

International Livestock Research Institute

Incorporating equity in agricultural research

Findings from veterinary student projects and updates on the collaboration between the International Livestock Research Institute and the Lilongwe University of Agriculture and Natural Resources

August 2021



ILRI thanks all donors and organizations which globally support its work through their contributions to the [CGIAR Trust Fund](#)



This publication is copyrighted by the International Livestock Research Institute (ILRI). It is licensed for use under the Creative Commons Attribution 4.0 International Licence. To view this licence, visit <https://creativecommons.org/licenses/by/4.0>. Unless otherwise noted, you are free to share (copy and redistribute the material in any medium or format), adapt (remix, transform, and build upon the material) for any purpose, even commercially, under the following condition:



ATTRIBUTION. The work must be attributed, but not in any way that suggests endorsement by ILRI or the author(s).

NOTICE:

For any reuse or distribution, the licence terms of this work must be made clear to others.

Any of the above conditions can be waived if permission is obtained from the copyright holder.

Nothing in this licence impairs or restricts the author's moral rights.

Fair dealing and other rights are in no way affected by the above.

The parts used must not misrepresent the meaning of the publication.

ILRI would appreciate being sent a copy of any materials in which text, photos etc. have been used.

Authors: Florence Mutua¹, Melaku Tefera², Kristina Roesel¹, Abel Chipembo², Thomson Banda², Shareef Ngunguni², Pemphero Kachule², John Gladstone², Nchimunya Ng'ona², Laston Chimaliro², Catherine Wood² and Delia Grace^{1,3}

¹International Livestock Research Institute

²Lilongwe University of Agriculture and Natural Resources

³Natural Resources Institute, University of Greenwich

Editing and formatting: Tezira Lore

Citation

Mutua, F., Tefera, M., Roesel, K., Chipembo, A., Banda, T., Ngunguni, S., Kachule, P., Gladstone, J., Ng'ona, N., Chimaliro, L., Wood, C. and Grace, D. 2021. *Incorporating equity in agricultural research: Findings from veterinary student projects and updates on the collaboration between the International Livestock Research Institute and the Lilongwe University of Agriculture and Natural Resources*. Nairobi, Kenya: ILRI.

Patron: Professor Peter C Doherty AC, FAA, FRS

Animal scientist, Nobel Prize Laureate for Physiology or Medicine—1996

Box 30709, Nairobi 00100 Kenya

Phone +254 20 422 3000

Fax +254 20 422 3001

Email ilri-kenya@cgiar.org

ilri.org

better lives through livestock

ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia

Phone +251 11 617 2000

Fax +251 11 667 6923

Email ilri-ethiopia@cgiar.org

ILRI has offices in East Africa • South Asia • Southeast and East Asia • Southern Africa • West Africa

Contents

Summary	iii
Introduction.....	1
Context	2
Key findings.....	3
Virtual meeting between ILRI and LUANAR	5
Projects requiring support in 2021–22	7
Conclusion.....	7
References	8

Summary

Agriculture has the potential to improve the economy in Malawi. Incorporating equity in the design of agricultural research projects can provide insights on which groups in the society are most affected in terms of age, gender and location. The research findings can be used to help policymakers allocate resources and prioritize interventions more effectively.

The International Livestock Research Institute supported seven Bachelor of Veterinary Medicine students from the Lilongwe University of Agriculture and Natural Resources (LUANAR) to undertake research that considered equity, as part of their final-year thesis work.

Data were collected using participatory methods. A few inequities and gender biases were reported. For example, women guarded crops from baboon invasions and there were instances where they were injured by the animals. Fishing was mostly done by men while women managed the post-fishing activities. Men were very active in the dairy value chain, given their role in managing large animals, whereas women mainly kept poultry. Access to animal health services was better in urban areas than in rural areas. Communities around the Kuti Wildlife Reserve were not fully involved in wildlife management.

There is a need to consider equity and gender in agricultural research. Building capacity among the student population is one way of ensuring its continuity in the future. The veterinary department at LUANAR is young and still needs support to establish itself. Opportunities for further collaboration need to be explored further.

