



Biosecurity in pig farms and the provision of animal health services in the United Republic of Tanzania: Should public-private partnerships be the way forward?

A snapshot from public and private livestock field officers in Sumbawanga

INTRODUCTION

Biosecurity is “a strategic and integrated approach to analysing and managing risks to human, animal and plant life and health, and associated risks to the environment” (Food and Agriculture Association of the United Nations [FAO], 2007). Simply, once a health risk or threat is identified, measures must be put in place to manage the risks. There are many laws, regulations and guidelines on biosecurity in livestock farming that aim at ensuring farmers adopt practices that minimize the risk of introduction and spread of animal pathogens.

This brief presents a snapshot of biosecurity in the Tanzanian pig sector and a quick assessment of the capacity of public and private animal health services suppliers to provide biosecurity advice to farmers. Existing laws, regulations and guidelines on biosecurity can make a difference only to the extent that they reach and are applied by livestock farmers.

BIOSECURITY IN THE TANZANIAN PIG SECTOR

There are approximately 3.2 million pigs distributed throughout the United Republic of Tanzania (United Republic of Tanzania, National Bureau of Statistics, 2021). About 537 000 households (7 percent of all Tanzanian households) raise pigs. While the average herd size is six heads, the sector is dominated by

Figure 1. Business model canvas of private animal health service providers in Sumbawanga, United Republic of Tanzania, 2020



Source: United Republic of Tanzania, National Bureau of Statistics. 2021. National sample census of agriculture 2019/20: National report, Dodoma.

smallholders: indeed, 77 percent of pig-rearing households keep an average of three animals (United Republic of Tanzania, National Bureau of Statistics, 2021). Households keep pigs as a store of wealth, and for income generation, food security and manure production (Kimbi *et al.*, 2015), and many do so on an opportunistic basis (Wilson and Swai, 2014). Figure 1 presents the distribution of the pig population reported by smallholder farmers as of 1 August 2020.

The Tanzanian pig industry has experienced rapid changes in recent decades and has the potential to become a dynamic market-oriented sector, operating sustainably to contribute to increased nutritional security, livelihoods and economic growth (Maziku, Desta and Stapleton, 2017). Between 2007/08 and 2019/20 – the years of the two most recent national agricultural censuses in the United Republic of Tanzania – the number of pigs raised in the country doubled from 1.6 million to 3.2 million, while the number of pig-raising households did not significantly change, decreasing from 521 000 to 517 000. The sector is thus clearly experiencing a process of intensification, with producers aiming to satisfy the burgeoning demand for pork of a growing and increasingly affluent population.

The performance of small-scale pig farming, however, is generally low due to poor husbandry, inadequate support services, rudimentary slaughtering practices and limited marketing infrastructure (United Republic of Tanzania, Ministry of Livestock Development, 2006). For example, in 2019/20, 42 percent of pig-rearing households reported occurrence of pig diseases and approximately 14 percent of all pigs died, which highlights the significant negative socioeconomic impact of poorly controlled disease on pig farming in the United Republic of

Box 1: What is the “Progressive Management Pathway for Terrestrial Animal Biosecurity (FAO-PMP-TAB)”?

This brief summarizes information collected in Sumbawanga, United Republic of Tanzania, as part of the [Progressive Management Pathway for Terrestrial Animal Biosecurity \(FAO-PMP-TAB\)](#) of FAO. The FAO-PMP-TAB is a collaborative, stepwise approach to assessing and managing biological risks, aimed at strengthening biosecurity in terrestrial animal production and associated value chains. In the United Republic of Tanzania, the focus is on pig value chain actors, initially producers, to adopt minimum biosecurity practices at the farm level that will minimize health threats, including disease and antimicrobial resistance. To this end, a checklist outlining the minimum biosecurity standards for pig farms in the United Republic of Tanzania has been developed based on existing assessments of the pig value chain and through stakeholder consultation. The FAO-PMP-TAB should be implemented through public-private partnerships and with shared public-private responsibilities. Using this joint approach, both sectors can achieve common objectives that deliver benefits sustainably. Such collaboration is timely since livestock sectors in the United Republic of Tanzania and most African countries are growing rapidly while public resources are dwindling (FAO, 2022). The private sector is instrumental in filling the widening gap to ensure that farmers are provided with livestock extension services.

