

Transforming pig systems for inclusive, healthy and sustainable nutrient-dense food supply chains in Uganda

October 2025

Workshop Report



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Background to the co-creation workshops

The CGIAR envisions improved lives and well-being of people in low- and middle-income countries by sustainably transforming animal and aquatic food systems, so they foster inclusive, healthy, and nutrient-dense food supply chains that are climate and environmentally friendly. Through the Sustainable Animal and Aquatic Foods (SAAF) Science Program, six interlinked Areas of Work will be implemented, by developing and scaling tailored innovations that boost productivity, strengthen market systems, and improve resilience. Since the focus is on collaboration with diverse partners, cutting-edge research, data-driven insights, and local engagement will be applied.

To achieve this, the SAAF program in Uganda organized two co-creation workshops as part of the collaborative process of developing and implementing solutions for sustainable pig systems in partnership with various stakeholders including researchers and market system actors. The workshops were held from 27 to 30 May 2025 in Kampala (see the program in Annex 1). To ensure full participation of the participants, the workshop sessions were structured to include presentations, facilitated sessions and group discussions.

The first workshop brought together stakeholders that included policymakers, researchers, and pork market system actors. Through this workshop, the stakeholders developed a pig value chain Theory of Change (ToC) for the SAAF program for the next 10 years. It included identification of key issues and challenges in the pork sector, followed by a visioning process of how success would look if the challenges were addressed. The long-term and short-term outcomes to track progress towards achieving the vision were then identified and developed, including the innovation/solution packages to be implemented to achieve the outcomes.

The second workshop focused on identification of market systems innovations for integrated delivery of innovations identified from the ToC workshop. The participants included the core market function actors (producers, aggregators/traders, processors, retailers, consumers), the supporting market function actors (technology providers, financial service providers, feed suppliers, herd health service providers, extension providers), and the enabling market function actors (regulators such as the district veterinary office).

Through this workshop, the stakeholders had a shared understanding of the pork market system in Uganda, they identified the pork market system blockages, analyzed market system performance and prioritized constraints that need to be addressed to improve the functioning of the pork market system for the smallholder pig farmers. They then developed a shared vision of market system change. The co-creation processes from both workshops are critical and ensure that the co-created innovations or solutions are relevant, practical and address the specific needs of the communities they are intended to benefit. The remainder of this report is organized as follows; Section 2 describes the workshop processes and outputs from the ToC stakeholder workshop, Section 3 describes the processes and outputs from the market systems stakeholders' workshop, and Section 4 highlights the next steps.

Theory of Change (ToC) workshop



Participants at the market systems analysis workshop in Kampala (photo credit: ILRI/ Pamela Wairagala).

Day 1: Introductory presentations

Session 1: Introduction and opening remarks

The first day of the workshop started with an ice breaker to assess partner perception of CGIAR performance in Uganda. Participants identified things done right by CGIAR in the previous research initiatives, things that need to change and what the centers need to start doing. This was followed by individual introductions and opening remarks.

What the CGIAR has done right

- Promoting and coordinating the pig value chain, and empowering women in livestock production
- Popularizing pig artificial insemination
- Collaborating and partnering with on the ground structures such as districts and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

What the CGIAR needs to change

- CGIAR needs to widen its reach
- Engage men more in interventions
- Acknowledge partners in publications
- The bottom-up planning approaches promoted by the International Livestock Research Institute (ILRI) need to be clearly explained and understood further; especially how beneficiaries are selected.
- Focus more on research applications

What the CGIAR centers need to start doing

- Have more engagements with partners or stakeholders
- Disseminate research findings through different platforms
- Scale out the technologies developed from research
- Acknowledge other researchers who support its research and go beyond central Uganda.

Remarks from Emily Ouma, ILRI country representative, Uganda

Emily Ouma welcomed the participants and introduced the SAAF program. She appreciated the feedback from partners acknowledging that ILRI would use it to improve its research work in the country. She said the institute would use the outcomes from the workshops to co-create innovations for the pig value chain with stakeholders. She thanked the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) for its dedicated support to ILRI's work in Uganda particularly through the district local governments from Mukono, Wakiso, Pader, Masaka, Mpigi, and the new districts of Lamwo and Pader.

She informed participants that ILRI was expanding its research beyond the central region, but this would be influenced by, among other factors, the available funds. She added that SAAF is one of eight CGIAR science programs that will carry on the impacts of the previous CGIAR research initiatives. She added that under the new CGIAR structure, there is a scaling program will be working with partners to scale up innovations, three accelerator programs to accelerate what the science programs are working on to reach diverse populations, and five impact areas of CGIAR research.

Remarks from Ben Lukuyu

Ben Lukuyu, ILRI Senior scientists and Animal Nutritionist, informed participants that ILRI was reviewing its research to strengthen it. Noting that the SAAF program will be implemented in several countries, he appreciated the feedback and acknowledged that this was a missed opportunity in the previous years, and said ILRI would use these lessons to build on partnership, a key pillar of its ILRI research strategy.

Remarks by Asimwe Grace on behalf of the Ministry of Agriculture, Animal Industry and Fisheries

Asimwe Grace acknowledged the presence of all stakeholders from Entrepreneurship 4 impact (E4Impact), National Agricultural Research Organization (NARO), district colleagues, micro finance institutions, Ripple Effect, the National Planning Authority, and ILRI. He recognized the vital role animal and aquatic foods play in human nutrition, especially in a world facing environmental change.



Plenary discussions at the market systems analysis workshop in Kampala (photo credit: ILRI/ Pamela N. Wairagala).

Noting that Uganda has a positive trade balance for agri-products and is a food basket for the East African sub region, he said the ministry is working to improve food security, climate resilience, and equitable food distribution. Building on the significant rise in food demand due to increase in human population and incomes, the Uganda agrifood system has the potential to enhance employment opportunities especially for the youth who are biggest population of the country.

He said the world is facing enormous pressure on food systems and thus there is need to produce animal and aquatic foods more sustainably. This will include adopting sustainable practices to ensure food security to improve livelihoods, protect biodiversity and climate change. He called for the development of innovative solutions and policies that promote sustainable animal and aquatic food systems.

Session 2: Reflections on CGIAR Research Initiatives transition to SAAF

SAPLING pig value chain ToC

Emily Ouma, ILRI Senior scientist and Uganda country representative highlighted the Sustainable Animal Productivity (SAPLING) ToC workshops in 2022, 2023 and 2024 where partners reflected on the change and informed participants that the same process would be followed under SAAF. She reflected on the SAPLING project and the rationale for its ToC design. She informed participants that the process will entail identifying the big issues, who is affected by the issues, visioning what we want to see, identifying the long-term changes/outcomes and short-term outcomes for monitoring. The innovation packages and actors whose behavior we desire to change, and the assumptions were articulated. <https://hdl.handle.net/10568/175662>

SAPLING progress and achievements

Peter Oba, a Herd health consultant highlighted the different work packages including herd health, feeds and forages, genetics, business skills and empowerment, gender and social inclusion as well as their respective innovation packages. Key achievements included 1) strengthening pig AI service provision through technical training; 2) technical support to trained service providers; 3) improved linkages between pig keepers and AI service providers by linking trained service providers to farmer groups through AI subsidization. Under Herd health, training for herd health champions and implementation of the model farm approach were identified as some of the achievements. Read more on this link: <https://hdl.handle.net/10568/175552>.

One Health progress and achievements Neglected zoonotic diseases

In Uganda the focus has been on One Health approach in the control of *Taenia solium*. Both qualitative and epidemiological studies to understand the distribution of *Taenia solium*, and the structure of the pork value chain in northern Uganda were conducted. Different interventions were co-designed with stakeholders. Under the SAAF program, the team plans to integrate gender work within health and the pork value chain, integrating slaughterhouse hygiene and meat inspector training and roll out of training packages developed through CGIAR Research programmes and Initiatives to support sustainable value chain improvements in northern Uganda. Read more on this link: <https://hdl.handle.net/10568/175554>.

Antimicrobial resistance (AMR)

Food safety, zoonotic diseases, and emerging antimicrobial resistance (AMR) are key issues that lie at the heart of the One Health approach and the policies that support it. The intention is to develop and support innovation to reduce antimicrobial use (AMU) and mitigate AMR. Investigations were done on AMR-transmission, vaccine use and efficacy, quantify biosecurity, AMR prevalence, AMU practices in poultry farms in Soroti and Wakiso districts. The AMR-data and transmission evidence was used to prioritize investment in reducing the problem of AMR. Under the antimicrobial resistance and One Health, which includes Animal Health, the Environment and Practitioner Engagement (AMROH), environmental AMR surveillance plan and animal health treatment guidelines were developed and AMR training conducted. Read more on this link: <https://hdl.handle.net/10568/175583>.

