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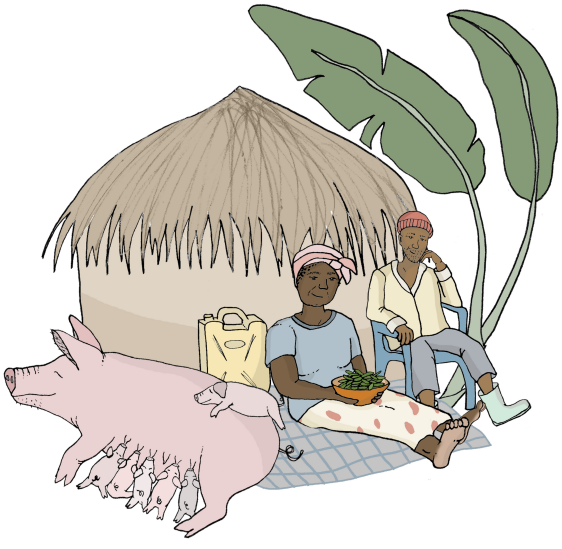
Smallholders and pigs in northern Uganda

An ethnographic study of pig rearing, disease management and local knowledges

Anna Arvidsson



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Abstract

In Uganda, pig numbers have increased rapidly in recent decades, with the majority reared by smallholder farmers in rural areas. It has been suggested that pig production can play an important role in reducing rural poverty. However, the severe and often fatal disease of African swine fever (ASF) represents a major threat to the Ugandan pig sector, hampering its potential to mitigate poverty. This thesis work is situated in post-conflict northern Uganda and aims to contribute knowledge about the challenges that smallholders face in pig production, paying particular attention to ASF. A discourse analysis of policy documents informing the Ugandan veterinary and agriculture sector was combined with ethnographic fieldwork among smallholders in northern Uganda. Results show that pig diseases such as ASF are one of many challenges faced by smallholders who keep pigs. Besides the obstacle of pig diseases and the associated difficulties commonly experienced, smallholders described social tensions caused by the possibility of accumulating individual wealth through pig production. The findings also reveal that smallholders have very limited access to veterinary services and are therefore heavily dependent on the resources and knowledge available in their local communities when dealing with pig diseases. In contrast to the dominant development narrative found in agricultural policies, which focus on transforming smallholder farming into large-scale agriculture, smallholders often perceive their own pig production as a potential launch pad out of poverty, rather than as a means to become large-scale farmers. Despite all the challenges associated with pig rearing, most smallholders continue to invest in pigs in the hope of improving their everyday lives and their future.

Keywords: Pig production, African swine fever, smallholders, local knowledge, Uganda

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Abstract

Under de senaste årtiondena har antalet grisar har ökat markant i Uganda, de flesta uppfödda av småbrukare på landsbygden. Det har föreslagits att grisproduktion kan spela en viktig roll i fattigdomsbekämpning på landsbygden. Den allvarliga och ofta dödliga sjukdomen afrikansk svinpest utgör dock ett stort hot mot Ugandas grissektor och minskar dess potential att bekämpa fattigdom. Detta avhandlings-arbete är situerat i ett post-konfliktområde i norra Uganda och syftar till att bidra med kunskap om de utmaningar som småbrukare möter i grisproduktion, med särskilt fokus på afrikansk svinpest (ASF). En diskursanalys av policydokument som vägleder den ugandiska veterinär- och jordbrukssektorn kombinerades med etnografiskt fältarbete bland småbrukare i norra Uganda. Resultaten visar att grissjukdomar, så som ASF, är en av många utmaningar inom grisproduktionen. Förutom grissjukdomar och de svårigheter dessa medför, beskrev småbrukare att möjligheten att bygga individuellt välstånd genom grisproduktionen gav upphov till sociala spänningar. Resultaten visar även att småbrukare har mycket begränsad tillgång till veterinärtjänster. I hanteringen av grissjukdomar är de därför starkt beroende av de resurser och den kunskap som finns tillgängliga i lokalsamhället. I kontrast till det dominanta utvecklingsnarrativ som påvisades i jordbrukspolicys, vilket fokuserar på att omvandla småbruk till storskaligt jordbruk, uppfattar småbrukarna ofta grisproduktionen som en potentiell språngbräda ut ur fattigdom snarare än ett sätt att bli storskaliga bönder. Trots alla utmaningar som grisuppfödning förknippas med, fortsätter de flesta småbrukare att investera i grisar i hopp om att det ska förbättra deras vardagsliv och framtid.

Nyckelord: Grisproduktion, afrikansk svinpest, småbrukare, lokal kunskap, Uganda

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Contents

List of publications

This thesis is based on the work contained in the following papers, referred to by Roman numerals in the text:

I. Arvidsson A., Fischer K., Hansen K., and Kiguli J. (2022). Pigs as a shortcut to money? Social traps in smallholder pig production in northern Uganda. *Journal of Rural Studies*, vol. 94, pp. 319–325.

