



A pig farmer in Uganda (photo ILRI/Sumy Sudarni).



INITIATIVE ON
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UGANDA'S PORK VALUE CHAIN BENEFITS FROM A DECADE OF RESEARCH AND ACTION

KEY MESSAGES

- CGIAR and its partners have been working with Uganda's pork value chain actors for a decade (2012-22) to help them meet the rising demand for pork products.
- CGIAR research identified seven major constraints to Uganda's pig production: genetic quality of breeding pigs, feed availability and quality, pig health and biosecurity, access to advisory services, environmental sustainability, market systems and access, and links and collaboration along the pork value chain.

- Successive projects have developed strong partnerships and collaboration to co-design, test, pilot and deliver integrated intervention packages to pork value chain actors to increase their productivity.
- Now, Uganda's pork production is more visible on national and regional agendas and is a higher priority for government policy and action.
- We need to synthesize, further test and invest in scaling up packages of interventions to ensure Uganda's pork value chain continues to meet demand.

DEMAND IS INCREASING RAPIDLY FOR UGANDAN PIG PRODUCTS

Pig production provides more than two million Ugandan households with income. Pigs are mostly produced by smallholder farmers; three-quarters of these are women.

Uganda has the highest per-capita consumption of pork in East Africa, estimated to be 3.4 kilograms per person per year.¹ Demand for pork products is rising, along with rapid increases in the number of pigs in Uganda—from 0.2 million to 4.1 million between 1980 and 2018.²

A decade's worth of research and extension (2012-22) is helping pig producers meet this demand, but smallholder

producers still face issues with low productivity, along with biosecurity and climate risks.

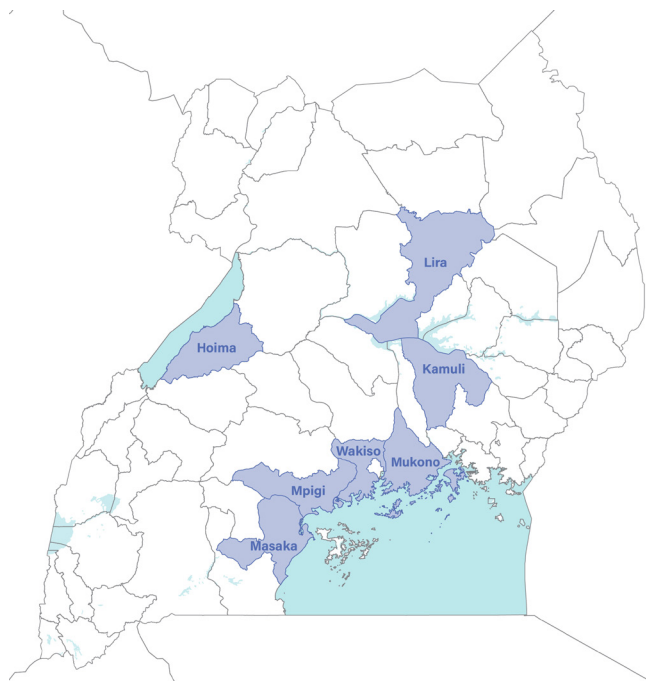
More needs to be done by government and commercial actors to provide the right policy and investment environment, so smallholder farmers and businesses can meet Africa's demand for more pork. More private sector investment in piggeries is necessary for smallholder farmers and others in the pork value chain to be empowered to influence and contribute to policies that impact their sector.

¹ FAO statistics: <https://www.fao.org/statistics/en/> ² Uganda Bureau of Statistics. 2020 Statistical Abstract (PDF, 6.9 MB): https://www.ubos.org/wp-content/uploads/publications/11_2020STATISTICAL_ABSTRACT_2020.pdf



A motorcycle rider in Kampala gets ready to deliver fresh pork (photo ILRI/Kabir Dhanji).

CGIAR and its partners conducted pork value chain work in the districts of Hoima, Kamuli, Masaka, Mukono, Lira, Wakisso and Mpigi from 2012 to 2022.



A DECADE OF PIG RESEARCH AND EXTENSION BOOSTS PRODUCTION AND VISIBILITY

Over the past decade, CGIAR and its partners have conducted a series of projects focusing on the pork value chain. At the start of this research in 2012, pig production was not recognized as a priority by Uganda's researchers, governments or commercial investors.

