

Needs analysis for the smart pig feeding training for extension service providers in Mukono and Masaka districts, Uganda

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Executive summary

The pig value chain in Uganda needs support to focus on the smallholder pig farmers who constitute the biggest proportion of pig producers. A desired change of turning smallholder peasant pig farmers into commercial pig farmers must be facilitated by different interventions. The key actors in this change process include government extension service providers, private extension service providers, input and output traders and the policy ecosystem entities. Smallholder farmers interact most with the extension service providers making them a strategic focus for interventions towards commercializing smallholder pig production.

To contribute towards helping Ugandan smallholders commercialize pig farming, the International Livestock Research Institute (ILRI) has prioritized the strategy to create focal persons in communities who can train and service farmers to adopt efficient technologies for commercial pig farming. These include equipping farmers with production skills in especially 1) pig feeding, 2) pig breeding and 3) marketing of pig products. ILRI recruited Single Spark, a Dutch agency that helps entrepreneurs in developing countries start businesses, to develop a practical and action-based training on pig feeding for extension workers. A training needs assessment was conducted to get a good understanding of 1) the different services offered by the extension service providers to pig farmers, 2) the level of knowledge of extension service providers in pig feeds and feeding, 3) the competence level in feed formulation, 4) the kind of questions on feeds farmers ask extension workers and 5) the questions that extension workers cannot answer.

The findings were that extension service providers are deficient in knowledge and skills relevant to support pig farmers in feed production and feeding pigs. We therefore recommend that the extension service providers and trainers based in communities be trained in the following topics:

1. Pig requirements (principles of pig nutrition and categorical feeding according to physiological status of animals).
2. Identification and preparation of locally available pig feed resources.
3. Pig feed formulation using simplified technologies such as FeedCalculator App, pig feed mixing and pig feed storage and preservation.
4. Pig feeding and watering (pig feed intake determination, efficient pig feeding technologies, alternative pig feeding, pig watering technologies, step-by-step feeding improvement plans for small holder pig farmers).

Introduction

Uganda is endowed with many resources that support livestock production including pigs. The pig value chain in Uganda needs support to increase pig production among smallholder farmers who produce most of the pork in the country. All stakeholders in the value chain should be involved in bringing about the desired change of turning Uganda smallholder pig farmers into commercial pig farmers. The key drivers of this change will include government extension service providers, private extension service providers, input and output traders and the policy ecosystem entities. Many smallholder farmers interact most with extension service providers making them a strategic focus in commercializing smallholder pig farming.

The number of pigs in Uganda is estimated to be more than 4.2 million (UBOS 2019). Pigs are mostly kept in the central region of Uganda with Masaka District leading and Mukono District third (UBOS 2019). The common breeds of pigs in Uganda include Large white, Landrace, Cambrough, Duroc and local breeds. The most common pig production system in Uganda is smallholder farming with a few commercially oriented farmers. The average selling weight of pigs in Uganda is reported to be 70 kg live weight. The pork prices at butcheries in Uganda range between UGX 9,000–15,000 while the farm gate price is about UGX 4,000–6,500 per kg. Farmers especially the small-scale farmers feed their pigs on forages and kitchen food waste, which may contribute to low average selling weight of about 70 kg in a year.

The poor performance of the pig industry in Uganda may also be attributed to poor access to technologies, skills and knowledge transfer from innovation centres to farmers. The provision of the services can be improved by partnering with the country's agricultural extension system. Therefore, building capacity of extension service providers to better transfer knowledge, skills and technologies would be a better strategy (Davis 2008) than the current system that relies on private companies such as Vetline Services Uganda Limited and individual private veterinarians who give technical service support to small-scale pig farmers. This needs' analysis focused on understanding the capacity needs of the extension service providers in Uganda.

Objective

The objective of this needs' assessment was to have an in-depth exploration of:

1. The services offered by the extension service providers to pig farmers.
2. The level of knowledge of extension service providers in pig feeds and feeding management.
3. The competence level of extension service providers in feed formulation requirements, processing and related adversary services.
4. Farmers' needs in pig feeds and feeding.
5. Knowledge gaps of extension workers.

Methodology

Sample size: The sample size was determined based on the recommendations by researchers Tynan and Drayton (2007). Excluding the facilitator and the representative from ILRI, the five respondents were determined to be effective for this needs' assessment.