II. Arvidsson A., Fischer K., Hansen K., Sternberg-Lewerin S. and Chenais E. (2022). Diverging Discourses: Animal Health Challenges and Veterinary Care in Northern Uganda. *Frontiers in Veterinary Science*, 9 (773903), pp.1–15.

III. Arvidsson A., Fischer K., Chenais E., Kiguli J., Sternberg-Lewerin S., and Ståhl, K. (2023). Limitations and opportunities of smallholders' practical knowledge when dealing with pig diseases in northern Uganda. *Submitted manuscript.*

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The contribution of Anna Arvidsson to the papers included in this thesis was as follows:

I. First author and wrote the majority of the text, with feedback from Fischer, Hansen and Kiguli. Collected and analysed the data. The idea for the paper and the conceptual framework were developed in discussion with the co-authors. Responsible for correspondence with the journal.

II. First author and wrote the majority of the text, with feedback from Fischer, Hansen, Sternberg-Lewerin and Chenais. Collected and analysed the data. The analysis of the survey data was performed in collaboration with Sternberg-Lewerin and Chenais. The idea for the paper and the conceptual framework were developed in discussion with the co-authors. Responsible for correspondence with the journal.

III. First author and wrote the majority of the text, with feedback from Fischer, Chenais, Kiguli, Sternberg-Lewerin and Ståhl. Collected and analysed the data. The idea for the paper and the framework for analysis were developed in discussion with the co-authors. Responsible for correspondence with the journal.

List of images

Abbreviations

ASF	African swine fever
CAHW	Community-based animal health worker
CoVAB	College of Veterinary Medicine, Animal Resources and Biosecurity
CVO	Chief Veterinary Officer
DVO	District Veterinary Officer
ERD&E	Ethnoveterinary research, development, and extension
IDP	Internally displaced person
IK	Indigenous knowledge
IKS	Indigenous knowledge systems
IMF	International Monetary Fund
LEK	Local ecological knowledge
LK	Local knowledge
LRA/M	Lord's Resistance Army/Movement
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MakSVAR	Makerere School of Veterinary Medicine and Animal Resources
NAEP	National Agricultural Extension Policy
NAP	National Agriculture Policy

NRM	National Resistance Movement
PE	Participatory epidemiology
PRA	Participatory rural appraisal
RRA	Rapid rural appraisal
SAP	Structural adjustment programme
TEK	Traditional ecological knowledge
TK	Traditional knowledge
UPDF	Uganda People's Defence Force

1. Introduction

1.1 Setting the scene: smallholders, pigs and disease in northern Uganda

It is late October 2019 and I am in the middle of four months of ethnographic fieldwork in rural, northern Uganda. The majority of people in this part of the country (sometimes also referred to as Acholiland) belong to the Acholi ethnic group and speak the Luo language (Atkinson 2015).

It is the rainy season. Frequent heavy rains make the grass grow tall between the homesteads in the main study village where the field assistant Alfred and I are living with a Ugandan family. This morning we are on our way to meet an elderly man whom I refer to here as David[1]. After a short walk on muddy paths, we arrive at David's home where he lives with one of his wives, Gloria, and their seven children. We find David sitting on a plastic chair in front of one of the mud huts and greet him with "icoo maber" (the Luo term for "good morning"). Gloria has already left for their garden where they currently grow sesame, maize, rice and sweet potatoes. David tells us that they also have some twenty chickens, two goats and five pigs.

When David was a child, there were no pigs in this village and, compared with now, there were more cattle. As David grew up, two decades of civil conflict between the rebel group of the Lord's Resistance Army/Movement (LRA/M) and the Ugandan government changed this. Many people had to leave their homes and animals behind, and animals were also stolen and killed during the conflict (see also Bøås & Hatløy 2005; Finnström 2008).

[1] The name David is a pseudonym. The names of the informants and the study villages have been anonymised throughout the thesis, as described further in section 4.6. Alfred and Susan, research assistants and translators, appear in the thesis with their own names at their own request.

David and Gloria stayed for many years in one of the government-run internally displaced person (IDP) camps, where people were forcibly relocated for their safety during the long-term civil unrest (Meinert 2020). While opportunities for crop and livestock production in the camp were very limited, David had his first experience of pigs there. Returning to their former home village, David and Gloria invested in pigs and have since become increasingly aware of the opportunities and challenges presented by this livelihood activity.