Gender, Youth and Social Inclusion

Under gender, youth and social inclusion, the focus was to integrate gender aspects in the different Areas of Work (AOWs) to ensure that the needs of women, youth and other groups were included in the interventions while the strategic work focuses on empowerment and norms. Interventions targeting norms included radio talk shows and community dialogues used to sensitize selected communities on the presence of well-trained women artificial insemination service providers, pig aggregators and large-scale pig farmers. Confidence building sessions to enable women pig farmers bargain for higher prices were also part of the interventions that were implemented. Read more on this link: <https://hdl.handle.net/10568/175663>.

Sustainable Livestock and environment progress and achievements

Climate and environment interventions enhance the resilience and sustainability of animal and aquatic food systems through climate-adaptive, low-emission socio-technical innovations and business models. Baseline surveys were conducted to characterize manure management and handling, storage, treatment, application, feeding, constraints and drivers in Uganda. The team engaged various stakeholders to improve acceptability and selected participants who will be involved in the surveys and developed training materials for stakeholders. Read more on this link: <https://hdl.handle.net/10568/175573>.

Market Systems, Policy Solutions and Scaling

Market systems, Policy Solutions and Scaling will develop innovations to foster equitable, efficient and sustainable transformations of animal and aquatic foods market systems. Therefore, there is a need to intervene in markets to make them inclusive and reduce inequality. Questions to ask include 1) Where are the most vulnerable pig producers, 2) who are they, 3) where are they and 4) how do we intervene? There is need to work with actors either through changing incentives or capacities for the vulnerable. Developing a ToC gives us the Areas of Work that were never tackled initially in SAPLING. Read more on this link: <https://hdl.handle.net/10568/175639>.

Introduction to the SAAF ToC, SAPLING ToC, and its achievements

Emily Ouma provided a brief background of the SAPLING project, highlighting key achievements and the rationale behind the design of SAPLING ToC, and what to take forward in the SAAFs program. She outlined the main elements in the SAPLING ToC; identifying what the issue is, who is affected, visioning, long-term changes, short-term outcomes, and what innovations could be taken forward. <https://hdl.handle.net/10568/175662>

Introduction to the SAAF and its research portfolio

Karen Marshall, Interim Deputy Director and Productivity+ Area of Work lead SAAFs, provided a detailed presentation of SAAFs program one of the CGIAR science programs which builds from the Sustainable Animal Productivity for Livelihoods, Nutrition and Gender (SAPLING) Initiative in Uganda, highlighting the five impact areas and three accelerator programs – details of the presentation are here: <https://hdl.handle.net/10568/175664>

Session 3: Research prioritization

Research prioritization for each area of work (structured roughly by SAAF AoW 1– 5)

Discussions were held around the different Areas of Work (One Health, Climate and Environment, Productivity+, Market Systems, Gender, Youth and Social Inclusion) and participants distributed according to their areas of interest and experience.

For each area of work, each group identified the big issues, opportunities, and existing national research priorities to address the identified issues and possible researchable areas for the CGIAR. Table 1 shows the summary of the output from this exercise showing the two priority research areas that were identified by participants in each area of work. Details are presented in Annex 2.

Table 1: Priority researchable areas for each Area of Work

Area of Work	Suggested priority area of research
Productivity+	Pig performance evaluation of different breeds for different feed and production systems Capacity building of all actors – farmers, input and service providers, butchers, AI service providers (new training areas, retooling)
One Health	Zoonotic diseases Zoonotic infections are common in pig-producing areas and pose serious public health risks. Despite existing policies (e.g., One Health strategic plan, priority zoonotic diseases list), implementation at the community level is weak. These diseases are preventable through affordable, integrated interventions (e.g., deworming, sanitation, vaccination), offering a high return on investment. Prioritizing this area supports One Health implementation and aligns with global and national health agendas. Antimicrobial resistance/antimicrobial use (AMR/AMU) Pig production in Uganda is increasingly intensive and is expected to be a hotspot for unregulated antimicrobial use, due to high disease pressure and limited veterinary oversight. This raises the risk of AMR, a major global health threat. While Uganda's National Action Plan-AMR provides a policy framework, data and tested interventions in pig systems are lacking. Addressing AMU through surveillance, biosecurity, and farmer behavior change offers clear One Health benefits and aligns with strong donor and CGIAR priorities.
Gender, Youth and Social Inclusion	Gender interventions exclusively targeted women and lack male involvement Persistent social norms that still restrict women's participation in certain aspects of value chains – AI, aggregation, roasting
Market Systems	Local feed trials – vs Feed conversion ration or growth and pork quality (cost effective feeds) Generation of evidence of the most cost-effective local feeds for production of quality pork. Research and develop models that can foster linkages and build trusts between the different value chain actors. Input dealer-farmers-pig traders.
Climate and the Environment	Enhancing the quality of manure will encourage farmers to practice improved manure management practices. Management of odor from pig manure; an incentive for people to adopt improved manure management practices; managing environmental pollution, etc.

Day 2: Developing the SAAF Theory of Change



Participants during the Theory of Change workshop in Kampala (photo credit: ILRI/ Pamela N. Wairagala)

Session 4: Development of vision, long-term and short-term outcomes

This session focused on the development of the SAAF ToC and during this session, participants worked in interdisciplinary groups to formulate a vision for each Area of work (See Annex 4). These visions later formed the basis upon which an overall vision was formulated by a team of nine core members constituting participants from different stakeholder category, then presented to the rest of the participants for consensus. Below is the overall vision which guided the formulation of long-term and short-term outcomes for each area of work.

Vision statement: A sustainable and inclusive pig value chain for healthier and better livelihoods by 2035

Following the formulation of a shared vision, the initial groups were then regrouped into three interdisciplinary groups, and each of the groups formulated long-term outcomes that would lead to the realization of the vision. Afterwards, three short-term outcomes were developed by each group that correspond to the long-term outcomes to achieve the vision. For each long changes, the short-term changes corresponded to changes in capacity, knowledge/awareness of the different actors that were developed. The value chain actors that would be directly affected by the outcomes were also identified. The summary of these discussions is presented in tables 2, 3 and 4 below.

Table 1: Development of SAAF Theory of Change

Which innovation package(s) can SAAF design and implement to achieve these short-term outcomes? Which actors would be involved in what role?	
Long-term outcome one	Value chain actors adopt appropriate business models that enhance profitability and inclusivity
Short-term outcome assigned to group	Farmers and traders adopt inclusive, organized and aggregated marketing
	Value chain actors increasingly use appropriate financial products
	Value chain actors strengthen and participate multi-stakeholder platforms (MSPs) for advocacy
	Farmers and input service providers adopt an integrated supply chain
Innovation package	Innovations (technical, process, business oriented etc.)
	– Integrated inclusive business model
	– Co-creation
	Capacity sharing – who requires capacity, in what, and how can this be achieved
	- Enhancing knowledge of actors in technology and practices will be achieved through MSPs.
	Enabling elements required (e.g. policy changes, institutional support etc.)

– Quality assurance support from Uganda National Bureau of Standards (UNBS) regarding certification

– Appropriate financing provided by financial institutions

Actors and their roles

All actors (input and service provider + farmers) – adopt appropriate climate smart and environmentally friendly practices by all value chain actors

Researchers– changing dissemination strategies

Input service providers and farmers and traders – Adopt the appropriate financial and risk mitigation schemes

Financial institution– Develop customer specific appropriate financial and risk mitigation packages

Input service providers and farmers – Actors adopt appropriate business models that enhance profitability and inclusivity.

Government– design appropriate by-laws – Enforce the implementation of the by-laws

Table 4: Development of SAAF Theory of Change

Long-term outcome two	Farmers adopt appropriate technologies and best practices for improved productivity of safe pork. Behavior change: stop adulteration of pig products /inputs/ services (pork, market, semen suppliers, fish meal, drugs) along the pig value chain in terms of quality, quantity, time and place.
Short-term outcome assigned to group	Farmer institutions strengthened by farmers' federation, private sector and government (MDAs, CSOs). Capacity of value chain actors is built to access cost-effective technologies, information and skills for improved productivity. Appropriate and conducive policies and standards in place for value chain stakeholders.
Innovation package	Innovations (technical, process, business oriented etc.) Establish pig breeding associations Train AI technicians, animal care workers and farmers on feeds, forages, breeds and disease control technologies Develop a business model for establishment, operation and maintenance of semen banks (possibly incl. health, feeds, forages) in districts for increasing accessibility Capacity sharing – who requires capacity, in what, and how can this be achieved Farmers – training on health, feeds, breeding, wastes/manure management through districts extension services, information and communication materials, including digital tools AI technicians – AI services, business management Animal health care workers – business management, herd health management (HHM) Enabling elements required (e.g. policy changes, institutional support etc.) AI Equipment and tools Technical and institutional support – on capacity building Policy review /update and guidelines Actors and their roles Farmers – demand for inputs, services, information, skills and adopt innovations AI technicians – provide AI services District LGs – mobilize farmers, implement, supervise and monitor appropriate technologies and programs

NAGRC & DB – produce, distribute and monitor performance of improved pig breeds in the country, conservation of indigenous breeds genetic resources
MAAIF – national livestock policy review and regulation
Private players – business development.