Today, because of CGIAR's research, there is increased knowledge, awareness and action. Nationally, for example, pork has been recognized within the meat category prioritized in the Ministry of Agriculture, Animal Industries and Fisheries' agro-industrialization program.³

³ Ugandan Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). *NDPIII Agro-Industrialization Programme Implementation Action Plan 2020* (PDF, 2.1 MB): https://mlhud.go.ug/wp-content/uploads/2021/03/AGROINDUSTRIALIZATION-PIAP-_Final-17.11.pdf

CGIAR's pork research is built on established international, national and local partnerships

For more than a decade, CGIAR's International Livestock Research Institute (ILRI) worked together with partners like the Alliance of Bioversity International and the International Centre for Tropical Agriculture (ABC), the International Center for Agricultural Research in the Dry Areas (ICARDA), the Swedish University of Agricultural Sciences (SLU), National Animal Genetic Resources Centre and Data Bank (NAGRC&DB), the Ugandan Ministry of Agriculture, Animal Industries and Fisheries (MAAIF), and the local governments in implementing districts (2012-22).

CGIAR's first project (Smallholder pork value chain development in Uganda)⁴⁾ analysed the role and situation of each actor in the pork value chain—from those providing inputs like genetics, veterinary services and feed; through to smallholder farmers, processors, wholesalers and retailers of pork and pork products.

This initial work identified entry points where significant changes could be made along the value chain to improve pig production that could address seven major constraints:

1. Genetic quality of breeding pigs
2. Feed availability and quality
3. Pig health and biosecurity (including low efficacy of veterinary drugs and weak implementation of quality assurance systems for veterinary supplies and feeds)
4. Access to advisory services
5. Environmental sustainability
6. Market systems and access (e.g. lack of pork inspection in unregulated slaughter spaces)
7. Linkage and collaboration along the pork value chain.

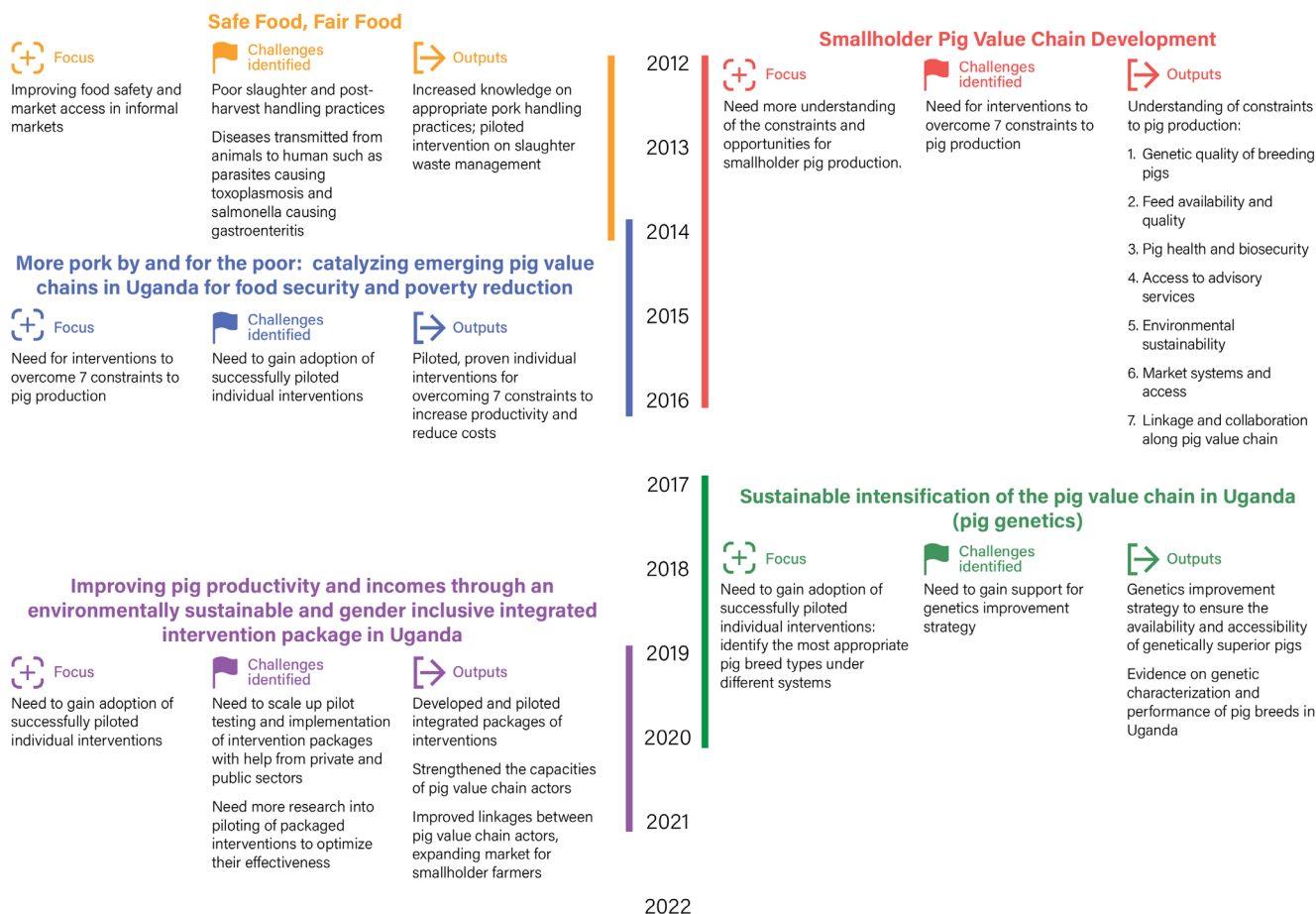
⁴⁾ <https://cgspace.cgiar.org/handle/10568/16943>.