David gets up from the plastic chair and directs us to a dilapidated mud hut where the pigs are kept. Most of their neighbours have their pigs free-roaming or tethered with a rope part of the day because building a pigsty is generally perceived to be too costly. Nevertheless, free-roaming pigs tend to destroy crops, creating a great deal of social tension between members of the community. Some people are even said to injure or kill their neighbours' pigs because of the social tensions caused by pig production. Standing in front of the mud hut, David points to a large sow that has been given the name Margret. He explains that Margret often responds when he calls her name, walks towards him and then lies down beside him. David says that only having a small number of pigs means that you can know them individually, experiencing a stronger emotional bond than if he had a large number of animals. However, David and Gloria hope to increase the number of pigs in future; not necessarily because they would like to end up as large-scale pig producers, but rather because having more pigs could improve opportunities to secure a better future for their children, enabling them to leave farming and the demanding rural lifestyle behind. David has experienced how pigs can reproduce quickly and grow fat in only a few months, and how it is possible to sell them to neighbours or visiting traders at relatively high prices. At the same time, David has also become increasingly aware of the uncertainties and challenges associated with pig production. Last year they struggled a great deal with their pigs. Gloria, who like most other women in the village has principal responsibility for managing the pigs on a daily basis, saw that something was wrong with their pigs. They appeared weaker than usual and she could see some colour changes in their skin. As they did not have a telephone number for a veterinarian, Gloria consulted David and gave the pigs a homemade remedy mix of washing powder and water. Unfortunately, the pigs did not respond well and died a few days later. It felt like all their investment had been in vain, David explains, having to start all

over again by investing in new pigs. When those pigs died, part of that hope of a better future had also been lost and they were unable to send all their children to school that semester.

This brief story about David, Gloria and their pigs highlights some of the key challenges of pig production faced in the study area. It illustrates how pig production affected social relations in the local communities during the study period in different ways. It also sheds light on the difficulties experienced in dealing with pig health issues, and how the studied smallholders largely relied on the knowledge and resources available in their rural communities. Finally, despite all the problems associated with pig keeping, the story also focuses attention on a commonly held perception among the smallholders studied: the potential of pig production to improve opportunities in life.

1.2 Framing the purpose of the thesis

Pig production has become an increasingly common livelihood activity in Uganda. The vast majority of pigs are reared by smallholder farmers, who represent approximately 80 % of all pig farmers in the country (Ouma et al. 2018). Pigs can contribute significant income and it has been suggested that they represent a potential pathway out of poverty for the rural poor (Randolph et al. 2007; Ampaire & Rothschild 2010; Twine & Njehu 2020). The rapid increase in the number of pigs, from about 0.2 million in 1980 to approximately 4.2 million in 2018 (Tatwangire 2014; UBOS 2019), has mainly been attributed to a rise in the demand for pork (Ouma et al. 2017; Atherstone et al. 2019). While the Ugandan pig sector is expected to see continuous growth in the next few years (FAO 2011; Ouma et al. 2017), the severe and often fatal infectious disease of African swine fever (ASF) is endemic in the country and represents a major threat to the sector's development (Ouma et al. 2018; Twine & Njehu 2020). Despite people being aware of ASF for over one hundred years (Montgomery 1921), there is still no vaccine or cure for it. The only way to prevent and control the disease is to implement biosecurity measures, which include various strategies to ensure that healthy pigs are not exposed to the virus (Chenais 2017). Previous studies have identified a number of factors limiting the possibilities of implementing biosecurity measures among Ugandan smallholder farmers, such as poverty-related constraints (Chenais et al. 2017a; Aliro et al. 2021), a lack of adaptation of existing biosecurity measures to local culture and

traditions (Aliro et al. 2021), poor access and quality of available veterinary services (Nantima et al. 2016; Aliro et al. 2021), and a lack of knowledge among smallholders regarding disease transmission and biosecurity (Dione et al. 2020; Thompson 2021). There are published and ongoing studies focusing on how to adapt biosecurity measures to poverty-constrained smallholder contexts since they are generally designed to suit large-scale commercial farming (see, for example, Penrith et al. 2021; Chenais et al. 2023a; Penrith et al. 2023). While acknowledging the importance of that work, this thesis builds on an assumption that in order to evaluate how ASF can be prevented and controlled, there also needs to be a better understanding of the role pigs play for the smallholders. This includes understanding how smallholder farmers conceptualise, prioritise and deal with diseases, one of the many challenges faced in their pig production. Filling this research gap can contribute important knowledge on the local perspectives of pig production challenges, and furthermore provide a basis for identifying more locally acceptable and adapted ways to control diseases such as ASF in poverty-constrained contexts.