Introduction

Malawi is a landlocked country. It has a population of 17,563,749 people and a population density of 186 persons per square kilometre (NSO 2019). Despite economic and structural reforms, the country is still one of the poorest in Africa (Kemp et al. 2003; World Bank 2019). The agriculture sector is the main source of income, contributing over 30% of the overall Gross Domestic Product (IMF 2017; Mussa 2017).

Access to products, especially necessities, should be based on level of need (Jones 2009). Various forms of inequities persist in Malawi and although the country's Vision 2020 highlights the need to address them, this has not been acted on (Mussa 2017). Poverty rates are higher in rural areas than in urban areas and a comparison of the richest and poorest 10% of the population reveals a wide disparity in incomes (World Bank 2007; Mussa 2017). Zere et al. (2007) found publicly provided services to have benefited the rich population more than the poor one. There are also challenges in the provision of basic public health services (Kemp et al. 2003). Illiteracy is high among rural women and gender balance is a problem at higher levels of education (FAO 2011). About 60% of primary school pupils entering Class 1 reach Class 5 and about 39% reach Class 8 (World Bank 2007). While men have opportunities to diversify their economic activities (FAO 2011), women are disadvantaged where income from agriculture is limited.

Inequity can constrain the delivery of essential services, negatively impacting the health and economic wellbeing of communities. Considering equity in agricultural research would ensure that the challenges faced by individuals are well highlighted (for example, exposure to health risks) and, irrespective of their economic and social position, they can benefit from available opportunities (for example, access to agricultural inputs). Equity, when considered, can also influence decision-making processes, inform allocation of scarce resources and contribute to economic growth.

One way of promoting equity and gender in society is to raise awareness among student populations. In this report, we provide a summary of findings from research projects implemented by undergraduate veterinary students enrolled at the Lilongwe University of Agriculture and Natural Resources (LUANAR) and co-funded by the International Livestock Research Institute (ILRI) in 2019–20. Also included is a summary of discussions at a virtual meeting of the students, their university supervisors and ILRI scientists. An update of the collaboration between ILRI and LUANAR is given, including the potential to support a third cohort of students through the ILRI-hosted [One Health Centre in Africa](#).

Context

The Faculty of Veterinary Medicine at LUANAR started offering undergraduate degrees in Veterinary Medicine in 2014 and the first cohort graduated in 2019. Prior to 2014, there was no training of veterinarians in Malawi and those who wished to study veterinary medicine had to enrol in universities in other countries. The faculty is still young and there have been opportunities to collaborate which ILRI has continued to explore. The support so far has been on co-funding of final-year veterinary students' projects.

In 2018, ILRI organized a series of student seminars on food safety in informal markets, participatory epidemiology and epidemiology of *Taenia solium*. A training course on equity was also given, with gender as one of the topics, and students learned how to effectively integrate gender in veterinary work (Waithanji and Roesel 2018).

LUANAR requires that all final-year veterinary students design research projects, collect and analyse data and write thesis reports in order to graduate. Through an agreement between ILRI and LUANAR, the CGIAR Research Program on Agriculture for Nutrition and Health funded five students to include equity in their research projects. Listed below are the five projects that ILRI co-supervised in 2018–19.

1. Comparative efficacy of Newcastle disease vaccines derived from chicken, duck and quail eggs
2. Preliminary investigation of *Taenia solium* cysticercosis in pigs in Malawi
3. *Strongyloides* infestation in wild vervet monkeys at Kuti Wildlife Reserve and opportunities for zoonotic transmission
4. Safety and economics of milk along the value chain in central Malawi
5. Sperm preservation method, egg quality and environmental factors affecting brood development in *Clarias gariepinus*

An additional student got an opportunity to undertake part of his research at ILRI Nairobi and due to his good performance, was subsequently awarded a stipend to pursue his MSc research as an ILRI graduate fellow. In July 2019, an ILRI scientist was invited to participate as an external examiner in the thesis defence, at the university.