Respondents sampling: A multistage sampling method was used. The clusters from which participants were selected were sampled using the cluster sampling method as recommended (Sarriot et al. 1999) to select both public and private livestock extension service providers. Among the clusters, the five participants were purposively selected based on availability, willingness to participate and possession of a mobile phone, with access to stable cellular network.

Sampling area: Though ILRI is running the Uganda Pig Value Chain Priority Country project throughout the country, the sample districts of Masaka and Mukono were purposively selected based on the criteria of convenience and pig industry status.

Data collection: Data was collected through a focused group discussion with respondents from both districts assembled. A discussion guide was used (see annex). Data was captured through both note taking and recording of conversation. Participants consented to recording of data before the core of the discussion was undertaken. The participants were virtually gathered through an online platform using the Airtel Conference calling technology. This was in adherence to COVID-19 standard operating procedures that restricted gatherings and use of public transport in Uganda at the time of data collection. Also, to ensure inclusivity and equal opportunity for the members selected, a commonly used technology, the ordinary phone call, was preferred to the Microsoft Teams, Skype, Zoom and other online calling platforms. Four out of the five selected respondents turned up for the virtual meeting. The meeting held on 5 October 2020 started at 10:00am lasted 2.5 hours with effective discussion of about 2 hours. There was a 30-minute interruption due to network fluctuations. Another challenge was that respondents were not physically present or seen on video, which gives room for impersonation. Some respondents were interrupted by surrounding noises which eventually interrupted the entire group discussion. The discussion was moderated by resource personnel from Single Spark B.V. A representative from ILRI also attended the meeting.

Data analysis: To achieve the objective of this assessment of having an in-depth exploration of selected themes, the data analysis was by a simple descriptive narrative which is recommended for such studies (Sandelowski 2000).

Findings and discussion

1. The main needs and questions asked by pig farmers about diseases, feeds and feeding

The knowledge areas and services demanded by pig farmers in the two districts were ranked by participants as follows:

- Pig diseases, their treatment and biosecurity measures.
- Feeding including sources of feeds, alternative least-cost feed formulas, pig feed intake, watering technologies and recommendations.
- Pig sty designs, construction specifications with emphasis on the safe designs that prevent diseases in pigs.
- Breeding services especially artificial insemination and sources of breeding pig stock.
- Marketing of pigs especially transparency by traders, better prices of pork and sale of live pigs.
- Public health: pork inspection for farmers who slaughter pigs at slabs and on farm.

Although most of the farmers wanted pig diseases' prevention, control and management services; the discussion revealed that feeding is their number one need to enable them make profit in pig enterprises and that extension workers lack knowledge and information that farmers need to formulate feed on farms using locally available resources. This therefore indicates that there may be an opportunity in supporting extension services providers to adequately provide advice on pig feeds and feeding. Also, it was found out that extension service providers interact with pig farmers either remotely through phone conversations or physically through occasional farm visits and training. This calls for retooling of extension service providers as an appropriate strategy for changing the level of pig feeding and pig industry performance in Uganda.

2. The level of knowledge of extension service providers in pig feeds and feeding should be improved

A detailed analysis of the extension service providers' level of knowledge on feeds revealed that most of them could not confidently help pig farmers in terms of pig feeding. Comments such as 'a better extension worker should also be a pig farmer,' 'farmers ask for formulas that include the local feed resources,' 'I consult colleagues or refer the farmer to the feed mills when they need to formulate feeds,' were made by respondents which indicates that extension workers need to be better prepared in delivering knowledge and practical skills to farmers for better services. This cuts across feeding and watering of pigs including feed intake per day, feed formulas, watering technologies, alternative feeding and feed ingredients.

3. Most of the extension service providers are incompetent in pig feed formulation

We further focused on feed formulation competences of the extension service providers. The findings show that most of the extension service providers are incompetent in pig feed formulation. This is because they consider this skill to be more of an experts' domain which may indicate that they did not acquire it in their professional training. It was revealed that extension workers use pig feed formulas from the National Agriculture Advisory Services (NAADS) Pig Production Manual, feed experts, feed millers, internet searches, formulas of concentrates and social media groups (e.g., on Facebook). Those who try to formulate pig feed use approximation methods, which optimise only for protein nutrient in the feed. This has increased errors in pig feed production. Addressing the problem requires introduction and retooling of methods of instant and simple feed formulation technologies as well as knowledge resources tools.