1.3 Aim and objectives

ASF represents a serious threat to the entire Ugandan pig sector and to all those who partly or entirely depend on pig rearing for their livelihoods. This thesis explores how ASF and other pig-related challenges are perceived and dealt with by smallholder farmers in the study area. The starting point is that the disease is not only a biomedical and technical issue, but just as much a social issue. Livestock production is embedded in the everyday lives of smallholders, and in order to understand the role pigs and diseases such as ASF play, there needs to be an understanding of the context in which pig rearing takes place. Local contextual factors that, in different ways, influence smallholders' pig production have been of central interest throughout the ethnographic study.

The aim of this thesis is to contribute knowledge about the challenges that smallholder farmers in northern Uganda face in pig production, with particular attention paid to ASF. To achieve this, the thesis work was guided by the following objectives:

- to examine the role of pigs for smallholders in northern Uganda (Paper I)
- to describe smallholders' experiences of pig production and perceived barriers, including but not limited to disease (Paper I and Paper III)
- to analyse the perceived role and room for manoeuvre of different actors in the Ugandan livestock health sector when dealing with pig production and disease (Paper II)
- to investigate how smallholders conceptualise and act on different syndromes of disease in pigs, including but not limited to ASF (Paper III)

1.4 Structure of the thesis

The thesis consists of six chapters and three appended papers. Following this introduction, chapter 2 situates the thesis in the wider research context of social science research on livestock rearing in sub-Saharan Africa, and provides a contextual background to the studies. Chapter 3 outlines the conceptual frameworks used in the three papers, and describes how together they enable the findings to be generalised through theory. Thereafter, chapter 4 outlines and discusses the methodology and methods and chapter 5 presents a summary of the three papers. Finally, the discussion in chapter 6 synthesises the findings from the three papers.

2. Background

2.1 Veterinary anthropology

In the 1970s and 1980s, animal health professionals involved in livestock development programmes in the Global South realised that conventional approaches to the study of animal health, such as epidemiological or biomedical studies, did not sufficiently capture the complexity of pastoralist systems or the local knowledge of livestock management (Sollod et al. 1984; Jones et al. 2020). Consequently, they initiated collaborations with anthropologists, with the aim of acquiring a better understanding of livestock systems in the Global South. In applying anthropological research methods, attention was increasingly being paid to the broader social and economic contexts in which livestock production in the Global South was embedded (McCorkle 1989a). This new approach and research field, referred to as 'veterinary anthropology'[2] (Sollod & Knight 1982; McCorkle 1989a), aimed to combine the knowledge of anthropologists and veterinary epidemiologists (Sollod & Knight 1982) and include livestock owners' problem framings and their suggested solutions for dealing with the challenges they faced in their livestock production (Jones et al. 2020). In the early days of this field of research, the main focus was on livestock-keeping pastoralists in the Global South, with an explicit goal of producing research with clear policy and development implications (McCorkle 1986; McCorkle 1989a). The starting point was to explore local ways of knowing and acting, with the broader aim of better adapting policy recommendations to local conditions and priorities.

[2] Several terms have been used to refer to this field in the literature. For example, the ecological anthropologist Constance McCorkle also described it in the mid-1990s in terms of "ethnoveterinary research, development, and extension" (ERD&E) (see McCorkle 1995:52).

Central to this new interdisciplinary research field was the improvement of human health and livelihoods by enhancing animal health and productivity (McCorkle 1989a). In this sense, the early works of veterinary anthropology can be understood as having an anthropocentric approach, placing humans rather than animals at the centre (Sollod et al. 1984; McCorkle 1989a).

In the 1980s, thus at around the same time veterinary anthropology was emerging, veterinary researchers and epidemiologists found interest in and started to use methods from rapid rural appraisal (RRA) and participatory rural appraisal (PRA). The use of tools from RRA and PRA evolved into its own line of research in veterinary epidemiology in the early 1990s (Catley 2020), referred to as participatory epidemiology (PE). PE was often used to gather quantitative data in contexts where national statistics were unavailable, and explore livestock owners' knowledge of livestock disease (Allepuz et al. 2017; Chenais & Fischer 2021). Comparing veterinary anthropology with PE, it is evident that while taking slightly different approaches, they aimed to fill a similar gap with regards to enhancing knowledge about animal diseases in the Global South. For example, initially PE was also used mainly in pastoral communities where access to western veterinary medicine was limited, but has since been extended to a diverse range of communities with mixed livestock agriculture systems (Jost et al. 2007). There are also significant overlaps between these fields with regards to other aspects. For example, both PE and veterinary anthropology acknowledge the potential benefits (and challenges) of interdisciplinary research on animal health and disease, as well as the strength of combining methods (quantitative and qualitative) to gain understanding of local knowledges and practices on these matters (see, for example, Sollod et al. 1984; McCorkle 1989a; Barnes et al. 2020a; Coffin-Schmitt et al. 2021). There are some differences, however, such as the explicit participatory elements in PE or how the social sciences have had a more prominent role in veterinary anthropology from the outset. Nevertheless, in later years, social scientists engaging with PE and interdisciplinary research have stressed the importance of properly integrating social sciences, arguing how only including social sciences as an add-on at the end of interdisciplinary research projects has negative impacts on research quality and results (Barnett et al. 2020; Tasker 2020; Chenais & Fischer 2021). For example, Ebata et al. (2020) have shed light on unbalanced power relations among researchers in interdisciplinary PE research, in which the role of social scientists has

sometimes been restricted to "…adding colour on to the concrete outline provided by the natural sciences" (Ebata et al. 2020:6).