The second cohort of final-year students started their field research in October 2019. The department provided a list of topics the students wished to research on and ILRI selected seven for co-funding. Listed below are the seven projects that ILRI co-supervised in 2019–20.

1. Human–baboon co-existence and parasite co-transmission
2. Effect of glycaemic index on longevity: A Malawian diet
3. Food safety and antimicrobial resistance in poultry in Malawi
4. Aflatoxin levels in milk in Malawi and aflatoxin inactivation
5. Meat-eating habits and microbial quality in Malawi
6. Antimicrobial resistance of *Aeromonas hydrophila* in Zambia's Kafue River
7. The use of unmanned aerial vehicles in monitoring wildlife and their habitat

ILRI scientists reviewed the proposals and provided feedback through the university department. Training on gender and equity was provided by the department, using materials from the training by Waithanji and Roesel (2018) and additional ones that ILRI scientists shared through email, including a guide for the focus group discussions and a checklist that could be used in data collection. The students collected and analysed their data, wrote their theses and defended them virtually. Two ILRI scientists attended the thesis defence sessions that were held during the week of 15–18 February 2021.

Key findings

Most of the supported studies were on food safety and antimicrobial resistance. Unsafe foods are not only a risk to public health but can also significantly impact on trade and development. The health burden associated with foodborne disease is comparable to that of HIV/AIDS, malaria and tuberculosis (Havelaar et al. 2015). The economic impacts are also huge (Jaffee et al. 2019) and this is particularly a concern in sub-Saharan Africa where investments to improve food safety in domestic markets are low¹. Antimicrobial resistance is a global threat to public health. Misuse of antimicrobials has been reported in Malawi (Munthali 2019) and although data are limited², antimicrobial resistance is a concern for the country (Makoka et al. 2012). The key findings on gender and equity from seven studies are summarized below. Data were mainly collected through surveys and focus group discussions.

Study 1

The study was done at Kuti Wildlife Reserve in central Malawi. Crop raiding by baboons is a problem in the community. Women are culturally expected to perform most of the work at home including guarding of crops from invasion by baboons. It was reported that baboons are not afraid of women. Cases of women being bitten by the animals were also reported. Men were more often employed by the reserve than women. The risk of parasite transmission to humans was perceived to be higher in pregnant women, because of their behaviour of eating soil, as well as in babies. Decisions were reported to be mostly made by men, both in the communities and in the reserve. Although all villages had wildlife clubs with an equal number of men and women, it was the men who made decisions and this may have limited the participation of women in conservation work. Communities experienced several challenges which, together with their proximity to the forest, contributed to habitat destruction. In West Africa, the frequency of baboon raids and economic losses of crops are highlighted by Warren (2008); the duration of the animals in the field depends on the crop being raided and the action of the farmers. Hill (2000) reports on the challenges that maize and cassava farmers in Uganda face because of baboon raids, especially farmers living near forest reserves.

Study 2

This was a cross-sectional study carried out among the Mitundu community in rural Lilongwe. Men were found to dominate livestock production. Large-scale farmers sold through the Agricultural Development and Marketing Corporation while other farmers were denied the opportunity. Equity was observed in crop production as both men and women participated in production of subsistence and cash crops. The vulnerable population was found to benefit from food aid and fertilizer subsidy, hence equity was applied in the implementation of government policies.

Study 3

This study was conducted in randomly selected extension planning areas of Lilongwe East, namely, Mkwinda, Chitsime, Mpenu and Chitekwere. Fifty-one poultry farmers were interviewed face-to-face or on telephone in Chichewa or English by structured questionnaire. Most of the farmers were male. A few inequities in terms of sharing of meat portions within households were reported, with most indicating that men received larger portions (this was a concern particularly in areas where meat is consumed irregularly). Knowledge of antimicrobial resistance was limited among women and this potentially increases their risk of exposure compared to men. Drug administration was mainly done by men. Gender differences were also reported in the marketing of poultry with men being more involved than women.