4. Main questions of pig farmers to extension workers

Farmers have questions they frequently asked to extension service providers. These include:

- What is the least-cost feed formula or recipe for pigs?
- What kind of diet should be given to lactating sows especially when they do not produce enough milk for piglets?
- Is it true that pigs stop producing milk for the piglets when they eat their placenta after farrowing?
- Can one feed pigs on pig offal's from the slaughter places?
- Why do pigs sometimes refuse to drink water?
- How do you feed piglets that have lost their mother?
- Is it important to add salt to pigs' drinking water?
- Is it recommended to add salt in pig feed?
- How much salt should one add to pig feed?
- How can one handle piglets and sows that are as a result of inbreeding?
- Will inbred piglets grow well?
- Is there a milk replacer for piglets?
- When should piglets be given iron injection?
- What are the cheapest alternatives of locally available feed resources for pigs?
- Can antiretrovirals (ARVs) help pigs grow faster?
- How much feed should be given to pigs at different stages of growth?

Most feed-related questions cannot be answered by the extension service providers. In addition, it was found that pig farmers take little advice from the extension service providers about pig feeding. They tend to trust feed ingredient sellers and feed stockists more than the extension workers. The commonly asked questions reported here matched with those of smallholder farmers reported by Ouma et al. 2013 and Lukuyu et al. 2017.

5. The challenges of farmers in finding the balance between quality and cost of feed

In addition to the objectives of the group discussion explored above, useful information about the current status of pig farming was gathered. The findings show that pig farmers are divided into two categories: (i) smallholder pig farmers (with less than 10 pigs and mainly utilizing locally sourced feed resources) and (ii) commercial pig farmers (with more than 10 pigs and mainly relying on commercial pig feeds). There are more smallholder pig farmers whose feeding practices are mostly based on household pig waste and forages.

The study revealed that commercial pig farmers who desire to improve the feeding of their pigs do not know the quality of feeds to use and that those who know, lack access to good pig feeds since most feed producers around them do not know how to make quality pig feeds. To get a solution, commercial farmers resort to using commercial protein concentrates, which are good quality pig feeds. Unfortunately, the recipes/formulas provided by the concentrate manufacturers are expensive and the farmers often do not follow them. They instead adjust the recipes/formulas to reduce the cost and make them affordable, thereby compromising their quality. Also, farmers feel cheated by middlemen who buy pigs at very low prices making it hard for farmers to attain high profits that would enable them to buy and use commercial pig feeds. It was also found that farmers who want their pigs to grow very fast have attempted to give them antiretrovirals. However, the extension service providers said that while they have heard about the claim, they have never found any pig farmer practicing it. Some farmers also feed pigs on maize cobs thinking it a quality feed ingredient. It was clear from the study that farmers are constantly in search of cost-effective pig feed formulations.

6. Challenges of water use in farms

Regarding watering of pigs, farmers reported challenges with knowing the recommended amounts for pig. Farmers complain that pigs do not drink water. To ensure pigs drink water, farmers sometimes add salt to the water or give them soapy water after washing utensils at home. Some just do not give pigs water because it only goes to waste as the animals pour it after drinking just a little of it. In communities with seasonal water scarcity, it is considered wastage to give pigs water. It was revealed that some farmers have tried to install semi-automatic watering systems on their farms. However, most of them have had difficulties maintaining them.

Conclusion and recommendation

Based on the findings of this study, we advise that Uganda's extension services providers be trained in the following knowledge and technical skills areas:

- Pig nutritional requirements: extension service providers need to be retrained on pig nutritional and feeding requirements to address the physiological needs of pigs. This will enable the services providers gain the skills and capacity needed to advise and recommend to farmers the nutritional requirements in terms of energy and protein needs of pigs as there is no such thing as a 'standard' diet for pigs. Extension service providers also need to enhance their capacity to advise farmers on suitable feed ingredients for pigs, because they are monogastric (single stomach animals), optimum daily feed intakes level, and use of feed formulations that produce balanced quality feed diets for pigs.
- Pig feed resources: because pigs have single stomachs, they are inefficient digesters of fibre (only 50% efficiency depending on type of fibre and age of the pig) therefore they are not suited to eating pasture alone and need to be given supplementary feeding. It is recommended that pigs are provided with a complete (manufactured) diet or a home mixed diet that has been formulated to meet their nutritional needs. Extension service providers need to be retrained in identifying good feed sources such as cereal grain including locally available and alternative pig feed resources, and feed processing methods (e.g., grinding, cracking, chopping, sorting etc.) that farmers can use so that available feeds are best utilized by pigs.
- Formulating and producing pig feeds: pigs are omnivores therefore eat a range of foods. If farmers are mixing own feed, to produce a well-balanced diet, a range of ingredients should be included in small amounts (e.g., meat meal, fishmeal, soya bean meal, blood meal, grains, bran, minerals, vitamins, salt, limestone etc.). Extension service providers need to know the feed formulation applications and be equipped with knowledge on feed mixing, storage and preservation. With these skills, the service providers can help farmers to make balanced pig feed diets including by installing feed formulation applications on farmers' phones or making recipes for farmers who do not have smartphones or cannot formulate diets on their own.
- Watering pigs: fresh water should always be available and accessible to all pigs (including piglets). Extension service providers need to know about watering of pigs especially in determining their water intake per day. Also, extension service providers need to know how to advise farmers on strategic plans for improving pig feeding and watering.

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Annex

Draft focus group discussion guideline for the training needs assessment of ToTs

Recommend group size: at least 4 extension workers

Objectives

To get a good understanding of

- The different types of services offered by the extension service providers to pig farmers
- The level of knowledge of extension service providers in pig feeds and feeding
- The competence level in feed formulation
- The different kind of questions on feeds farmers ask extension workers
- The different questions that extension workers cannot answer

Preparation

- Recording device for the facilitator

Introduction

- Welcome and thank you very much for agreeing to participate in this focus group. My name is Joshua Isiko. This focus group will be the input for the development of training for trainers on pig feeds and feeding. My role is to guide the discussion today. We encourage you to be honest, open and share your opinions, ideas, and feelings.
- There are no right or wrong answers to the questions I'll be going to ask, so please just relax and enjoy the discussion.
- Before we get started, there are just a few things I'd like to point out. As you may have noticed, the discussion is being recorded. The recording of our conversation is for use with my colleagues to allow us to remember the conversation when we are writing our report. Your responses are completely confidential. In our report, your name will not be connected to any of your responses.
- If you have a question or need some more explanation on anything that will come up, or a translation when it is not clear enough in English don't be afraid to ask me or members.

Housekeeping rules

- Each of you has been asked here to offer your views and opinions, so participation from everyone is important.
- Please speak one at a time.
- When you are not speaking, please mute your microphone.
- It is OK to disagree with each other because there are no right or wrong answers to these questions. If you dislike something or disagree with something that is said, I want to hear it.
- Please use first names only when speaking.
- All answers are confidential, so feel free to speak your mind.
- Does anyone have any questions before we start?

Focus group topics

Topic	Questions and format																		
Services offered by extension service providers (10 minutes)	<ul style="list-style-type: none"> • What are the services you offer to pig farmers? <table border="1"> <thead> <tr> <th>Type of service</th> <th>Frequency per month</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Type of service	Frequency per month																
Type of service	Frequency per month																		
The level of knowledge of extension service providers in pig feeds and feeding (20 minutes)	<ul style="list-style-type: none"> • How easy do you give services in line with pig feeding and feeds? • How do you deal with pig feeds and feeding-related services if you cannot offer them? • How do you differentiate the quality of an ingredient? • How have you been handling water-related problems? 																		
The competence level in feed formulation (15 minutes)	<ul style="list-style-type: none"> • If a pig farmer asks for pig feed formula, how do you get the formula? • Do farmers use different recipes according to the different stages or physiological states? 																		
The different kind of questions on feeds farmers ask extension workers (15 minutes)	<ul style="list-style-type: none"> • What are some of the questions pig farmers ask about feeds? 																		
The different questions that extension workers cannot answer (10 minutes)	<ul style="list-style-type: none"> • Which of the questions asked are hard for you to answer? 																		



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