Tanzania (United Republic of Tanzania, National Bureau of Statistics, 2021). Notably, approximately 27 000 households reported that their pigs were affected by African swine fever (ASF), which killed over 130 000 pigs (United Republic of Tanzania, National Bureau of Statistics, 2021). Most outbreaks of diseases such as ASF on farms are caused by human actions such as movement of infected animals to the farm, sharing of infected breeding boars between farms, use of contaminated feed, and poor disposal of infected waste that may be spread by scavenging animals such as birds and dogs.

Basic biosecurity is the best and only way to prevent the introduction and spread of ASF and many other diseases on farms (Arias and Sánchez-Vizcaíno, 2002). An analysis of husbandry practices among pig producers in the Songwe and Ruvuma Regions of the United Republic of Tanzania, for example, showed that less than 50 percent of farmers regularly cleaned their pig premises, and that only around 53 percent used personal protective equipment (PPE) (Ngosomwile *et al.*, 2021). This implies that the adoption of basic biosecurity practices, which requires marginal changes to existing business models, could greatly improve pig productivity by minimizing the risk of pathogen introduction and spread, and deaths of animals. In the case of ASF, for example, it has been predicted that biosecurity measures implemented within 14 days of the onset of an epidemic can avert up to 74 percent of deaths (Barongo *et al.*, 2016).

Two actors play major roles in enhancing biosecurity at the farm level. Pig farmers, who are supposed to adopt biosecurity practices that minimize introduction and spread of diseases within and outside the farm; and both public and private animal health service suppliers (known as livestock field officers [LFOs]), who are expected to provide farmers with advice, as well as inputs in some cases, to adopt good biosecurity practices. This brief provides insight into the functioning of the animal health workforce in the United Republic of Tanzania and its capacity to interact and cooperate with livestock farmers, facilitating farmers' adoption of good biosecurity practices and compliance with animal health legislation to ensure prevention and timely detection of animal disease and improve health outcomes.

METHODOLOGY

We held focus group discussions and interviewed a sample of 14 public and private LFOs working in Sumbawanga Municipal Council of Sumbawanga Municipality, one of the four districts of Rukwa Region, United Republic of Tanzania. There are over 17 000 pig-rearing households in Rukwa, which has a pig population of almost 150 000 heads. Respondents operated in the wards of Izia, Katandala and Kizwite. A ward is an administrative unit composed of several villages and streets. The discussions and interviews took place in October 2023 in Kiswahili and were aimed at generating information on:

- the capacity of public and private LFOs to deliver livestock-related extension services;
- the nature of the relationship between public and private LFOs; and
- evidence on the business models for private LFOs.



LFO using the checklist to assess on-farm biosecurity with a pig farmer in Sumbawanga.

FINDINGS

Public livestock field officers

LFOs are front-line animal health or extension staff, employed by the public or private sector, with a certificate or diploma in animal health and production from livestock training agencies or occasionally from private livestock colleges. LFOs provide services to private actors such as farmers at the village and ward levels (Msuya, 2021) and enforce animal health policies, strategies and (by-)laws at the local level. According to the National Sample Census of Agriculture (United Republic of Tanzania, National Bureau of Statistics, 2021), only 9 percent of households rearing livestock in the United Republic of Tanzania received livestock extension services, and only 5 percent of households in Rukwa Region received extension advice (United Republic of Tanzania, National Bureau of Statistics, 2021).

Working conditions

Sumbawanga Municipal Council has a total of 22 staff members. Six individuals are stationed at the headquarters and 15 LFOs operate at the ward level. Each ward generally has one stationed LFO, and each LFO is responsible for at least five villages/streets and 50–100 farms. While all public LFOs are required to meet with their supervisors and submit reports at least once per week, in some wards they are also required to visit the head office.

In terms of their usual working week, LFOs “have no specific timetable” (public LFO). They service small- to large-scale pig farmers (from five to 100 pigs) by conducting routine visits, or receive requests and attend to sick animals, occasionally spending up to two hours on the road to reach farms. The number of days per week they spend visiting farms varies from week to week. The main services that LFOs provide to pig farmers are advice and treatments for animal diseases (commonly for ASF outbreaks, swine erysipelas, internal and external parasites, and diarrhoea in piglets). Farmers also request advice on feed formulation and breeding/genetics, and it was reported that “pig farmers are more inquisitive than others” (public LFO),

suggesting that they are more eager to learn and improve the production of their farms. LFOs also perform inspections of slaughtered animals. However, as there is no specified, common slaughter point for pigs, they are expected to visit multiple points to inspect slaughtered pigs, which is usually done in the morning.