Study 4

This study was done in three districts in central Malawi. A large percentage (78%) of the study population was not aware of the presence of aflatoxin M1 in fresh milk. Laboratory analysis of milk samples revealed

¹ https://www.gfsp.org/sites/gfsp/files/public/GFSP%20Report_Food%20Safety%20in%20Africa-web.pdf

² <https://wellcomeopenresearch.s3.amazonaws.com/supplementary/12523/5cc2ca53-6843-4d7a-ade4-92a40d484b4d.pdf>

that all were positive for aflatoxin M1. Unlike women, men were reported to be very active in the dairy value chain, especially because of the perception that men are mostly in charge of managing large animals whereas women mostly keep poultry. Women reportedly participated in organization committees at milk bulking groups, driven by the involvement of non-governmental organizations such as Heifer International that promote gender equality.

Study 5

Eight districts were randomly selected for this study. Data were collected from livestock farmers. Animal feeding and breeding were mostly done by men. Access to feeds and animal health services was better in urban areas than in rural areas.

Study 6

This study involved four fishing camps on Kafue River in Kafue District, Zambia. Thirty-seven fish value chain players participated. Fishing was mainly done by men (43.2%) while post-fishing activities were done by women (51.4%). A higher proportion of men were educated at tertiary (5.4%) and secondary (21.6%) levels compared to their female counterparts (0% and 13.5%, respectively).

Study 7

This study involved communities around Kuti Wildlife Reserve and Liwonde National Park. Six focus group discussions were conducted to understand the involvement of men and women in decision-making on wildlife management. None of the men and women in Kuti Wildlife Reserve management took part in decision-making, although they knew the importance of protecting the habitats. Both men and women were vulnerable to wildlife conflict because when animals (bush pigs, baboons and vervet monkeys) destroy their maize fields, the whole family suffers. Women around the Liwonde National park were found not to be active in wildlife conservation. There is a need to promote education among these communities so that they can actively participate in wildlife decision-making.

Virtual meeting between ILRI and LUANAR

Some follow-up activities, including a training course on research methods and writing scientific papers, had been planned for 2020, but these could not be conducted due to travel restrictions and closure of the university occasioned by the COVID-19 pandemic. ILRI scientists continued to assist the students develop manuscripts from their research work. A virtual meeting of the ILRI researchers and the seven final-year students was held on 5 March 2021. The students presented their research work and received inputs from the participants (listed below).

Participants from ILRI

Arshnee Moodley, Delia Grace, Florence Mutua, Johanna Lindahl, Kristina Roesel and Theo Knight-Jones


Participants from LUANAR

Abel Chipembo, Catherine Wood, John Gladstone, Laston Chimaliro, Melaku Tefera, Nchimunya Ng'ona, Pemphero Kachule, Shareef Ngunguni and Thomson Banda

Agenda

1. Presentations on Bachelor of Veterinary Medicine projects co-funded by ILRI
2. Discussion on potential publications and the support that students might require to draft manuscripts from their work
3. Continuation of the collaboration between ILRI and LUANAR

Presentation by Melaku Tefera, Florence Mutua, Catherine Wood and Kristina Roesel



**Malawi BVM students
LUANAR-ILRI**


Melaku Tefera, Head of Department of Veterinary Biomedical Sciences LUANAR
Florence Mutua, ILRI-AHH
Catherine Wood, lecturer LUANAR and University of Edinburgh
Kristina Roesel, ILRI-AHH

Virtual seminar
Friday 5 March 2021

ILRI
International Livestock Research Institute
CGIAR

Background of the collaboration

- 2014: first cohort of BVMs started training in Malawi
- 2018: ILRI involvement
- some small seminars funded by CRP A4NH
 - Participatory epidemiology (Florence/Kristina)
 - Gender & Equity (Liz/Kristina)
 - Parasitology: *Taenia solium* (Florence)
- Hard copies of VER
- 5000 USD support for 5 final year student projects in 2018/2019
- Amos Mhone – internship at ILRI tick unit; now MSc student working in AHH