Market systems workshop



Group discussion during the Theory of change workshop in Kampala (photo credit: ILRI/ Pamela N. Wairagala)

Day 3: Understanding the pork market system in Uganda

Session 1: Categorizing different stakeholders in the pig value chain

During this session, participants identified the different critical actors within the pig value chain. The participants then categorized the identified actors based on their market function. Three market functions; core market function, support function and enabler function were developed. Participants were then categorized into three-market functions, each delved into understanding the roles of the identified actors within the market function.

The core market function actors are those that lie at the heart of the market system and are engaged in the exchange of goods or commodities. The core function was further divided into the supply side and demand side. The following actors were identified under the demand side; processors, slaughterers, butchers, abattoirs while the supply side included pig farmers and aggregators/and traders, large retailers who could also be on the demand side. Table 5 summarizes the discussions on the roles of the identified core market function actors.

Table 5: Description of the roles of the actors in the core market function

Market function	Actor category	Description/role
Core function		
Demand side	Processors	Value addition to pork– e.g. make sausages, slaughter, sell specialized chops and sale packed pork in different quantities
	Slaughterers	They slaughter pigs and ensure quality control and pork– partition into different quantities There is a bit of intersection between the abattoirs They can be recognized and certified-specialized with a slaughterhouse–

Supply side		Some are within the local community and are called upon on demand
	Butcherers	Butchers can be stationed– with different butcher points selling pork. They deal with traders, – can move with their special slaughters, They are connected to traders, UNBS, local government under public health, inspectors, vets,
	Abattoir	Gazetted place, well built, for slaughtering pigs, well-constructed with water – inspection of pigs is done.
	Pork joints	Sell pork (raw), roast, cook, luwombo, Major activity at the pork joints is roasting, followed by frying
	Roasters	Work at the roadside selling roasted pork, ' <i>kilenge</i> ',
	Consumer	Buy the pork from pork joints– roasted, raw or fried– they are the final user of the pork and by products (manure) Work with traders, pork joints, restaurants, processors
	Pig traders	They buy live pigs from the farmers, aggregate and sometimes transport Can also slaughter and take to the pig joint Link between farmer and market But their core role is to aggregate Connected to vets, transporters, financial services, security, local government, licensors, processors, abattoirs
	Farmers	They raise pigs from a pig let until marketing, feeding, disease control They are connected to the aggregators, pig traders, middlemen, extension officers/veterinarians, feed stockist, drug stockists, local government
	Aggregators	Buy pigs in bigger numbers They are market suppliers They are connected to the farmers, brokers and sale to the traders Work with abattoirs, vets, transporters
	Large retailers	They retail /buy pork at pork joints in bigger quantities Supply the pork to small retailers, restaurants Work with abattoirs and pig traders They also deal in special off-cuts retailed at supermarkets Buy pigs in bulk, slaughter, supply pork to retailers (head, legs, thigh)

Table 6 is a summary of the roles of the identified actors under the support market function. This discussion came from boar stud operators, AI technicians, multipliers, financial institution representatives, feed manufacturers and stockists that were in attendance in the workshop. The support function in this context referred to actors that offer services, resources and infrastructures to enable a well-functioning value chain. A total of about 17 actors were identified and categorized under this function. These included AI service providers, breeders, multipliers, transporters, financial institutions, pigsty builders, business development institutions, telecoms, middlemen/ market agent, extension service providers, investors/ waste management, transporters, researchers, animal health service providers, feed manufacturer and stockists and drug stockists.

Table 2: Description of the roles of the actors in the support market function

Market function	Actor category	Description/role
Support	Boar stud operators	- Produce semen - They are connected to pig inseminators/AI technicians
	AI technicians	- Inseminate the pigs - Training farmers in good pig management practices
	Semen distribution services	Semen storage and transportation from boar to farmer
	Breeders	- Provider good quality/ pure liners - They are connected to multiplier
	Multipliers	Supply farmers with quality parent stock
	Researchers	- Generate knowledge and innovations - Understand issues that need to be researched - Identify gaps and co-develop solutions with stakeholders
	Business development support	- General business skilling mgt book keepings - These are expected to provide value chain specific training
	Financial services	- Support actors with affordable loan - Provide business and financial training - Provide value chain specific training
	Feed manufacturers and stockists	- Provide quality and cost-effective feed - Offer animal feeding and nutrition training
	Drug stockists	Train and ensure proper handling and availability of general drugs particularly vaccines
	Pigsty construction services	Offer advisory services on simple and cost effective durable affordable housing
	Extension service providers	Training actors in the value chains could be provided by public and private
	Investor (Waste Management)	Provide technical support and invest in sustainable waste management innovations/technologies
	Telecoms	- Offer extension services through text messaging - Provide market information
	Transporters	- Move pigs from farm to the market/ abattoirs - Move feed from stockists/manufacturers to farm - Move semen from boar stud to pig inseminator
	Middlemen/ market agents	These move information between the different actors in the value chain Scout farm to farm for pigs ready for the market Connect the big trader to the suppliers/small retailers– Wambizzi– they are termed as ‘pork providers’

Third group discussion comprised of district Local government representatives, pork inspector and these discussed the roles of the actors that were categorized under the enabler function. The enabler market function is

comprised of actors that set laws, regulations, standards, social rules and norms that influence when, where and how exchanges take place. These have implications for the power of actors along the value chain. Table 7 shows a summary of the roles of the actors identified under the enabler Market function.

Table 3: Description of the roles of the actors in the rules and norms market function

Market function	Actor category	Description/role
Enablers	Pork inspectors	Quality assurance Disease surveillance and monitoring
	Local governments	Provide extension services Ensure financial inclusion for vulnerable groups like the disabled, women and youth access finances Supervise and monitor startup funds programs – Emyogga, PDM, etc. Implement ministry policies
	Ministry of Agriculture Animal Industry and Fisheries (MAAIF)	Develop and regulate national agricultural policies
	Security agencies	Provide security for pigs and related resources
	Ministry of Trade	Support marketing Provide technical support to farmer cooperatives
	National Animal Genetics Resources Centre and Data Bank (NAGRC&DB)	Breeding regulation Genetic data bank Breed conservation
	Uganda Revenue Authority (URA)	Implement tax policies
	National Drugs Authority (NDA)	Regulate manufacture, importation, & exports of veterinary drugs and vaccines Ensure drug quality monitoring and quality assurance
	Legislators	Legislate on laws in the livestock / pig industry
	Uganda National Bureau of Standards (UNBS)	Standards setting and monitoring

After mapping the relevant actors under the three-market function categories, participants identified critical actors that they thought ought to have been a part of the meeting. These included Uganda Revenue Authority, National Planning Authority, Uganda Bureau of Standards, Waste management, drug stockists, National Animal Genetic Resources Centre and Data Bank (NAGRC and DB).



Participant discussion during the Theory of change workshop in Kampala (photo credit: ILRI/ Yusuf Nsubuga)

Session 2: Understanding system blockages

The second session focused on understanding system blockages. Through group discussions participants identified the challenge that they viewed as the most constraining to the pork market system, contributing actors, affected actors and how the problem affects the market system. During the plenary discussion, consensus was reached by all participants on the top four priority challenges that are affecting the pork market system. Table 8 indicates the four key challenges affecting the pork market system. Discussions from each group session can be found in Annex 4.

Table 8. Main challenges affecting the pork market system

Challenge/problem	Contributing actors	Other affected actors	Effect on market
Farmer end – low demand for inputs and services	Traders and aggregators– most times want to make wide profit margins and therefore offer low prices when buying pigs from farmers.	Farmers	Feed producers resort to making low quality feeds that are affordable for the farmers but became expensive in the long run as the pigs do not achieve optimal growth in time.
	Feed ingredient suppliers– maize suppliers hoard maize and sell expensively, fish meal is adulterated.	Feed producers	
		Breeder/ Multipliers	
		AI technicians	
	Cost of feeds is high– price high and feed ingredients are expensive, poor kg price of maize brand keeps increasing.		
	Ingredients such as Silverfish, premix are also expensive.		
Low prices for pigs	Market segment for high quality pork is very small.	Input service products are affected	When the market segment for high quality pork is small, farmers lack an incentive to invest in quality feeds and breeds.
	Traders determine price based on the numerous backyard farmers who might not necessarily mind about the quality of the pigs.	Majority of the support actors are affected	
			Farmers cannot maintain a high-quality

Lack of access to commercial pork breed	AI service providers – stud managers, AI technicians Farmers lack awareness of the existing good breeds because There isn't enough veterinary officers and extension officers to reach the number of pig farmers. AI inseminators and Input dealers seem leave the role of training and extension to the public sector	Pig traders, farmers, butchers, processors, retailers.	breed or invest in good management practices when the market still offers low prices for Kg of pork at farm gate. Farmer cannot offset high production costs when market prices are low. Low prices, delayed fattening, low quality of pork.
Risk of diseases	Veterinary officers' huge workload Input suppliers– Drug stockists selling expired vac/drugs– lack of supply– lack of knowledge of how and when to vaccinate Farmers– failure to uphold the good biosecurity measures Local government– lack good vac programme, failure to facilitate vets	The entire core and support actors in the value chain are affected	When disease ravages farms, pig populations are reduced and the markets run short of enough pork. During African Swine Fever outbreaks, traders offer farmers very low prices for their pigs since majority of the farmers are in a hurry to sell off their pigs.