In this thesis I am primarily inspired by the veterinary anthropological approach, partly due to its clearer grounding in anthropology, and I also have an interest in taking a broader perspective on livestock production challenges than the narrow focus on animal health and disease often found in PE studies. For transparency reasons, I should also mention that my intention was to include more participatory elements in this thesis work, using tools and methods from the PRA approach, but fieldwork was cancelled due to the COVID-19 pandemic and this was therefore not possible (see more details in section 4.4).

The research field of veterinary anthropology attracted new attention in 2016 when it was revived by a group of scholars from social and natural sciences who identified a gap concerning animal health and veterinary topics in collaborative interdisciplinary research work (Gardiner 2016). The field has been described as an underdeveloped sub-field of medical anthropology (Brown & Nading 2019; Thompson 2019). However, medical anthropology originally concerned the study of human health and disease (Scotch 1963), often with a focus on ethnomedicine (Brown & Nading 2019), with anthropological investigation of aspects such as the medical systems or healing practices of a particular group of people in the Global South (Erickson 2008). Nevertheless, in recent decades, medical anthropologists have started to move beyond a core anthropocentric focus by paying interest to areas such as so-called 'human animal health' (e.g. diseases shared by humans and animals) (McElroy & Townsend 2018; Brown & Nading 2019). That said, it should also be noted that the current scope and focus of veterinary anthropology diverge quite extensively from how it was first described in the 1980s (see Sollod & Knight 1982; Sollod et al. 1984; McCorkle 1989a). For instance, the prior focus on livestock owners and their livestock production in the Global South has now shifted towards focusing on the veterinary profession and veterinary practices in the Global North (Keck & Lynteris 2018; Ashall 2022; Desmond 2022). While the field still pays attention to the wider political, economic and social structures impacting the everyday practices of veterinarians and animal owners, recent descriptions of this interdisciplinary field seem less explicitly concerned with influencing policy and development, and instead engage with other questions such as the ethics of care within the veterinary profession (Gardiner 2016;

Broz et al. 2023) and theoretical engagement in developing more-than-human and multispecies approaches (Brown & Nading 2019; Desmond 2022). A similar shift has taken place regarding perceptions and explorations of animals within anthropology at large and, as mentioned briefly above, including the sub-field of medical anthropology (Mullin 2002; Brown & Nading 2019). Although many anthropological texts from a variety of sub-fields still tend to approach animals much as a means to acquire a better understanding of how humans think and organise themselves, there has been a shift away from the entirely anthropocentric anthropological approaches of the past towards placing animals in the foreground of ethnographies (Mullin 2002; Segata & Lewgoy 2016). This has meant that animals and other non-human actors no longer remain on the margins "as part of the landscape, as food for human beings or as symbols" (Kirksey & Helmreich 2010:545). This shift is not limited to anthropology, but rather has taken place in the social sciences at large, with the return to materiality in which animals, plants and objects, for example, are increasingly assumed to play an active role in the making of the world (Whatmore 2006; Tsing 2021; Wadham 2021). More-than-human approaches and multispecies ethnographies have provided new insights into subjects ranging from biosecurity biopolitics in the contexts of industrial poultry production in the Global North (Hinchliffe et al. 2016) to human-animal relations, such as in cases of pig deaths in the Global South (García 2019). This thesis, however, revolves around other questions and perspectives, placing humans rather than animals at the centre. Based on the assumption that this thesis can contribute important knowledge about local conditions for pig rearing in rural Uganda, I am aware that other findings might have emerged if the ethnography had been animal-centred.

