEA) breed, are central to rural livelihoods due to their adaptability to diverse agro-ecological zones. However, their productivity remains low and their genetic potential underutilized. This study integrated phenotypic characterization with high-density SNP genotyping to provide a comprehensive understanding of their diversity, structure, and conservation value. Phenotypic assessment of 12 populations revealed considerable variation in body size, reproductive performance, and adaptive features. Ujiji, Newala, and Lindi goats were distinguished by their reproductive performance, notably higher twinning ability, whereas goats in other regions showed more intermediate phenotypes. Genomic analyses, based on the Axiom Caprine Genotyping v2 array, indicated moderate overall inbreeding ($F = 0.056 \pm 0.071$) with marked population variation. Higher inbreeding was observed in Newala, Ujiji, and Songwe goats, while pastoralist-managed Maasai goats exhibited the lowest levels, reflecting genetic diversity maintained through herd mobility and gene flow. Principal component analysis (PCA) and ADMIXTURE clustered the populations into four groups, consistent with both the phenotypic distinctiveness and geographic isolation of Ujiji, Newala, and Lindi goats. The integration of phenotypic and genomic data provides complementary insights, showing that while Tanzanian goats are generally admixed, some populations remain genetically and phenotypically distinct due to ecological and management factors. These findings highlight the importance of balancing conservation of unique but vulnerable populations with within-population selection and genetic exchange in more admixed groups. This study demonstrates that combining phenotypic and genomic approaches is a practical strategy to inform breeding and conservation interventions. Such evidence is particularly relevant for developing sustainable programs that safeguard adaptive traits while improving productivity in indigenous goat populations under smallholder systems. **Keywords:**

Indigenous goats, Small East African goats, Phenotypic diversity, SNP genotyping, Inbreeding, Population structure.

26. Building agripreneurship through incubation and digital innovation: lessons from smallholder dairy in Tanzania

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Smallholder dairy farmers remain central to Tanzania's livestock sector, yet continue facing low productivity, limited services, and weak business orientation. The Sustainable Animal Productivity for Livelihoods, Nutrition, and Gender Inclusion (SAPLING) initiative piloted an incubation model that combined technical training, business mentorship, and digital innovation. Across six districts in Kilimanjaro and Tanga, 94 youth and women agripreneurs were incubated through the Kuza Leadership Academy, one-on-one coaching, and peer-to-peer learning. More than half (52%) were women and two-thirds (68%) were youth under 30. By September 2025, agripreneurs had registered nearly 15,000 farmers on the Kuza-One platform and captured transactions worth TZS 317.5 million in inputs and services. Using digital kits: tablets, projectors, and Rukas they delivered 91 trainings to over 1,100 farmers, improving calf care, housing, feeding, and vaccination. Herd health interventions showed 82% vaccination uptake and 77% implementation of participatory herd health goals leading to cleaner calf pens, stronger biosecurity, and improved calf survival. Nonetheless, challenges remain. While youth increasingly access loans, training and new income opportunities, sustained coaching is essential. Financing remains a constraint, requiring de-risking and attention to gender barriers. Digital tools have improved service delivery, yet stronger public-private partnerships are needed for farmer mobilization and scaling. Strategic engagement from the Ministry of Livestock and Fisheries, local governments, and donors is also key. This paper explores whether empowered agripreneurs using digital tools enhance smallholder uptake of integrated technologies. Preliminary results indicate positive impacts on enterprise growth, youth and women empowerment, and farmer participation, with further analysis underway to assess long-term outcomes and policy implications. **Keywords:** Agripreneurship, Incubation models, Dairy value chain, Herd health, Digital platforms, Youth and women empowerment, Tanzania.

BIOGRAPHIES OF CHAIRS OF SCIENTIFIC SESSIONS



Dr. Ruth Waineina, a results-driven research scientist with over 25 years of research and consulting expertise. She holds a Doctor of Animal Science degree from Egerton University in Kenya majoring in Animal Breeding and Genomics, and MSc. in Animal Sciences from Wageningen University, The Netherlands, specializing in two areas: Animal Breeding and Genetics and Livestock Production Systems. She holds a BSc. degree in Animal Production from Egerton University, Kenya. Her research interests include the goal of functional genomics and productivity in tropical livestock systems. Dr Waineina is a Chief Research Scientist at Kenya Agricultural and Livestock Research Organization (KALRO) – Dairy Research Institute (DRI), Naivasha, Kenya. She is the head of Small Ruminant Research Programme (SRRP) and National Sahiwal Stud (NSS) in DRI. She has worked with a wide range of stakeholders along the agricultural product value chain, from farm to market to consumers. Her involvement in R&D has resulted in increased animal's productivity among livestock keeping communities in numerous counties. Dr. Waineina has consulted for various organizations among them International Fund for Agricultural Development (IFAD). She has presented in various scientific fora among them the World Congress on Genetics Applied to Livestock Production, International Goat Association conference, and Tanzania Society of Animal Production. She has (co)authored over 20 publications in scientific peer reviewed journals and conference proceedings. Dr Ruth is a member of Animal Production Society of Kenya.