Day 4: Root cause analysis and visioning

Session 3: Root cause analysis for the four prioritized system level challenges

During this session participants were introduced to the concept of causal loop diagrams. Participants were carefully grouped (following their areas of market function). Four groups were formed to tackle the four prioritized system level challenges. Specifically, aggregators, traders, abattoir operators were assigned to tackle the root cause of low prices for pigs as shown in Figure 1; Risk of diseases was tackled by animal health service providers as shown in Figure 2; low demand for inputs services tackled by feed producers and AI service providers as illustrated in Figure 3 while lack of access to commercial pork breeds was left to the farmers.

Figure 1: Root cause analysis of low prices for pigs at the farm level

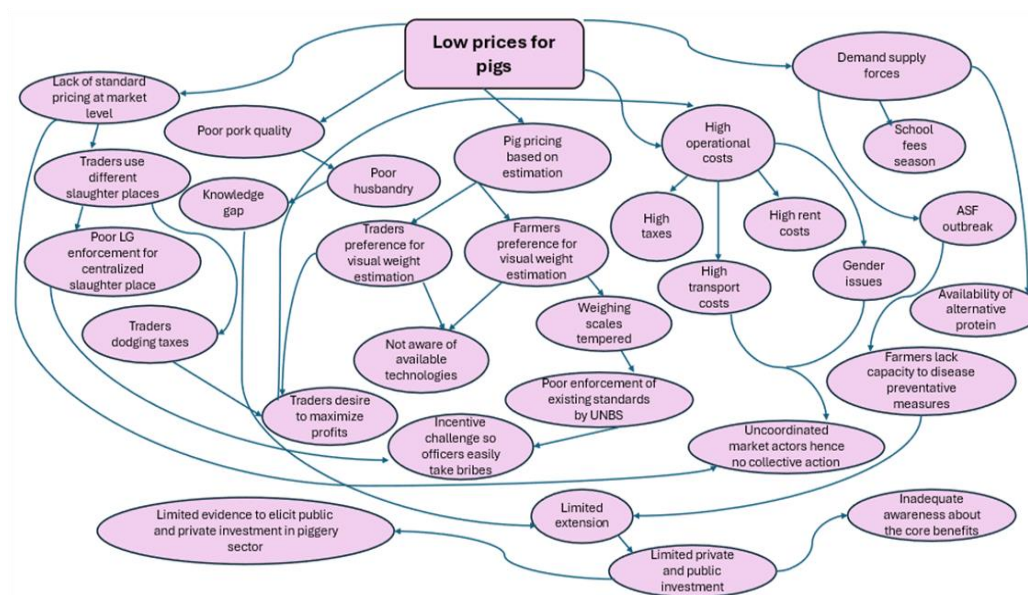


Figure 2; Root cause analysis for the risk of disease challenge

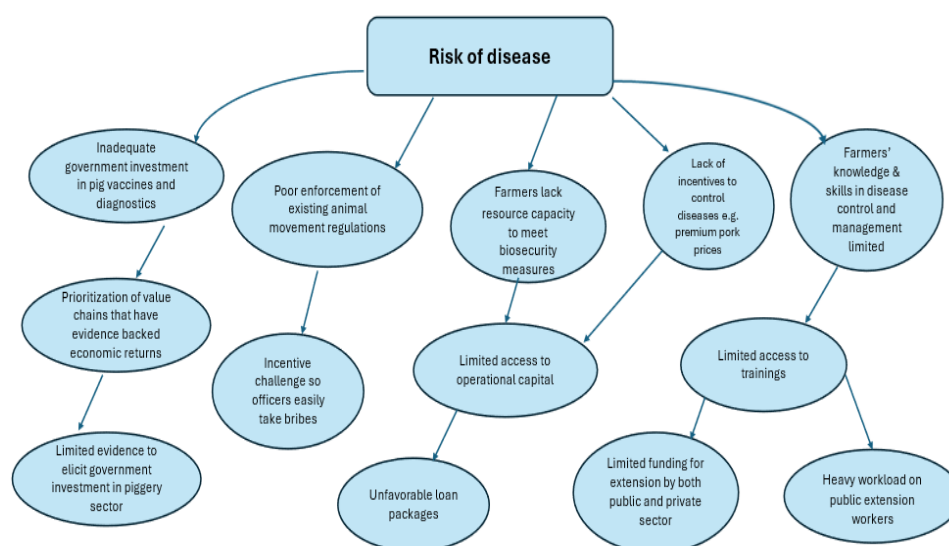


Figure 3 illustrates the root reasons why farmers barely invest in their pig enterprises. Three root causes were identified, and these include high interest rates, lack of product segments for different clients and farmers exit the farmer groups.

Figure 3: Root cause analysis for limited investment in the pig enterprise by pig farmers

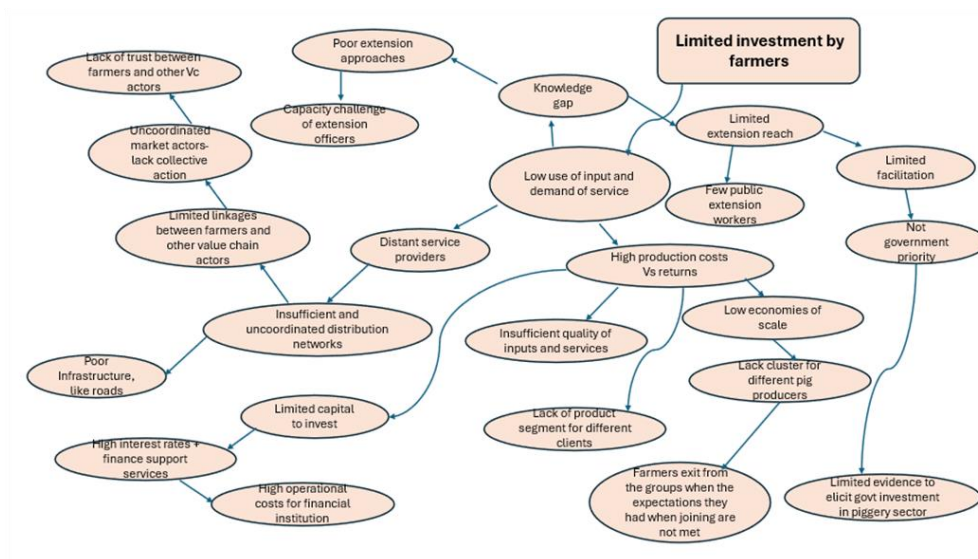
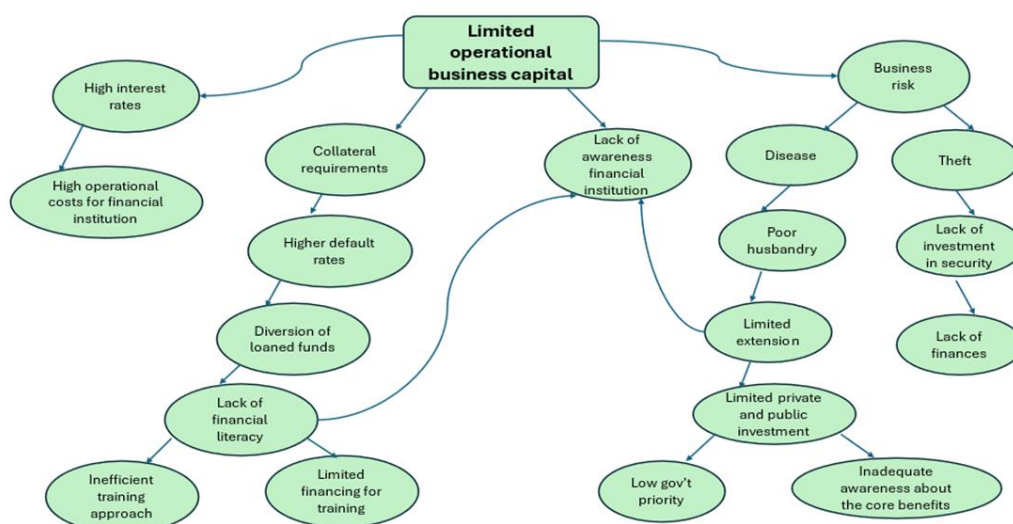


Figure 4: Root cause analysis of limited operational business capital



Session 4: Prioritization of constraints identifying capacity and incentive challenge

In each of the four groups, participants were asked to reflect on the system blockages, identify which market function actor is involved and discuss why the functions and roles are underperformed by the actor. The purpose was to outline whether the challenge is as a result of limited capacity or incentive related or both. This exercise would eventually aid in prioritizing which market system constraints can be addressed in the short-term. Table 9 shows the market actors, capacity and incentive challenges that were prioritized after the group discussions. A detailed submission of each of the groups can be found in Annex 4.