Training materials for improved management of health and technologies like artificial insemination were disseminated to service providers. (photo ILRI/Sumy Sudarni).

A decade of CGIAR work for Uganda's pig value chain actors

Increasing awareness, knowledge and engagement by and for pig value chain actors



ADDRESSING PORK VALUE-CHAIN CONSTRAINTS DELIVERS PILOTED, INTEGRATED PACKAGES

Throughout the decade, CGIAR and its partners have learned that four principles expedite achieving improved outcomes for pork value-chain actors:

- Gain ownership for interventions through processes of co-design and collaboration with all pork value-chain actors.
- Partner with different stakeholders to ensure successful innovation and sustainability of initiatives.
- Engage actively with policymakers throughout implementation to ensure their buy-in and that projects are in line with national development plans.
- Identify policies and legal frameworks that can further support the pork value chain.

CGIAR and its partners tackled the seven constraints faced by Uganda's pork value chain actors using a combination of:

- testing new ideas/technologies,
- piloting interventions,
- delivering training,
- providing support and investment, and
- facilitating engagement and collaboration.

1. Genetic quality of breeding pigs

Researchers found that smallholder farmers lacked knowledge of good breeding practices and access to affordable, good-quality genetics.

ACTIONS AND OUTCOMES

- Piloted interventions to strengthen the artificial insemination (AI) system for distributing high-quality pig genetics. For example, piloted a community-based AI model using synchronization (where female pigs are treated with hormones so that they all come on heat at once) in Mukono and Masaka districts. Over 400 female pigs were synchronized using hormones for stimulating heat, and then inseminated at the same time.

Schemes like the one above increase AI success rate, and decrease the cost to both the farmer and AI service providers.

2. Feed availability and quality

A decade ago, smallholder pig farmers lacked access to quality, low-cost feed rations for their pigs, which reduced their productivity. This was due to erratic availability of feed in different seasons, lack of knowledge on how to formulate quality feed, and poor-quality control among the many small- to medium-scale feed producers.

ACTIONS AND OUTCOMES

- Trained 70 small-scale commercial feed producers in how to improve their feed quality and grow markets through improved feed formulation, mixing and feed safety.

- Tested 220 samples of 57 feeds suitable for pigs. For example, pigs gained 100-200 grams of weight per day after being fed a sweet potato silage-based diet,⁵ which costs 32% less per kilogram of liveweight gain, compared to conventional diets.
- Trained 300 pig farmers in how to feed their pigs sweetpotato silage-based diets.
- Trained 13 small-scale entrepreneurs in setting up sweetpotato silage businesses.
- Piloted different forage seed business models to improve access to high-quality feeds.
- Facilitated private sector investors by providing information so they could set up new businesses. For example, Devenish Nutrition has set up a feed mill and model farm in Hoima District (Western Region) to improve availability of quality feeds for pigs.