Capacity and challenges

LFOs reported being moderately satisfied with their jobs in terms of income and respect from the communities in which they work. When asked to rate their level of job satisfaction, LFOs reported an average rating of seven out of ten, with a range of six to nine). However, they all have an additional job, either keeping livestock or engaging in other businesses (unspecified), which implies that either their salary is insufficient or that being an LFO is not a full-time job. LFOs reported never receiving transport allowances, making it difficult for them to travel to meet farmers’ requests: “the challenge lies ... in how to effectively reach farmers” (public LFO). Farmers also rarely reimburse transport costs. Issues with efficient transportation and the need to collect outstanding payments from farmers is causing conflicts of interest and challenging the relationship between farmers and LFOs.

LFOs rarely receive PPE to use during farm visits and report that “it is hard to deliver good services due to lack of equipment and drugs” (public LFO). All LFOs reported not having participated in government training in the last 12 months and a lack of standard guidelines that can be used when providing animal health or disease control services to pig farmers. They rely on their own knowledge. Occasionally, they are called out to provide advice (for instance, on crops) or to perform tasks that they are not trained for and report that “the Ministry is causing confusion by merging us with the agriculture department, making our work more challenging” (public LFO).

Private livestock field officers

Private LFOs are graduates with diplomas and occasionally bachelor’s degrees. They spend most of their time in agrovet shops, assisting customers who visit in person and providing telephone advice and services. Some have contractual agreements with farmers and allocate a number of days per week for visiting farms, which suggests there is capacity and willingness to pay for extension services and production inputs. They serve both smallholder and large-scale pig farms, often servicing over 20 farmers per week. “Most farmers seek services for animal treatment” (private LFO), farm management and vaccination. “Competitive pricing, excellent service and ensuring constant supply of drugs” and “... offering quality consultation services” (private LFO) were key contributing factors for customer retention.

They described initial capital, equipment, transport, veterinary input, communication and business skills as essential resources for running their business (see Table 1). In general, procurement of veterinary inputs, transport and service charges are major variable costs, while rent for agrovet shops and utilities are the largest fixed-cost items (see Table 1).

Private LFOs reported very frequently cooperating with public sector officers, in addition to veterinary input suppliers and fellow agrovet. Cooperation with public sector officers was said to be helpful in garnering trust from farmers.

Table 1. Business model canvas of private animal health service providers in Sumbawanga, Tanzania

Key partners	Key activities	Value propositions	Customer relationships	Customer segments
<ul style="list-style-type: none"> Public LFOs Veterinary drug/input suppliers Fellow agrovets 	<ul style="list-style-type: none"> Provision of advice or extension services Management of agrovet shops Sale of veterinary drugs 	<ul style="list-style-type: none"> Competitive pricing Constant availability of animal drugs (to meet demand) Quality consultation services (customer care) 	<ul style="list-style-type: none"> Interpersonal relationships Long-term relationships 	<ul style="list-style-type: none"> Individual livestock farmers
	Key resources <ul style="list-style-type: none"> Agrovet shops Veterinary inputs Transport vehicles Telephones 		Channels <ul style="list-style-type: none"> Agrovet shops Farm premises Telephone Meetings 	
Cost structure <ul style="list-style-type: none"> Fixed: rent for agrovet shops and utilities Variable: purchase of animal drugs and transport costs 		Revenue streams <ul style="list-style-type: none"> Service provision (TZS 50 000 for standard visits) Sale of veterinary drugs/inputs Management of agrovet shops 		

Source: Author's own elaboration.

Overall, private LFOs are moderately to highly satisfied with their position in the community in terms of their job, income and perceived respect. They felt as though “providing treatment ... enhances [their] relationship with the community” (private LFO) and were comfortable with the mobile services provided. However, private LFOs described issues with the high taxes paid to manage agrovet shops.

In Table 1, we provide a snapshot of the business model of private animal health services using the business model canvas. The business model canvas represents a business enterprise based on nine major building blocks, including (i) key resources; (ii) key activities; (iii) key partners; (iv) customer segments; (v) value proposition, which concerns the real benefits that an enterprise delivers to its customers (e.g. affordably priced animal health services versus comprehensive animal health services); (vi) customer channels, the way in which enterprises get in touch with their customers (e.g. at the retail store or via phone); (vii) the customer relationship, the way in which enterprises interact with their customers (e.g. one-off versus long-term transactions); (viii) cost structure; and (ix) revenue streams.