Table 4: Selected market actors and their identified capacity and incentive challenges

Market actor	Market functions	Describe the capacity challenge (<i>inadequate, mismatched, absent</i>) *	Describe the incentive challenge (<i>inadequate, mismatched, absent</i>) *
Core function			
Supply side			
Trader/aggregator	Provide market services to farmers		Lack desire to make farmers profitable and the business sustainable Inadequate incentive to offer better prices to the farmers– absence of trust, when someone is not a regular supplier you show no loyalty to them so you can as well offer low prices
	Offer standard price of pork	Inadequate capacity for collective action among traders	
Demand side			
Farmer	Produce and supply of pigs to markets	Inadequate capacity to consistently supply required quality and quantity	
Supporting function			
Feed manufacturer and stockist	Supply quality and cost-effective feeds to farmers		Inadequate incentive to supply segmented feed products to different types of farmers
Public extension service provider	Train farmers in better farming techniques	Inadequate capacity in modern training approaches	Inadequate incentives to reach out to farmers
Rules/norms			
District local government		Regulations or by-laws on unauthorized slaughters are absent	

In a plenary session, participants were asked to rate the constraints into **significant**, **moderate**, and **low** in terms of how they negatively impact the functioning of the market system. Using the colour codes a heat map indicated in **Table 10** was produced.

Table 10: Rating of constraints and impact on the market system

Core functions – Supply (Group 1)	Support functions (Group 2)	Rules/norms (Group 3)
Trader prices too low to encourage investment	Farmers unable to repay credit	
Traders have too high standards		Farmers do not comply with biosecurity measures
Core functions – Demand (Group 1)		
Farmers lack capacity to supply consistently	Expensive & inappropriately designed entrepreneurship programs	Unfavorable business regulations
Farmers offer poor quality pigs	Limited support from public sector	

Session 5: Creating a shared vision

During this session, the three groups were asked to draft a vision. Specifically, groups described what they envisioned as success if the system blockage had been dealt with, then identified critical success factors and what influences the critical success factors.

Table 5: Shared vision drafted by the different groups

System blockage	Description of success	Critical success factors	What else influences these factors
Low prices for pigs	Favourable prices encouraging farmers to invest	Good quality pork attracting better prices Improved trust between traders and farmers	Farmers investing in good quality feeds and better breeds Adequate extension/training for farmers Repeated engagement between farmer and trader
Limited operational business capital	Reliable pig production business where farmers, traders can access financial services	Pricing based on verifiable standards All pork supplied from regulated slaughterhouses Low interest rates on loans offered by financial institutions Flexible collateral requirements Farmers/traders/ are aware about financial institutions	Acceptable weighing standards Strict enforcement by the local government Acquisition of grant from a partner/repayable grant e.g. from Mastercard foundation Conventional loans with an extension Designing products that target specific groups e.g. youth, women, PWDs etc Financial literacy and extension services Advise services through different media/social/print Increased demand
Limited Investment by farmers in commercial pig production Feed manufacturer and stockist	Farmers fully invest in commercial pig production	Feed producers selling large volumes and high-quality feeds. Consistent supply of pork to big retailers/traders Exportation of high-quality pork to best international markets	

		Breeders/multipliers have stable market for their pigs and products	High demand for hybrid pigs and other input products
		Inputs and services are readily available	High demand for inputs and services
		Increased production from farmers	High demand for high-quality pork
		Collective actions in areas like input sourcing, training and marketing	High bargaining power
		Existence of stable farmer groups with stable financial pool	High-quality pork on market
		Actors are knowledgeable about commercial pig production. Private-led comprehensive extension services.	Provision of extension services by private actors
		Workshops and seminars organized by farmers and input service providers	
Persistent disease outbreaks, especially ASF in farms, causing high mortalities and losses	Reduced incidence of important diseases in farms; farmers well informed of disease prevention strategies such as biosecurity, are willing and able to invest in disease control measures	Availability and access to technical information by farmers on disease control measures	Extension system – positive as improved control measures will translate into improved incomes for farmers and aggregators
		Availability of incentives for improved disease control e.g. increased prices of safe, high-quality pork and related products	Aggregators – positive as increased availability of good quality, healthier pigs will boost their businesses by increasing their profit margins and reduced operational costs
			Consumers – positive, as increased availability of safe pork improves overall public health; and their willingness to pay for premium pork
Poor feed quality, high feed costs and low availability	Farmers are knowledgeable of quality and quantity of feeds required for different growth stages of their pigs	Access to quality feed ingredients at home and properly processed quality feeds from local markets.	Knowledge of value chain actors – especially feed producers
			Supply and prices of raw materials required
			Price of pork in the market

Conclusions and next steps

The final session of the SAAF inception and cocreation workshop concluded with remarks from ILRI and MAAIF representatives.

To support the transition from SAPLING to SAAF, participants conducted a quick stakeholder analysis, identifying different actors, areas of interest, and the locations within the country where they operated.

Closing remarks from ILRI representatives

James Rao- Senior scientist- ILRI

He informed participants that the focus of the market analysis process was to understand the different actors and the areas where they operated. This would help the project to identify places where complimentary services are available.

Emily Ouma – ILRI Uganda country representative

ILRI Uganda country representative informed participants that the ILRI team would synthesis all the information generated by different discussion groups and develop the TOC presentation with a vision statement, long-term outcome, short-term outcome, and innovation packages. This will be shared with all the participants for more input and validation. The plan was to implement different innovations. To continuously reflect on the TOC regarding what we have learnt, what worked, what needs to change/tweak or what innovations to add as we implement on the ground at least every year. We will also hold reflection workshops every year since we are going to implement the innovation packages together.

She noted that the exercise to identify operation areas helped highlight areas where there is already work happening so that the project can leverage on it. Owing to the limited resources, the strategy was to work where there was some ongoing work. ILRI team will synthesis this information as well and share with the wider SAAF team working in Uganda to take decisions on where it can work in the next 10 years. She acknowledged the new partners, for example triple A from Mukono and appreciated all participants for their dedication and commitment throughout the workshop.

Closing remarks by Deogratius Wonekha from MAAIF

Deogratius Wonekha, senior veterinary officer at MAAIF appreciated all the actors present; researchers, academia, businesspeople, farmers for coming and staying throughout the workshop to share ideas and ILRI for continuing to bring various actors together in such a platform and the ILRI board for considering Uganda as a SAAF country.

Pledged their commitment as the ministry given that they have the structures in place thus will continue to extend their robust extension in support of the partnership with ILRI. MAAIF will continue the partnership and share advice occasionally. He noted that ILRI has walked the piggery unit journey from behind and as MAAIF they promised to walk the journey together with other actors and play their part. He emphasized the importance of the pig value chain to small holders and people no longer whisper about it and that pork has demand in Uganda thus should be at the table as a priority. Finally, he appreciated ILRI for embracing the collaborative approach, looking forward to embracing the vision of SAAF in the next 10 years.