⁵ CGIAR Research Program on Roots, Tubers and Bananas (RTB). *Economic analysis of sweetpotato silage based diets for smallholder pig farmers in Uganda 2017* (PDF, 801 KB): <https://cgspace.cgiar.org/bitstream/handle/10568/88015/RTB-ENDURE-TRReport-Economic-analysis-of-sweetpotato-silage-based-diets.pdf?sequence=1&isAllowed=y>.

3. Pig health and biosecurity

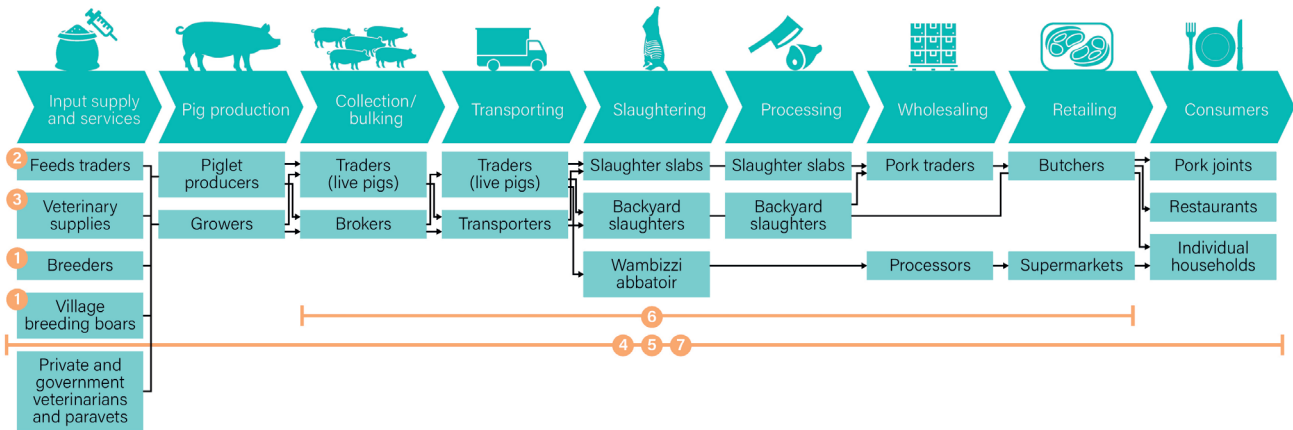
A weak, decentralized veterinary structure at the district level has hampered the control and surveillance of diseases such as African swine fever.

ACTIONS AND OUTCOMES

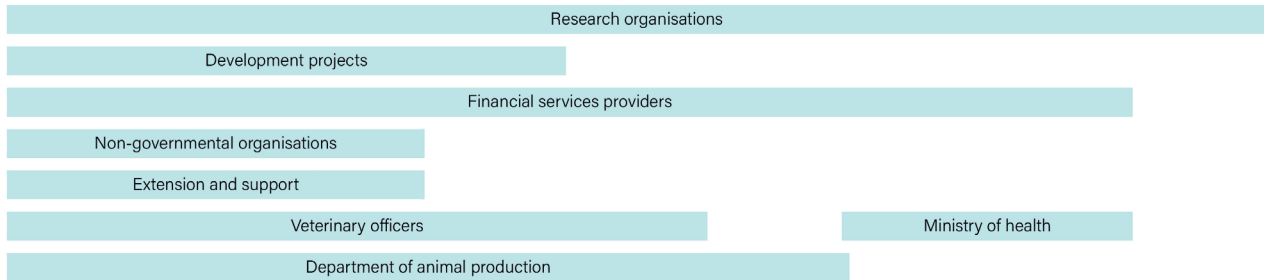
- Trained more than 2,000 pig farmers in biosecurity practices (confining pigs by constructing pig pens or fences, restricting access to pig pens, and boiling swill) to control African swine fever.
- Tested implementing improved farmer biosecurity practices along with pig business hub support,⁶ and found that these combined interventions improved pig producer margins by 3.7% per year, while reducing pig mortalities by 17.8%.
- Trained pork value-chain actors in improved biosecurity protocols and husbandry practices.
- Trained four veterinary herd-health champions to share their knowledge and build capacity of other animal health workers in antimicrobial resistance, biosecurity and herd-health management.
- Supported pig producers in Mukono District to recover from an outbreak of African swine fever by working with the local government to train farmers receiving new piglets from the local government in pig production, parasite, disease control and biosecurity measures, as well as business planning and marketing.