Dr Chrilukovian Wasike, is a results-oriented research scientist and academician with over 20 years of experience in teaching, research, consultancy, and community outreach. He holds a Doctor of Agricultural Science (Dr. rer. Agr.) Degree from Humboldt-Universität zu Berlin in Germany, with a bias in Animal Genetics and Breeding. He is a Norman Borlaug research fellow, having taken a research stay fellowship at Langston University. His research interests include the genetics of functional efficiency and productivity in tropical livestock. Currently, he is evaluating the genetics of (re)productive and functional efficiency in indigenous chicken, cattle, and dairy goat populations in Kenya and is also the country lead scientist for NORPART project that aims to build capacity for advancement of climate-smart agricultural practices in East and Southern Africa. Dr Wasike is a Senior Lecturer and Dean of the School of Agriculture, Food Security and Environmental Sciences, Maseno University. He is also part of the national panel of experts (NPOE) for the National Value

Chain Development Project (NAVCDP). Dr. Wasike is a trained curriculum developer with competencies in the development of e-learning content and competency/problem-based learning. He has consulted for various organizations, among them the International Livestock Research Institute (ILRI), FARA, GIZ, and the State Department of Livestock Development (SDLD – LRC). He is an external examiner and journal reviewer, and has participated in the development and publication of two sourcebooks for management of Sahiwal cattle and dairy goats, and the National agricultural extension manual. He has presented papers in various scientific fora and (co) – authored over 45 publications in scientific peer-reviewed journals. Dr Wasike is a member of Prolinnova network, American Society of Animal Science (ASAS) and is a DAAD and Norman Borlaug fellow.



Prof Fred Kabi, is one of the leading animal nutritionists at the Department of Animal and Range Sciences, at Makerere University, Uganda. Through public private partnerships (PPP) and collaborations with the United Nations (UN) World Food Program (WFP), International Livestock Research Institute, Michigan State University, Ghent University, Swedish University of Agricultural Sciences (SLU), Ento Organic Uganda Ltd. Fred has been majorly focusing on research, innovation and entrepreneurship with the youth geared towards elimination of extreme poverty and hunger (SDG1 and SDG2) as well as addressing Industrial innovation, climate action, responsible consumption while creating cleaner cities. Currently Fred, through PhD and masters' students, is working on harnessing circular and carbon-sequestering local feed resources to close the nutrition gap of cross-bred dairy cattle in Uganda supported by metabolic biomarkers in blood spot samples. This research is aimed at developing specialized gluconeogenic diets for intensive and semi-intensive dairy cattle to close the nutrient gap during the transition period in order to reduce ketogenesis. Fred has worked on strategies to use atomic nuclear science for food production rather than for war. Specifically, targeting cuticular n alkanes and their enrichment with stable carbon 13 isotopes. This is also targeted to support estimation of required supplementation of cattle grazing heterogeneous pastures in order to accurately close the nutrient gap of grazing cattle. Fred is currently working with trans-disciplinary teams of youth on disentangling secrets of biology, engineering and ICT for linking local organic agricultural business to the global market place worth over 140 billion USD annually. An all-inclusive KeBERA Organic Farming Certification Model hinged on participatory guarantee system (PGS) has been innovated using a human centered design approach. Here, emphasis has been put on the geolocation and geo-mapping of organic farmers for product traceability, e-commerce as well using dry chemistry through a digital ware (Digware) to test authenticity of

organic food for safety or contamination with inorganic contaminants as a complement to the more expensive third-Party certification. This innovation is ready for launching and patenting.

Dr Renalda Munubi, is a senior lecturer at Sokoine University of Agriculture (SUA), where she conducts research and extension activities related to aquaculture. Her PhD study was on Lake



Tanganyika's cichlid fish and she assessed the relationship between climatic changes, algal quality and herbivorous cichlid fish growth, behavior and wellbeing. She is passionate in research and teaching on fish ecology and the changing ecosystem. At the moment, she is instructing students on different aquaculture production techniques both in marine and freshwater. Furthermore, Dr Munubi has professional experience in consultancies, and provision of extension services in the field of agriculture, aquaculture, climate change and beekeeping for poverty alleviation. Her background working on both local and international projects has given her skills in fish pond construction, feed formulation, water quality management, and value addition in order to boost fish productivity and income which in turn enhances food security.

Dr Augustine Mwandya, is currently a Vice-chairperson of TSAP and Senior Lecturer at SUA. Dr Mwandya has over 15 years' experience in teaching both undergraduate and postgraduate students, research and outreach activities mostly on aspects related to Fisheries and Aquaculture. He has a PhD in Fisheries Biology, MSc in integrated Mariculture systems, and BSc in Chemistry and Marine Biology. He has supervised a number of undergraduate and postgraduate students pursuing BSc. And MSc. Degree in Aquaculture and Fisheries. Has undertaken several research projects, outreach and consultancy activities either as Principal Investigator or as team member.

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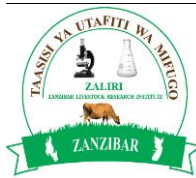
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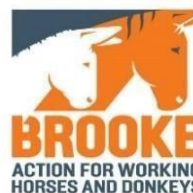


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