Amos Lucky Mhone – 1st Graduate Fellow at International Livestock Research Institute
Nairobi – 334 connections – Contact info

ILRI
International Livestock Research Institute
CGIAR

Students in second cohort – graduation 2021

Student name	Thesis topic
Abel Chipembo	Human Baboons co-existence and parasite co-transmission
Thomson Banda	Effect of glycemic index on longevity: A Malawian diet
Shareef Ngunguni	Food safety and antimicrobial resistance in poultry in Malawi
Pemthero Kachule	Aflatoxin levels in milk in Malawi and aflatoxin inactivation
John Gladstone	Meat eating habits and microbial quality in Malawi
Nchimunya Ng'oma	Antimicrobial resistance of <i>Aeromonas hydrophila</i> in Zambia's Kafue River
Laxton Chimaliro	The use of unmanned Aerial Vehicle in monitoring Wildlife and their habitat

Questions to presenters:

- What are you planning to do after graduation?
- Which ILRI scientist supported your work?
- Are you planning to prepare a journal publication and if so, do you need support from the ILRI scientist who supported you previously?



ZIKOMO KWAMBIRI

Projects requiring support in 2021–22

The department provided a list of 12 projects for the 2021–22 academic year (indicated below). ILRI has reviewed these and identified 8 to support, under the One Health Centre for Africa. ILRI researchers, including PhD fellows, will be involved in supervising the students.

1. Seroprevalence of brucellosis in cattle and goats in government of farms and selected smallholder farms around them in central region of Malawi
2. Comparative assessment of antimicrobial resistance in *Escherichia coli* obtained from human and domestic animals
3. Hepatic coccidiosis: Prevalence, predisposing factors and therapeutic effectiveness of triple sulfa versus Amprolium
4. Assessing the impact of poor-quality antibiotics sold in veterinary drug stores in Malawi
5. *In vitro* and *in vivo* methane gas production in goats fed roughages versus concentrates and impact of methane gas emission on climate change
6. Comparative health and ecology of elephants in Vwaza Marsh Wildlife Reserve and Liwonde National Park
7. Prevalence and pathological study of schistosomiasis in cattle in Mangochi, Malawi
8. Assessment of prevalence of antimicrobial resistant–*Escherichia coli* in wild carnivores and wild herbivores at Liwonde National Park
9. Efficacy of *Azadirachta indica* and *Ficus carica* on wound treatment and other possible traditional wound remedies in Malawi
10. Surveillance of *Salmonella typhimurium* and other factors affecting hatchability in poultry farms in southern Malawi
11. Molecular identification of *Theileria parva* strains and growth of *Theileria* in splenectomized mice in the Northern Province of Zambia
12. Age- and breed-based gastrointestinal helminths of free-range chickens and anti-helminthic effect of *Solanum elaeagnifolium*

Conclusion

The Faculty of Veterinary Medicine at LUANAR is still the youngest veterinary school in Africa; only two classes have so far graduated. ILRI started a collaboration with the university in 2018 which, through funding from the CGIAR Research Program on Agriculture for Nutrition and Health, has continued to support student research. Twelve student projects have so far been supported. ILRI and partners are exploring opportunities for continued collaboration to build capacity in animal health and One Health in Malawi. Using participatory approaches, research by previous students identified a number of equity and gender gaps which can be used as a basis for further research.