Ugandan pig farmers are more aware of the animal husbandry and biosecurity measures they need to take to ensure and protect the health of their herds.

Uganda pork value chain



Support services and organisations



Constraints along the pork value chain

- 1 Genetic quality of breeding pigs
- 2 Feed availability and quality
- 3 Pig health and biosecurity
- 4 Access to advisory services
- 5 Environmental sustainability
- 6 Market systems and access
- 7 Linkage and collaboration along pig value chain



Improved feed quality, including appropriate forages, can increase pig productivity (photo ILRI).

4. Access to advisory services

In 2012 pork value-chain actors, especially farmers, were inadequately supported by government or the private sector to improve their productivity and profitability.

ACTIONS AND OUTCOMES

- Piloted PigSmart platform (an ecosystem of digital actors and contributors working towards efficiency, quality of pigs, profits and cost reduction) with 700 pig farmers to link them to quality-controlled input and service providers, and offer a two-way flow of information.
- Trained extension workers in feed-ration formulation using the Feedcalculator app so they better support pig farmers.
- Trained 120 members of pig farmer collectives and 340 other pork value chain actors in business and enterprise management, marketing and governance issues.
- Facilitated the formation of 10 pig farmers' cooperatives on project sites. For example, provided technical support (business plan and optimal structural design) to the Masaka Pig Cooperatives' Union and the Masaka District (now city) local government to construct a modern abattoir which supports biosecurity surveillance and improves the prices paid to farmers.

The last decade has seen increased support for pork value-chain actors by Ugandan government agencies, as well as the private sector.

⁶ African swine fever control and market integration in Ugandan peri-urban smallholder pork value chains: An ex-ante impact assessment of interventions and their interaction: <https://www.sciencedirect.com/science/article/pii/S0167587717304452?via%3Dihub>.

5. Environmental sustainability

The Ugandan pig sector is especially vulnerable to climate change, with rising temperatures increasing pig heat stress and decreasing farmer productivity. Despite this, pigs are not included in Uganda's climate change and adaptation planning.

ACTIONS AND OUTCOMES

- Facilitated government and private-sector stakeholders to act by engaging them in a policy briefing on pig heat stress.
- Supported extension workers with a training manual on managing heat stress.
- Trained more than 50 farmers in Lira in management of pig heat stress.

Pig farmers in the project areas now have a greater awareness of the dangers of heat-stressed pigs, and how to prevent this.

6. Market systems and access

Researchers found that Uganda's smallholder pig farmers had limited access to input markets that guarantee affordable feeds and veterinary products, and unreliable access to profitable pork and pig markets. This means many pig farmers are unable to provide a stable supply of pigs—in terms of quantity and quality—to meet market demands.

ACTIONS AND OUTCOMES

- Facilitated engagement with the private sector along the pork value chain to help package and implement the most reliable interventions. For example: mentored and monitored 40 feed producers through private sector partners Single Spark and Ultimate Business Strategies, and worked with 70 pig buyers to facilitate conversations between buyers and farmers for win-win business agreements.
- Piloted and evaluated a training and certification model with 87 feed producers to improve feed quality from small-scale seed producers resulting in an online training manual and a guide on good manufacturing practices.
- Improved engagement and dialogue amongst pork value-chain actors has improved input and output market access for pig producers.



Access to technologies can support pig farmers in becoming more productive and adapted to environmental stresses (photo ILRI/Kabir Dhanji).



A pork butcher in Masaka. Photo ILRI/Kabir Dhanji

7. Linkage and collaboration along the pork value chain

Historically, there has been mistrust among pork value-chain actors and poor coordination along the value chain.