Annexes

Annex 1: Program– SAAFs ToC and market systems workshop

Time	Activities	Process/in-charge	Logistics
8.30-9.00	Registration		
9:00-9:30	Introductions		
9:30-10:00	Opening session		
	Welcome, introduction, objectives		
	Remarks by Country Representative, ILRI Uganda		
	Remarks by Government Representative – MAAIF		
10:00-10:30	Coffee / Tea Break		
10:30-11:30	Introduction to ToC general and SAPLING ToC	Presentations Emily	
	SAPLING ToC (piggery VC) – Achievements and lessons learnt, next steps	Peter Oba Dreck – AMR- Poultry & piggery Nicholas- Zoonoses	
11:30-12:00	CGIAR Research portfolio and SAAF (including Areas of Work)	Presentation Karen	
12:00-12:30	Overview of MSA workshop- Summary of challenges identified by the market actors	James and Market system Actor- Rep	Summary of outcomes from MSA workshop
12:30-1:30	Coffee / Tea Break		
01:30-02:30	Group exercise 1 – Research prioritization (structured roughly by SAAF AoW 1-5): What are the big issues, challenges and opportunities? What are the national research priorities to address them? Which researchable areas have CGIAR comp. advantage? (would the participants know?) Which are the first two priorities? Why?	Break out groups- (5 groups, 5 topics) (group composition criteria- area of work)	Each group to enter their content into a table on a laptop
03:00-04:15	Report back and discussion (Generate a list of the priority areas)	Plenary	
04:15	End of day 1		

Day 2

Time	Activities	Process/in-charge	Logistics
8.30-9.00	Arrival and registration		
9:00-9:15	Recap day 1.		
9.15-10:30	Group Exercise 2: Development of SAAF Theory of Change	Break out groups	Soft copies of forms shared- to be completed by the group members
	Major problems and opportunities identified and prioritized on Day1	Plenary	
	10-year vision	(A small group to synthesize a combined vision and Long-Term Outcomes)	
	Long term changes (outcomes) to achieve the vision		
	For each long-term outcome, short-term outcome (3 years) changes (capacity, knowledge, awareness) we want to see		
	Report back		
10:30-11:00	Coffee / Tea Break		
11.30-12.00	Introduce innovations and innovation packages, technology bundling and integrated approach	Presentation Emily	
12.00-01:30	Group Exercise 3: Design innovation packages (by each group to achieve the respective Long-Term outcome/s) and activities to attain the same-	Break out groups and Plenary	
	Report back		
11:30-12:00	Research locations, Actors, assumptions, risks, indicators and measurement approaches	All	
01:30-02:00	MEL: How will we use the ToC to monitor, evaluate and learn	Presentation – Karen	
02:00- 02:30	Reflection and Review	All	
	Final remarks	Government representative, ILRI	
02:30- 3:30	Lunch and departure		

Day 3

Time	Session	Notes
8.30-9.00	Arrival and registration	
08:30	Registration	
09:00	Welcome, agenda, objectives	Pamela
09:30	Opening remarks	Emily Ouma
10:00	Coffee BREAK	
10:30	Participatory market mapping	Pamela
	Group exercise (break into market system group – core market, inputs & services, enablers)	
	Groups discuss the following questions	
	Core market – how do they add value to the market system?	
	Support functions – How does the rest of the market system benefit from their services?	
	Enablers – How does the rest of market system benefit from their services?	
	Market actors develop the market map by:	
	Outlining the actors with whom they are connected	
	Explaining the actors that benefit from their services or input	
	Identifying the actors that are affected by the issue they address	
11:30	Understanding system blockages	
	Group exercise (break into market system group – core market, inputs & services, enablers)	
	Groups discuss:	
	Biggest challenges, contributing and affected actors and how the problem affects the market system	
	In plenary	
	Groups present as facilitator capture and cluster expressed problems	
	Participants agree on most contentious blockages	
13:00	Lunch BREAK	
14:00	Root cause analysis	Emily
	Group exercise (break into “system blockage” groups)	
	Introduce the concept of causal loop diagrams and introduce “seed structure” based on system blockages	
	Divide participants into groups – per blockages and let each group develop their CLD	
	Each group present in plenary	
15:00	Coffee BREAK	
15:30	Root cause analysis	Pamela/James
	Each group presents their CLD	
16:30	Closing	

Day 4

Time	Session	Notes
08:30	Recap	Ronnie
09:00	Root cause analysis Group exercise (still in “system blockage” groups) Discuss the performance of functions associated with blockages Describe why functions and rules underperformed Each group present in plenary, outlining why (mismatched, inadequate, absent) functions are underperformed	Pamela/James
10:30	Coffee Break	
11:00	Prioritizing market system constraints Group exercise (still in “system blockage” groups) List the constraints identified according to functions – core function, support functions, rules/norms Rate the constraints in terms of how they negatively impact the functioning of the market system Red – significant Moderate – orange Green – low Groups decide which constraints are a priority based on feasibility, impact, sequencing, and importance. Groups present in plenary	Groups: James Rao
13:00	Lunch BREAK	
14:00	Creating a shared vision Group exercise (working mixed groups – each for one blockage) Discuss how the market system might look different if blockages are addressed Develop CLD to illustrate the effects of various factors on success Report back in plenary Facilitator Capture emerging vision of change Identify market interest groups	Groups: James Rao
16:30	Closing remarks	Partners

Annex 2: Research prioritization for each Area of Work

One Health group

What are the big issues/challenges?	What are the opportunities?	What are the national research priorities to address them?	Which researchable areas have CGIAR comp. advantage?
Zoonotic diseases	Existing Priority Zoonotic Diseases list	OHSP is under revision.	Community-led <i>T. solium</i> control trials (vaccination, deworming, sanitation)
	One Health Task Force is active at the national and district levels	Prevention and control of zoonoses and food pathogens	Spatial risk mapping using One Health risk models
	National deworming and sanitation campaigns		Integrated sampling from pigs and humans for burden assessment
AMR/AMU	NAP-AMR strategic areas already defined	Developing new diagnostics.	AMU quantification and pattern analysis at pig farm and slaughter points
	AMR recognized as a top global health priority by WHO, FAO, WOA, and the UN	Promote preventive measures	Piloting integrated AMR stewardship models (vaccination + biosecurity)
		New therapeutics	
	CGIAR's AMR platform provides institutional leverage	Innovative strategies to reduce transmission and prevent infections	
Food safety – pathogens, residues in pork	Growing donor investment in One Health AMR research		
	UNBS and DVO food safety initiatives (lab testing, inspection, etc.)	Monitor chemical and microbial hazards	Risk assessments of Salmonella, E. coli, and residues in pork
	Support from various partners and government on pork hygiene training	Improve inspection and testing	Studies on antimicrobial residues and meat withdrawal compliance
	Community interest in safe pork		Evidence-based models for training meat inspectors and butchers
OH systems and capacity gaps	Existing OH task forces at sub-national level	Build capacity at district level	One Health training programs and M&E frameworks for pig value chains
	Donor interest in strengthening workforce	Train frontline OH actors	
	Alignment with OHSP and MoSTI priorities	Develop institutional coordination mechanisms	Research on operationalizing district-level OH teams for pigs
			Institutional readiness assessments across sectors

Biosafety and biosecurity (Biosecurity and disease control)	Existing national and regional laboratories	Promote cost-effective biosecurity	Participatory biosecurity design and on-farm trials
	Farmer's willingness to adopt prevention practices post-outbreak	Improve detection and reporting of zoonoses	Early detection tools and predictive spatial risk models
	FAO, district extension vet extension workers and MAAIF are active in ASF training	Coordinate response across districts	Studies on adoption, barriers and incentives for prevention behaviours
	Willingness to adopt vaccination		
Policy and institutional gaps	OHSP under review (2024– 25)		Policy implementation, research, and stakeholder analysis in pig systems
	Existing policy instruments Cross-ministerial support for OH platform		Case studies on intersectoral collaboration in disease control
Surveillance system weaknesses			Evaluation of OHSP rollout in pig-producing districts
	Existing tools (e.g., EMA-i) are not fully used	Operationalization of the integrated surveillance tool	Digital disease/AMU surveillance tools for farmers and DVOs
	MoSTI's interest in digital innovation		Studies on interoperability between vet, lab, and health sectors
Environmental risks (waste, water, zoonotic spread)	DVOs willing to adopt a streamlined system		
	WASH and sanitation programs at district level	Evaluate waste impact on water/soil	LCA (life cycle assessments) of the environmental impacts of pig systems
	Local demand for manure and biogas products	Promote safe waste management and re-use	Waste-to-value research (biogas, composting)
		Monitor environmental contamination	Environmental surveillance for zoonotic and chemical hazards

Productivity+ group

What are the big issues/challenges	What are the opportunities?	What are the national research priorities to address them?	Which researchable areas have CGIAR comp. advantage?
Inaccessibility of preferred and suitable pig breeds in Uganda	Scaling use of long-term semen extenders and distribution centres in districts Number of AI inseminators is low	Increase production and productivity of livestock esp. piggery Evaluate different breeds for different agro-ecologies	Pig performance evaluation of different breeds for different production systems Scale out use of long-term extenders (10 days)
Expiry of boar semen within 3 days	Low number of semen banks in districts – long distance travelled to reach farmers Low conception rates	Increase production and productivity of livestock esp. piggery Evaluate different breeds for different agro-ecologies	Pig performance evaluation of different breeds
Service providers (AI technicians, animal health care workers) and traders associated with disease spread in pig farms	Build on existing on-farm biosecurity interventions	Increase production and productivity of livestock esp. piggery	Pig performance evaluation of different breeds for different feeds & production systems Capacity building
Persistent ASF outbreaks in pig farms.	Role of small birds (finches) in ASF transmission between farms unknown, but suspected (nearby farms often affected)	Reduce livestock disease burden and impacts on livelihoods	Excellent ASF research capacity Suggested: capture birds, swab feet and beaks, then release or tag the birds and monitor their movements
Low adoption of health and biosecurity practices	High disease incidence and burden in farms (esp ASF).	Reduce livestock disease incidence and burden in the country	Excellent research capacity on health, diseases and biosecurity by ILRI
No data or evidence on GHG emissions in pig farms and no information available on best manure management practices	Methodologies developed at Mazingira exist Tools to measure GHG emissions from waste/manure exist	Reducing greenhouse gas emissions and climate change mitigation	Pig performance evaluation of different breeds for different feeds & production system Capacity building Expertise in the measurement of GHG emissions
Poor use of locally available feed resources	More information needed – capacity gaps of actors (farmers) on feeds still exist	Evaluate local feed resources for nutritional composition Production of high-quality animal feeds	Identification and conduct nutritional analysis of local feed resources
Adoption of good manufacturing practices (GMP) by small-scale feed producers remains low	Low quality feeds on the market	Production of high-quality animal feeds	Existing research labs at ILRI Nairobi campus Expertise on capacity building of feed producers
Heat stress in pigs			