This thesis contributes to the field of veterinary anthropology, both in the sense of past and more recent understanding of what this subject comprises. It does so by taking an ethnographic approach to exploring smallholder farmers' and veterinary actors' perceptions of pig production challenges in northern Uganda. My hope is that this work will provide insights that can broaden understanding of the social, cultural and economic context in which northern Ugandan smallholder pig production is situated for a variety of actors (including animal health service providers, veterinary researchers and policymakers). Applying ethnographic research methods to understand social and cultural responses to specific diseases has proved crucial, for example in the case of controlling and hindering the devastating effects of

Ebola virus disease in Sierra Leone (Richards 2016). Similarly, when the Global Rinderpest Eradication Programme was introduced in Africa, it only succeeded when local conditions, livestock management practices and knowledges were acknowledged and there was a move away from top-down vaccination approaches. Vaccination efforts in African countries came to rely on community-based animal health workers (CAHWs) who lived in the actual communities in which rinderpest was present. The CAHWs involved in the Global Rinderpest Eradication Programme had received basic training in animal health, disease surveillance and vaccinations, and used these skills to eradicate rinderpest as well as address other animal health concerns in their local communities (Youde 2013). The CAHWs knew the history, customs and practices of the communities in which the cattle were infected and they were trusted by farmers – a trust that had previously been undermined by top-down vaccination efforts (Roeder et al. 2013; Youde 2013). Having knowledge about local conditions and adjusting control efforts to the specific context in which diseases occurred were thus key to opportunities to eradicate rinderpest in Africa and control the spread of Ebola in Sierra Leone. The assumption is that this can also play an important role in the case of ASF in Uganda today.

2.2 Brief history of pigs and pig research in sub-Saharan Africa and Uganda

In earlier anthropological publications on animals in sub-Saharan Africa, a recurring theme was pastoralism, often exploring the symbolic and ritual value of cattle in social life (see, for example, Evans-Pritchard 1951; Ferguson 1985). Less attention was paid to the value and role of smaller livestock, such as sheep, goats, poultry and pigs (MacDonald 2000). When specifically looking at the role of pigs in anthropological studies in sub-Saharan Africa, their minor role can partly be explained by their shorter history in this geographical area, which also means that they have typically been less integrated into traditions and culture, topics that have been of central interest to anthropology (Blench 2000; MacDonald 2000; Thompson 2019). More research attention has been paid to pigs in other parts of the Global South, such as in the Pacific and Asia, where they have been domesticated for longer than in sub-Saharan Africa (Bellwood 2011; Sand 2022). Pigs were present and domesticated in African countries before the

colonisers imported European pigs to the continent (Amills et al. 2013), and the genetic heritage of today's African pig populations indicates a mixing of breeds that originated in Europe, North Africa, the Far East and India (Noce et al. 2015; Weka et al. 2021). Knowledge of when pig production began in Uganda is very scarce, partly due to the fact that pigs have been excluded from many research projects in the past (Blench 2000). Historical records on pig-keeping in East Africa suggest that intensive pig-keeping started in western Kenya in the early twentieth century (Porter et al. 2016), thus coinciding with the time of the first documented description of ASF (Montgomery 1921).

Even today, pigs are almost invisible in national policy, and the pig sector attracts very limited investment compared with most other livestock sectors in Uganda (CGIAR 2013; CGIAR 2020; Twine & Njehu 2020). Besides anecdotal reports, such as former president Idi Amin (who governed between 1971 and 1979) banning pig-keeping and removing all pigs from the country (Carter 2015), there are few plausible explanations for the marginal role played by pigs in Uganda. Despite this neglect of pigs in historical records and contemporary national policies, the Ugandan pig sector has seen tremendous growth in recent decades. In 1959, the number of pigs was estimated to be 15,669 (Masefield 1962:95), but by 2018 the number of pigs exceeded four million (UBOS 2019). Currently, Ugandans consume the most pork in the east African region, with average personal consumption of around 2.87 kilograms per annum (FAO 2020). The pig population has also grown in northern Uganda (UBOS 2008), a part of the country that has experienced many years of civil unrest (described in more detail in section 2.3.2). In an attempt to restore this part of the country after lengthy armed conflict, the government[3] and donors have, among other initiatives, promoted pig production as a strategy to reduce rural poverty (Ikwap et al. 2014; Wassajja 2015). However, research indicates that not all smallholders have benefited equally from such pig development initiatives, creating social tensions in local communities (Wassajja 2015).

[3] More specifically through the Northern Uganda Social Action Fund, a post-conflict recovery project, as well as the National Agricultural Advisory Services, which is an extension reform project implemented throughout Uganda but has played a particularly important role in agricultural recovery in conflict-affected northern Uganda (see Wassajja 2015).