ACTIONS AND OUTCOMES

- Facilitated multi-stakeholder platforms at regional and national levels to stimulate engagement and capacity-building among pork value-chain actors.
- Supported multi-stakeholder platforms (MSPs) through reflection workshops where stakeholders in the value chain come together to discuss strategies for addressing barriers to the growth of the pig sector in their respective regions. For example, the Central and Greater Masaka region MSPs have been successful in strengthening business linkages between actors in the value chain.
- Supported MSPs to advocate for new or modified policies that benefit value chain actors.

The value chain work catalyzed vertical and horizontal links between partners such as feed producers, aggregators, extension workers, veterinary service providers, individual farmers and farmer cooperative unions. However, the sustainability of the MSPs is an ongoing challenge that needs to be addressed.

SCALING UP SUCCESS REQUIRES SYNTHESIS AND MORE UNDERSTANDING

Over the last decade, CGIAR and its partners have learned many lessons about what works and what does not through piloted best-bet innovations. Uganda's pork industry now needs to synthesize and build on such knowledge and experience to scale up these successes.

There is a real opportunity to leverage private-sector investments to support scaling interventions in a sustainable manner, which will benefit investors as well pork value-chain actors.

The approach of piloting integrated feed, health and genetics interventions has proved successful. However, to optimize the effectiveness of integrated interventions, more research is necessary to understand both their combined and individual effects on improving the productivity, profitability and sustainability of Uganda's pork value chain.

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RELATED PUBLICATIONS

Babigumira, B.M., Johann Sölkner, Gábor Mészáros, Christina Pfeiffer, Craig R. G. Lewis, Emily Ouma, Maria Wurzinger, and Karen Marshall. 2021. A Mix of Old British and Modern European Breeds: Genomic Prediction of Breed Composition of Smallholder Pigs in Uganda. *Frontiers in Genetics* 12: 676047. <https://doi.org/10.3389/fgene.2021.676047>.

Carter, N., C. Dewey, D. Grace, B. Lukuyu, E. Smith, and C. D. Lange. 2017. Average Daily Gain and the Impact of Starting Body Weight of Individual Nursery and Finisher Ugandan Pigs Fed a Commercial Diet, a Forage-Based Diet, or a Silage-Based Diet. <https://www.semanticscholar.org/paper/Average-daily-gain-and-the-impact-of-starting-body-Carter-Dewey/65627e742492a5b708d0d47f5bcb1601bc9620ae>.

Carter, N.A., C. E. Dewey, Delia Grace, Ben A. Lukuyu, E. Smith, and C. F. M. de Lange. 2017. Average Daily Gain and the Impact of Starting Body Weight of Individual Nursery and Finisher Ugandan Pigs Fed a Commercial Diet, a Forage-Based Diet, or a Silage-Based Diet. *Journal of Swine Health and Production*, May. <https://cgspace.cgiar.org/handle/10568/82533>.

Carter, N.A., Sally Humphries, Delia Grace, Emily Awuor Ouma, and Catherine Elizabeth Dewey. 2017. Men and Women Farmers' Perceptions of Adopting Improved Diets for Pigs in Uganda: Decision-Making, Income Allocation, and Intra-Household Strategies That Mitigate Relative Disadvantage. *Agriculture & Food Security* 6 (1): 18. <https://doi.org/10.1186/s40066-017-0095-7>.

Carter, N., Cate Dewey, Delia Grace, Ben Lukuyu, Eliza Smith, and Cornelis de Lange. 2017. Average Daily Gain and the Impact of Starting Body Weight of Individual Nursery and Finisher Ugandan Pigs Fed a Commercial Diet, a Forage-Based Diet, or a Silage-Based Diet. *Journal of Swine Health and Production* 25 (May): 121-28.

Dione, M.M., Ian Dohoo, Nicholas Ndiwa, Jane Poole, Emily Ouma, Winfred Christine Amia, and Barbara Wieland. 2020. Impact of Participatory Training of Smallholder Pig Farmers on Knowledge, Attitudes and Practices Regarding Biosecurity for the Control of African Swine Fever in Uganda. *Transboundary and Emerging Diseases* 67 (6): 2482-93. <https://doi.org/10.1111/tbed.13587>.

Dione, M. Edwin Kangethe, Elizabeth Poole, Nicholas Ndiwa, Emily Ouma, and Iddo Dror. 2021. Digital Extension Interactive Voice Response (IVR) mLearning: Lessons Learnt From Uganda Pork value Chain. *Frontiers in Veterinary Science* 8 (June): 611263. <https://doi.org/10.3389/fvets.2021.611263>.