Market Systems group

What are the big issues/challenges	What are the opportunities?	What are the national research priorities to address them?	Which researchable areas have CGIAR comp. advantage?
Poor pork quality depends on the quality of inputs and services (feeds & genetics). Safe and quality pork	Growing demand for pork, pig inputs & services Some actors willing to invest in extension Emerging Premium markets “Bazungu market” at local & international levels	Agriculture extension is a key national research priority.	Local Feed trials- vs FCR or growth and pork quality (cost effective feeds) Generation of evidence of the most cost-effective local feeds for production of quality pork.
Linkages between farmers and traders; Input dealers to farmers and traders. Farmer and dealers Farmer, trader, dealer and transport	Some of the existing actors are already in groups Trust and compliance of some farmers & traders	A national research priority on improving animal health and productivity through effective disease control Leverage on existing groups that as a platform to push local government to enforce area slaughter places this will enhance/ better associations among the traders-reduce disease spread enhance production of safe and quality pork Centralized slaughter place enhances with the price standardization	Research and develop models that can foster linkages and build trusts between the different value chain actors. Input dealer-farmers-pig traders.
Limited uptake of innovations like digital platforms (internet enabled device) that could enhance delivery of services. Digital skill gap is still big Issue of follow-up is key Poor marketing skills for the service or product on both farmers and input suppliers No market information systems for pork Farmers lack confidence and negotiation skills and knowledge of quality of their products Unfair prices offered by the aggregators coupled with untransparent price determination for other pig parts Limited investable capital-available and loanable funds. The terms and interest on it are not favorable			

Gender Youth and Social Inclusion group

What are the big issues/challenges	What are the opportunities?	What are the national research priorities to address them?	Which researchable areas have CGIAR comp. advantage? (would the participants know?)
Gender interventions exclusively targeted women and limited male involvement.	Men are interested and willing to participate Male involvement projects interventions within the communities, need to target these projects Involve the entire household Find out about the projects. Tap into learnings from other projects in the community which have successfully promoted male champions, male models or male community groups Deliberate targeting of men	Piggery is a priority enterprise Emphasis on the development of piggery value chain Women and youth empowerment Youth and women into the market economy and employment	Establish factors that limit/enhance male involvement mapping -actors/male models Identify the effectiveness-success factors of previous programs
Limited involvement of community members	Government embraces a bottom-up planning model and social inclusiveness Emphasized by representation of all special groups in leadership	Specific programs and interventions for special groups – youth, women, PWDs, older persons to ensure involvement and benefit for all community members Allocation of % benefits to special interest groups under Parish Development Model	Document case studies for successful individuals on mindset change
Male domination-When men are leaders in groups the women fear to take charge	Women ready to take up leadership position – joint training and sensitization of both men and women and continuous mentorship in confidence building	Affirmative action – women participation	
Persistent social norms that still restrict women's participation in certain aspects of value chains- AI, aggregation, roasting-women mostly in serving AI originally known for cows but not pigs. Its promotion by women in pigs is a double shot Women are against deviating from some of the norms Women engage men in selling their pigs for fear of exploitation from the traders It's a male dominated activity	Presence of women champions aggregators and agri-entrepreneurs To act as champions and train the other women		AI technicians who are trained are not practicing Carry out research on resilient norms Despite the interventions to break the persistent norms, what factors are preventing these norms from being broken
Limited engagement of people with disabilities, Limited youth involvement	People with disabilities are interested, already	Interest groups within government programs	Extent to which PWD have benefited and been empowered

	recognized in government policies Structures are already in place that support their involvement at grassroots and village level Youth interests in agri-entrepreneurship Approaches that support inclusiveness in place		
Farmers Interest in AI but lacked the information - popularization of AI- limited number of persons trained	AI Training persons already in place	One of the interventions to promote livestock production and productivity	Effectiveness of AI in promoting piggery production by women
More interest in incentive-mindset issues	Mindset change is a focus area in national development. Eg one of the 7 pillars of PDM, though ignored Aligning with government programs that engage communities without providing incentives Work more with government or community structures	Mindset change -within the one of programs of NDPIV/ PDM pillar awareness raising interventions -through media	models that best change the mindset of people

Climate and the Environment group

What are the big issues/challenges	What are the opportunities?	What are the national research priorities to address them?	Which researchable areas have CGIAR comp. advantage?
It does not include AMR and heavy metals that may be associated pig manure	Reduction of GHG emissions, pollution	Reduction of GHG emissions from animals and manure. Manure GHG emissions are a major source in Uganda	Enhancement of biogas production from pig manure; addition of cattle manure. Need for research in this area
Should address disposal of manure in heavily intensified systems in urban areas	Organic farming driven markets need manure	Reduction in AMR in manure	Potential of urine as a bio-pesticide. Need for research in how to treat the urine before application and on what pests is the manure effective
Limited research into value addition to manure to facilitate its marketing- need for a business model	Reducing pathogens, AMR and heavy metals through improved manure management	Quality manure required by farmers (in the face of expensive synthetic fertilizers)	Research on value addition to manure
Production systems (e.g. tethering) may not facilitate efficient manure handling	Improvement of herd health through improved manure management		Evaluate slaughterhouse waste management practices for efficiency
Inadequate waste management at slaughterhouses (blood, water, intestinal materials)- These need to be considered	Improving crop productivity in mixed farming. Most smallholder farmers' soils are depleted, improving manure quality is important in improving yields		Need for research on the extent of pollution of water bodies and ground water by manure, this would enhance policy reviews given the magnitude of the issue
Management of odor from the manure in storage is not covered. If odor is managed farmers can be motivated to manage the odorless manure.	Improvement of soil health		
Practices that reduce pathogen transmission by vectors such as houseflies should be fronted	Source of income; feeds from vermicomposting, manure especially for the youth		
Practices that reduce run-off from liquid waste facilities	Biogas production: Compressing and packaging of clean energy for commercialization		
Application recommendations for productivity optimization are lacking	Use of pig urine as a bio-pesticide		
Direct application of manure; need for treatment measures that farmers can be taught			

Annex 3: Visions formulated by each Area of Work

Group	Proposed priority research areas	Vision statement
Productivity+	Pig performance evaluation of different breeds for different feed and production systems Capacity building of all actors – farmers, input and service providers, butchers, AI service providers (new training areas, retooling)	In 10 years, farmers will have access to high quality feed tailored to different production stages. They will raise high prolific pig breeds known for high survival rates, efficient feed conversion, and suitability to various production systems. Competent and suitable actors that will enable pig producers to be knowledgeable and capable
Climate and the Environment	Enhancing the quality of manure will encourage farmers to practice improved manure management practices Management of odor from pig manure; an incentive for people to adopt improved manure management practice; managing environmental pollution,	A dynamic and inclusive pig value chain that ensures sustainable production of safe and high-quality products and fair market access to enhance nutrition and livelihoods
One Health	Zoonoses- Community-led <i>T. solium</i> control trials (vaccination, deworming, sanitation) Spatial risk mapping using One Health risk models Integrated sampling from pigs and humans for burden assessment AMR/U- AMU quantification and pattern analysis at pig farm and slaughter points Piloting integrated AMR stewardship models (vaccination + biosecurity)	A resilient pig value chain with reduced AMR/U zoonoses safer foods and strengthened on health systems
Market Systems	Local Feed trials- vs FCR or growth and pork quality (cost effective feeds) Generation of evidence of the most cost-effective local feeds for production of quality pork. Research and develop models that can foster linkages and build trusts between the different value chain actors. Input dealer-farmers-pig traders.	A coordinated market system driven by information sharing and strategic alliances that enhance trust, strengthen efficiency and inclusiveness
Gender and Social Inclusion	Gender interventions exclusively targeted women and lacked male involvement Persistent social norms that still restrict women's participation in certain aspects of value chains- AI, aggregation, roasting	Integrated communities thriving in gender responsive pig value chain by 2035

Annex 4: Market Systems Group discussions

Most constraining challenges in the pork market systems- elaborate discussions from the four groups