2.2.1 Contemporary pig production in Uganda

The majority of pigs in Uganda are kept by rural smallholder farmers who generally keep between one and five pigs (Ndyomugyenyi & Kyasimire 2015; Ouma et al. 2015), make minimal investments in their pig enterprises, in most cases let their pigs roam freely or have them tethered, and occasionally keep the pigs confined in a pigsty (Ikwap et al. 2014; Twine & Njehu 2020). Pigs are commonly appreciated for growing fast and producing numerous piglets at regular short intervals, with relatively limited investments in land, inputs and labour (Ndyomugyenyi & Kyasimire 2015). Pig production has been reported to play a critical role in smallholder farmers' livelihoods, as pigs have inherent value and can easily be sold to cover school fees and emergency costs, such as unexpected medical bills (Muhanguzi et al. 2012; Ouma et al. 2015; Thompson 2021). Ugandan pigs are commonly divided into so-called 'indigenous' or 'local' breeds and introduced exotic breeds (Twine & Njehu 2020). The local pig is black in colour and has a long snout and straight tail (Blench 2000; Twine & Njehu 2020). The average body size is smaller and the growth rate of local breeds slower than exotic breeds (Muhanguzi et al. 2012; Okello et al. 2015). They are described as being better adapted to the local environment, diseases and parasites, and surviving on low-quality feed (Muhanguzi et al. 2012; Twine & Njehu 2020). The larger exotic pigs, pale pink in colour, can be sold at higher prices, but generally require better management and feeds to perform well (Lekule & Kyvsgaard 2003). In addition to the local and exotic breeds, there are also so-called crossbreeds, partly an attempt to combine the positive traits of both (Blench 2000).

Several factors have been identified as hampering the development of pig production in Uganda. For example, previous studies have pointed to inappropriate and low-quality feed (Ouma et al. 2014; Dione et al. 2015; Twine & Njehu 2020), low-productive breeds (Twine & Njehu 2020), smallholders' lack of access to markets (Dione et al. 2014a; Atherstone et al. 2019), and limited access to and poor quality of available veterinary services (Dione et al. 2014a; Twine & Njehu 2020; Aliro et al. 2021). Linked to limited access to veterinary services is one of the most pressing issues: a large disease burden (Twine & Njehu 2020).

2.2.2 African swine fever

African swine fever (ASF) has been identified as a major obstacle in the Ugandan pig sector (Twine & Njehu 2020). It is a fatal viral disease of pigs and is endemic in Uganda (Chenais et al. 2017b). ASF was first described in a publication by Eustace Montgomery in present-day Kenya in 1921 (Montgomery 1921) and is now widespread in sub-Saharan Africa (Penrith et al. 2019). The ASF virus can spread when healthy pigs come into contact with infected pigs or infected material, such as pork or blood from infected pigs (Penrith et al. 2021). Typical disease signs are high fever, diarrhoea, vomiting, coughing, a loss of appetite and haemorrhaging leading to colour changes in the skin (Sánchez-Vizcaíno et al. 2015; Sánchez-Cordón et al. 2021). Most pigs typically die within one week of infection. As there is no vaccine, the only option for prevention and control is to implement biosecurity measures hindering virus spread. At farm level, such measures typically refer to confining pigs, restricting visitors' contact with pigs, not feeding swill to pigs, separating healthy from sick pigs, and handling pig carcasses in a safe way (Twine & Njehu 2020). Adoption of preventive biosecurity measures among Ugandan smallholder farmers has been found to be very low (Dione et al. 2014a; Chenais et al. 2017c). Several studies have identified pig farmers' lack of knowledge as a key challenge to improved pig management and biosecurity (Dione et al. 2014a; Dione et al. 2016; Dione et al. 2020). In a study providing training to Ugandan farmers on biosecurity measures in relation to ASF, knowledge about biosecurity increased among the trained farmers, but this knowledge did not lead to any significant changes in biosecurity practices (Dione et al. 2020). Another study from northern Uganda showed that a lack of knowledge was not necessarily the major cause of continuous ASF outbreaks, as farmers were already quite knowledgeable, willing to learn more, and able to incorporate new knowledge in their pig production (Chenais et al. 2017b). This discrepancy highlights the fact that smallholders are not a homogenous group, and that reasons for low biosecurity uptake vary across geographical areas and even within specific communities.

Moving beyond the farm level, there is currently no explicit national policy or regulatory framework in place to ensure control of ASF in Uganda (Dione et al. 2017). In addition, there is no system to compensate farmers for losses related to the disease or its control, for example when they implement control measures such as the culling of pigs if there are ASF outbreaks

(Twine & Njehu 2020). The lack of compensation mechanisms has been found to encourage emergency selling of apparently healthy (but maybe incubating) and possibly infected pigs, as a strategy to reduce financial losses (Dione et al. 2014a). In a study by Thompson (2021), one of the few ethnographies exploring reasons for low biosecurity uptake among Ugandan smallholder farmers, it was recognised that smallholders generally preferred having their pigs free-roaming. This was partly because they perceived their pigs as part of the household, and therefore could not be separated from humans through confinement (see also Penrith et al. 2023). These findings made Thompson (2021) question what she refers to as universal biosecurity measures that are based on the premise that farmers will always prioritise disease prevention (Thompson 2021:16). This conclusion is similar to those of several other empirical studies on sub-Saharan livestock keeping, revealing that controlling and eradicating diseases might not necessarily always be a top priority for farmers (see, for example, Waller & Homewood 2017; Wolff et al. 2017). Against this backdrop and as also proposed by several researchers (Dione et al. 2020; Penrith et al. 2021; Chenais et al. 2023a), it would appear important to continue to develop more locally adapted and accepted biosecurity measures to deal with ASF in the Ugandan smallholder context, including measures that pay particular attention to challenges related to poverty.