CONCLUSIONS

The provision of livestock extension services appears to have little effect in Sumbawanga. Public LFOs face a multitude of constraints in enacting their responsibilities and providing private actors, such as producers, with extension services and enforcing laws and regulations. They lack resources (e.g. transport allowances) to service the large number of farms within their designated catchment areas in a timely manner and report having limited technical capacities in some circumstances. In addition, they reported not having clear guidelines to follow when providing technical assistance to farmers and not receiving any refresher trainings, both of which further limit their capacities to effectively provide services. While private LFOs seem more effective at reaching farmers and providing services to them, they tend to serve only those few farmers with the capacity and willingness to pay for their services, and for vaccines and drugs.

While the information we gathered does not suffice to statistically portray the situation of livestock extension services in Sumbawanga, our qualitative findings are consistent with the agricultural census data (United Republic of Tanzania, National Bureau of Statistics, 2021). In 2019/20, in Rukwa Region, only 10 percent of livestock-keeping households received extension

Table 2: Summary of focus group discussions with public and private livestock field officers in Sumbawanga (n=14)

Dimensions	Public livestock field officers	Private livestock field officers
Main activities	<ul style="list-style-type: none"> Provision of technical advice to farmers Disease prevention (dipping and vaccination) Disease treatment Disease reporting Meat inspection Provision of advice on feed formulation or nutrition Provision of advice on breeding Administrative data collection Enforcement of regulatory measures 	<ul style="list-style-type: none"> Provision of advice on general farm management Sale of vaccines and animal drugs Disease prevention (e.g. vaccinations, anti-parasitic drugs) Disease treatment Feed formulation or nutrition
Total number of farms serviced	<ul style="list-style-type: none"> Most often responsible for 50–100 farms with approximately 45 farms serviced per week 	<ul style="list-style-type: none"> Provides services to an average of ten farms per week (range of two to 35 farms)
Transport	<ul style="list-style-type: none"> No allowance provided by the Government and farmers rarely reimburse transport costs 	<ul style="list-style-type: none"> Transport at own cost (included in service fee)
Use of PPE	<ul style="list-style-type: none"> No PPE provided by the Government 	<ul style="list-style-type: none"> No information provided on use or provision of PPE
Training	<ul style="list-style-type: none"> Participated in no training over the last 12 months 	<ul style="list-style-type: none"> Participated in no training over the last 12 months
Other income sources	<ul style="list-style-type: none"> Yes, including keeping livestock and managing other businesses (unspecified) 	<ul style="list-style-type: none"> Yes, including keeping livestock, owning agrovet shops and other jobs (e.g. being a pastor)
Main issues reported	<ul style="list-style-type: none"> Lack of transport allowance Lack of PPE provision Inability to meet requests/demands of all farmers Lack of clear guidelines for provision of advisory services Knowledge gaps 	<ul style="list-style-type: none"> High rent and taxes paid for agrovet shops Maintaining a constant supply of veterinary drugs to meet demand Business knowledge gap

advice on animal diseases, and only 5 percent received extension advice on feeding. The public sector is the most important provider of livestock services, which it provides to three quarters of the farmers who request them.

Longer-term solutions, such as the provision of sufficient and sustainable funding for local governments to expand the animal health workforce and improve resourcing, are unlikely. As such, given the overlapping key activities and challenges faced by both public and private LFOs (see Table 2), closer partnerships could indeed be beneficial and sustainably fill the capacity gap. Moreover, some private service providers stressed that cooperation with the public sector is beneficial to their business. At the same time, the provision of basic guidelines (that are easily understandable by both public and private service providers and farmers) on basic biosecurity practices to prevent disease, limit veterinary costs and improve productivity and profitability could represent a simple entry point for facilitating cooperation as well as better supporting farmers in adopting biosecurity practices and supporting livestock sector growth, livelihoods, food security and public health.

THE WAY FORWARD

This brief is a result of stakeholder consultations and will be made available to all stakeholders involved. Key results will be used during a participatory workshop, planned for December 2023 in Sumbawanga, United Republic of Tanzania, to co-create a pilot intervention that ensures the uptake or progressive adoption of the biosecurity checklist. In addition, this approach of gathering data through participatory methods with local stakeholders on the ground and focus group discussions will hopefully serve as a template for other countries with similar endeavours.



Typical example of a pig farm in Sumbawanga.

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