Challenge/problem from the support side- (Input service providers group)	Contributing actors	Other affected actors	Effect on market
Farmer end- low demand for inputs and services Market end-Market segment for high quality pork is very small	Traders and aggregators- most times want to make wide profit margins and so offer low prices when buying pigs from farmers. Feed ingredient suppliers- maize suppliers hoard maize and sell expensively, fish meal is adulterated	Farmers Feed producers Breeder/ Multipliers AI technicians	Feed producers resolve to make low quality feeds that will be affordable for the farmers but become expensive in the long run as the pig will not be able to achieve optimal growth in time. When the market segment for high quality pork is small, farmers lack an incentive to invest in quality feeds and breeds
Risk of disease and theft	Veterinary officers- big workload Input suppliers-Drug stockists selling expired vac/drugs- lack of supply- lack of knowledge of how and when to vaccinate Farmers-failure to uphold the good biosecurity measures Local government- lack good vac programme, failure to facilitate vets	The entire core and support actors in the value chain are affected	When disease ravages farms, pig population is reduced and the markets run short of enough pork. During African Swine Fever outbreaks, traders offer farmers very low prices for their pigs since majority of the farmers are in a hurry to sell off their pigs.
Farmer perception and knowledge	There isn't enough Veterinary officers and Extension officers to reach the number of pig farmers. AI inseminators and Input dealers seem leave the role of training and extension to the public sector	Input service providers- feed producers, AI service providers, drug stockists Traders	Farmers are unable to produce quality pigs since they are stuck in poor management practices
Challenge/problem from the core-demand side (traders, abattoir operators' group)			
Limited capital	Customers who take on credit and take too long to pay- this, in turn, affects money taken on loan	The consumers with whom we have signed contracts The abattoir and the slaughtermen will receive limited income This also affects the quality of the pork The local government revenues also get affected	The quantity of pork will be affected

High transaction costs when searching for pigs, especially for women – transport costs is double-	Transporters who charge high transport costs	This affects the aggregators This affects the final consumers as the costs are passed on to the final consumer. The farmer is also affected	The women aggregators and traders will offer farmers a much lower price than men traders to cover the additional costs
The transaction costs of the aggregators outweigh the benefits due to the lack of pigs – preference is for coffee	Competing value chains like coffee make pigs scarce and, therefore, make the prices for the purchase of pigs Other operational costs like taxes are rising	This affects the final consumers as the costs are passed on to the final consumer.	The market will have fewer pigs since farmers will be more focused on the value chain that is more profitable hence the cost of pork goes high
Challenge/problem from Core-Supply side (pig farmers)			
Cost of feed is high-price high and feed ingredients are expensive, poor	Maize farmers are few – cost of production high (seeds, fertilizers, pests, cost of weeding)	Pig traders Aggregators Feed stockists	Leads to reduction in pigs reared; Reduction in pigs on market-majority of farmers are not keeping pigs
kg price of maize brand keeps increasing	Unreliable rainy seasons – Poor maize harvests	Transporters Middlemen	Low supply of pigs from the pig farmers-because the cost of production increases.
Quantity of feeds depends on the age of pigs and number of feeds	Priority crop is coffee – competing value chain	Consumer	Elsewhere- farmers' choice and investment depends on season-priorities
Ingredients such as silverfish (mukene), premix also expensive			Commercial farmers are around 5%
A Kg of pork costs between 10000/- to 14000/= pork price is constant, yet feed price is fluctuating			Number of pig farmers reduces, farmers can't afford cost of feeds Market price is low because of poor quality pigs Poor feeding leads to poor growth, High cost of investment to raise large numbers of pigs
Poor quality feeds on the market-leading to poor pig growth	Feed stockists-counterfeits on the market	Pig traders, final consumers	Low demand for services
Farmer is not aware of which feed mixtures to use - several feed companies on the market	Negative margin for the price of feeds	Feed stockist	Low pig weight-poor quality of pork
	Business development services	Pig breeders	Low price of live pigs
		Consumer	Income flows affected
High cost of extension services-more private veterinarians available services is demand driven	Local government has no capacity to service the number of farmers	Pig farmers – AI service providers Input service providers	Low productivity Low demand for the services
Limited vet services, unreliable and unreachable veterinarians			

Challenge/problem
from Support-
(Veterinary, feed
producers)

Lack of access to superior /pork breeds	AI service providers – stud manager, AI technicians	Pig traders, farmers, butchers, processors, retailers	Low prices, delayed fattening, low quality of pork
Poor quality feeds, underfeeding	Feed manufacturers, farmers, feed stockists, UNBS	Pig traders, farmers, aggregators, butchers, processors, retailers, consumers	Low prices, delayed fattening, low pork quality
Suboptimal health – diseases	Vets, drug stockists	Pig traders, farmers, butchers, processors, retailers, breeders, multipliers	Low supply, increased prices, loss of incomes, low quality of pork
Lack of premium pork buyers	Traders, middlemen, aggregators, large retailers	Farmers, local government, researchers, financial services	Poor quality pork, inconsistent supply

Identifying capacity and incentive challenges of pork systems value chain actors

Market actor	Market function	Describe the capacity challenge (inadequate, mismatched, absent) *	Describe the incentive challenge (inadequate, mismatched, absent) *
Core function			
Group 1			
Trader/aggregator/butchers	Offer fair prices to the pig farmers		Inadequate incentive to offer better prices the farmers- a trust issue, when someone isn't a regular supplier, you show no loyalty to them so you can as well offer low prices
	Offer standard price of pork	Regulations or by-laws on unauthorised slaughters are absent Inadequate capacity for collective action among traders	
Farmer	Provide good quality pigs to the traders	Inadequate capacity to manage production costs-by the way business	Unfavourable pricing from traders, farmers cannot be drawn to put effort in providing good quality pigs.
Female aggregators	Offer fair prices to farmers	Inadequate capacity for collective action- so they can do transport sharing this in turn reduces costs when the women traders work together hire a tukutuku	
Supporting function			
Other input service providers like feed producers	Provide quality services and products Offer training on proper use of the inputs	Inadequate capacity to produce quality feeds Inadequate capacity to train farmers sometimes they are in these businesses but have no knowledge of say animal nutrition and are just following some formulas	

Rules/norms

Local government	Develop, enforce standards and regulations in slaughter	No by-laws to enhance enforcement of mandatory use of abattoirs	Absent
	Offer veterinary services including extension	Inadequate capacity i.e ratio of extension officers to farmers is high.	Inadequate incentive- officers most times don't even have fuel for moving

Group 2

Core function

Farmer		Low capacity to make own feeds by farmers	
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Supporting function

Feed producers	Produce quality animal feeds targeting different categories/classes of pigs	Lack of capacity to determine/regulate feed quality	Farmers perceive commercial feeds as costly. Expensive and sometimes unavailable feed ingredients
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Semen producers	Produce quality semen for different categories/classes of pigs	Low capacity to store, and distribute Inadequate to ensure acceptable success rate	Farmer perceive semen as expensive Narrow market for semen use
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Artificial inseminators	Effective distribute and timely insemination of pigs	Poor heat timing by farmers Limited capacity to determine quality of semen	The perception that the cost of insemination of high
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Veterinary and feed stockists	Ensure availability/stock of quality feeds and animal drugs Proper storage vaccines Offer advisory services on feed and drug products	Inadequate capacity for determining quality of feeds and drugs Limited knowledge on which vaccines to dispense for different diseases	Farmer perceive feeds and drugs as expensive Narrow market for drug and commercial feed use
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Group 3

Traders	Purchase pigs		Lack desire to make farmers profitable and sustainable
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Farmers	Supply pigs	Inadequate capacity to consistently supply required quality and quantity	
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Group four

Supporting function

Input and service providers-AI, feeds etc	Collateral requirement Provide quality inputs to farmers	Inadequate capacity to appreciate the value/benefit of extension services to their businesses Farmers not willing to pay for extension services	
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Financial institutions	Provide financial services to farmers, aggregators etc	Inappropriate financial services/collateral requirements are high farmers are not willing to commit the asset to acquire a loan 'Pig belongs to woman and the land title belongs to the man'	
Farmers/traders/large retailers	Create business opportunities that assist them to acquire business services	Limited asset options for collateral use (considering gender ownership of assets)	failure to operate business in legal ways
Rules/norms/enablers			
MAAIF/Local government	Responsible for putting in place extension policies/regulation recruitment of extension workers	Inadequate appreciation of the value or benefit of extension services- Poor prioritization of extension services	Poor alignment of incentives for public interest
Financial institutions	They provide loans They offer financial and advisory services	Inadequate capacity to cover all operational costs for the financial institutions-such as administrative costs, rent, security, transport, salaries, appraisals and monitoring for loan applicants Financial Institutions have few like- minded partners onboard for collaboration opportunities e.g rubber foundation. These could lower the cost of servicing the loan	Inadequate low-cost funds for on- lending by financial institutions Inadequate incentive to reach out to loanees



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