References

- FAO (Food and Agriculture Organization of the United Nations). 2011. *Gender inequalities in rural employment in Malawi: An overview*. Rome, Italy: FAO.
<http://www.fao.org/3/ap092e/ap092e00.pdf>
- Havelaar, A.H., Kirk, M.D., Torgerson, P.R., Gibb, H.J., Hald, T., Lake, R.J., Praet, N., Bellinger, D.C., Silva, N.R. de, Gargouri, N., Speybroeck, N., Cawthorne, A., Mathers, C., Stein, C., Angulo, F.J. and Devleesschauwer, B. on behalf of World Health Organization Foodborne Disease Burden Epidemiology Reference Group. 2015. World Health Organization global estimates and regional comparisons of the burden of foodborne disease in 2010. *PLOS Medicine* 12(12): e1001923.
<https://doi.org/10.1371/journal.pmed.1001923>
- Hill, C.M. 2000. Conflict of interest between people and baboons: Crop raiding in Uganda. *International Journal of Primatology* 21: 299–315. <https://doi.org/10.1023/A:1005481605637>
- IMF (International Monetary Fund). 2017. *Economic development document for the Republic of Malawi: Assessment letter for the IMF*. IMF Country Report No. 17/184. Washington, D.C.: IMF. <https://www.imf.org/en/Publications/CR/Issues/2017/07/05/Malawi-Economic-Development-Documents-45037>
- Jaffee, S., Henson, S., Unnevehr, L., Grace, D. and Cassou, E. 2019. *The safe food imperative: Accelerating progress in low- and middle-income countries*. Agriculture and Food Series. Washington, D.C.: World Bank. <https://openknowledge.worldbank.org/handle/10986/30568>
- Jones, H. 2009. *Equity in development: Why it is important and how to achieve it*. ODI Working Paper 311. London, UK: ODI. <https://cdn.odi.org/media/documents/4577.pdf>
- Kemp, J., Aitken, J.M., LeGrand, S. and Mwale, B. 2003. *Equity in health sector responses to HIV/AIDS in Malawi*. EQUINET Discussion Paper No. 5.
<https://www.equinet africa.org/sites/default/files/uploads/documents/aidsmalawi.pdf>
- Makoka, M.H., Miller, W.C., Hoffman, I.F., Cholera, R., Gilligan, P.H., Kamwendo, D., Malunga, G., Joaki, G., Martinson, F. and Hosseinipour, M.C. 2012. Bacterial infections in Lilongwe, Malawi: Aetiology and antibiotic resistance. *BMC Infectious Diseases* 12: 67. <https://doi.org/10.1186/1471-2334-12-67>
- Munthali, A.C. 2019. *Malawi AMR Strategy : some issues to consider during implementation*.
https://cdn.southampton.ac.uk/assets/imported/transforms/content-block/UsefulDownloads_Download/C6C715AED6784622962EB30060C6B30C/A%20Munthali%20-%20Malawi%20AMR%20Strategy.pdf
- Mussa, R. 2017. *Poverty and inequality in Malawi: Trends, prospects, and policy simulations*. MPRA Paper No. 75979. <https://mpra.ub.uni-muenchen.de/id/eprint/75979>
- NSO (National Statistical Office). 2019. *2018 Malawi population and housing census*.
http://www.nsomalawi.mw/index.php?option=com_content&view=article&id=226:2018-malawi-population-and-housing-census&catid=8:reports&Itemid=6
- Waithanji, E. and Roesel, K. 2018. *Veterinary students' training in equity*. Report of a training course held on 4–5 December 2018 at Lilongwe University of Agriculture and Natural Resources, Malawi. Nairobi, Kenya: ILRI. <https://hdl.handle.net/10568/99786>
- Warren, Y. 2009. Crop-raiding baboons (*Papio anubis*) and defensive farmers: A West African perspective. *West African Journal of Applied Ecology* 14(1): 1–11.
<https://doi.org/10.4314/wajae.v14i1.44705>
- World Bank. 2007. *Malawi poverty and vulnerability assessment : Investing in our future*. Synthesis report. Washington, D.C.: World Bank. <http://hdl.handle.net/10986/7557>
- World Bank. 2019. *Malawi overview*. <https://www.worldbank.org/en/country/malawi/overview>
- Zere, E., Moeti, M., Kirigia, J., Mwase, T. and Kataika, E. 2007. Equity in health and healthcare in Malawi: Analysis of trends. *BMC Public Health* 7: 78. <https://doi.org/10.1186/1471-2458-7-78>