Gertzell, E., Ulf Magnusson, Kokas Ikwap, Michel Dione, Lisa Lindström, Lena Eliasson-Selling, and Magdalena Jacobson. 2021. Animal Health beyond the Single Disease Approach - A Role for Veterinary Herd Health Management in Low-Income Countries? *Research in Veterinary Science* 136 (May): 453-63. <https://doi.org/10.1016/j.rvsc.2021.03.021>.

ILRI (International Livestock Research Institute). n.d. Engaging with Smallholder Pork value Chain Actors through Multi-Stakeholder Platforms. Accessed April 27, 2022. <https://www.ilri.org/publications/engaging-smallholder-pig-value-chain-actors-through-multi-stakeholder-platforms>.

ILRI. MorePork Project Creates Digital Content to Help Farmers in Uganda Improve Their Pig Enterprises. 2022. January 22, 2022. <https://www.ilri.org/publications/morepork-project-creates-digital-content-help-farmers-uganda-improve-their-pig>.

ILRI. Training and Certification Scheme for Small-Scale Feed Producers in Uganda. n.d. Accessed April 27, 2022. <https://www.ilri.org/publications/training-and-certification-scheme-small-scale-feed-producers-uganda>.

Lukuyu, B.A., and Emily A. Ouma. 2021. Uganda MorePork II Project - Results and Achievements. October. <https://cgspace.cgiar.org/handle/10568/115606>.

Mangheni, M. N. 2014. Review of the Uganda Smallholder Pork value Chain Assessment Results and Suggested Potential Interventions to Improve Women's Access and Control of Resources in the Pork value Chain. Makerere University. <http://hdl.handle.net/10568/56899>.

Mutua, John Y., Paul Zaake, An Maria Omer Notenbaert, and Birthe K. Paul. 2020. Reducing Climate-Induced Heat Stress in Pigs in Uganda: Policy Actions. September. <https://cgspace.cgiar.org/handle/10568/110342>.

Ouma, E.A., Michel M. Dione, Kristina Roesel, Peter M. Lule, Brian Kawuma, Rosemirta Birungi, G. Asiimwe, F. Opio, and Ben A. Lukuyu. 2017. Smallholder Pork value Chains Transformation in Uganda: Results, Lessons and Insights. <https://cgspace.cgiar.org/handle/10568/81344>.

Ouma, E., Justus Ochieng, Michel Dione, and Danilo Pezo, eds. 2017. Governance Structures in Smallholder Pork value Chains in Uganda: Constraints and Opportunities for Upgrading. *International Food and Agribusiness Management Review*. <https://doi.org/10.22004/ag.econ.264226>.

Ouma, E., Michel Dione, Nadhem Mtimet, Peter Lule, Angie Colston, Samuel Adediran, and Delia Grace. 2021. Demand for *Taenia Solium* Cysticercosis Vaccine: Lessons and Insights From the Pig Production and Trading Nodes of the Uganda Pork value Chain. *Frontiers in Veterinary Science* 8. <https://www.frontiersin.org/article/10.3389/fvets.2021.611166>.

Ouma, E., Michel Dione, Rosemirta Birungi, Peter Lule, Lawrence Mayega, and Kanar Dizyee. 2018. African Swine Fever Control and Market Integration in Ugandan Peri-Urban Smallholder Pork value Chains: An Ex-Ante Impact Assessment of Interventions and Their Interaction. *Preventive Veterinary Medicine* 151 (March): 29-39. <https://doi.org/10.1016/j.prevetmed.2017.12.010>.

Thompson, R. 2021. Penning Pigs: Pig Rearing Practices, Biosecurity Measures, and Outbreaks of African Swine Fever in Central Uganda. *Human Organization*, March. <https://doi.org/10.17730/1938-3525-80.17>.

Walugembe, M., G. Nadioppe, J D Stock, K J Stalder, D Pezo and M F Rothschild. Prediction of Live Body Weight Using Various Body Measurements in Ugandan Village Pigs. n.d. Accessed April 27, 2022. <http://www.lrrd.org/lrrd26/5/walu26096.htm>.