2.2.3 The Ugandan veterinary sector

This section aims to complement the overview of the Ugandan veterinary sector presented in Paper II by briefly outlining veterinary services in the country and some of the challenges related to contemporary veterinary service provision.

Veterinary regulatory services are important for monitoring and controlling infectious animal diseases of concern for human and animal health, ensuring animal welfare and food safety, providing law and order in the livestock sector, and regulating the veterinary profession and livestock trade (Wesonga et al. 2018). In Uganda, formal veterinary services were established in the early 1900s, with veterinary officers part of the colonial administration (Abebe 2016; Nakayima et al. 2016; Wesonga et al. 2018). Before this, the Chief Veterinary Officer (CVO) in Kenya was the main official responsible for handling urgent livestock disease problems in Uganda (Nakayima et al. 2016). During the colonial era, clinical services

were primarily directed towards commercial farms owned by white settlers, with less attention paid to livestock owners in marginal areas (Abebe 2016). For several decades, the major focus of the Ugandan veterinary sector was the control of cattle diseases, particularly rinderpest (Nakayima et al. 2016). In the years following independence in 1962, the government made huge investments in the veterinary sector, resulting in a significantly improved and expanded service delivery (Koma 2000; Abebe 2016; Wesonga et al. 2018). However, in the early 1970s, a time of political turmoil and worsening economic conditions in the country, funding of the veterinary sector began to dry up and consequently many veterinary services were disrupted (Koma 2000; Abebe 2016).

In the late 1980s and early 1990s, the Ugandan government adopted what are known as structural adjustment programmes (SAPs), loans from the World Bank and the International Monetary Fund (IMF) that had strict conditions attached. Uganda adopted the SAPs in times of economic hardship in an attempt to address governance challenges and boost the national economy (Ilukor et al. 2015; Nakayima et al. 2016). Among other consequences, the adoption of the SAPs drastically changed the veterinary sector and the conditions for service delivery in the country (Ilukor et al. 2015; Nakayima et al. 2016; Ilukor 2017). Over the years, what had been a public veterinary sector was transformed into a decentralised and privatised structure of clinical veterinary services, including the downscaling of public services (De Haan & Umali 1992; Ilukor et al. 2015). The scope and influence of the public veterinary sector was reduced considerably, including a decreased number of veterinarians and a reduced supervisory and regulatory role (De Haan & Umali 1992; Silkin 2005; Nakayima et al. 2016; Wesonga et al. 2018). In evaluating some of the spillover effects of SAPs, it has been found that the liberalisation of veterinary services mainly benefited better-off farmers who had access to veterinary extension services, while the rural poor in marginal areas became increasingly neglected (Makokha Akoyi 2001).

Today, a variety of actors provide animal health services in the public and private veterinary sectors, including veterinarians with a university degree in veterinary medicine and paraprofessionals with varied length and quality of training in animal health (Dione et al. 2014b; Ilukor 2017). This situation entails certain risks, with actors working in the free market of veterinary care able to provide services without supervision or adequate regulation, and actors with limited or sometimes no training at all providing incorrect advice

or treatment (Ilukor et al. 2015). The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) has remained responsible for overseeing the animal health infrastructure in Uganda (Twine & Njehu 2020) and controlling epidemic animal diseases (Ilukor et al. 2015). In line with the liberalised and decentralised approach to veterinary service provision, the private sector is expected to provide inputs and services for livestock farmers (Twine & Njehu 2020). Recent research has illustrated that many farmers, particularly smallholders in rural areas, have very limited access to veterinary services (Okello et al. 2020; Myers et al. 2022).

2.3 Description of the research context

2.3.1 Uganda's agricultural development approach

Uganda is a landlocked country in eastern Africa and currently has a population of approximately 45 million people (World Bank 2022), of whom about 75 % live in rural areas (UBOS 2020). The country was given its status as a British protectorate in 1894 and gained independence in 1962 (Kanyeihamba 2010).

To better understand the current situation of the Ugandan agricultural sector, I find it relevant to take a step back and briefly examine how the political leadership of past and current presidents has shaped the direction of development in the country. My intention is not to present an extensive outline of Uganda's recent history, but rather to situate the country's agricultural development agenda in the broader political landscape of post-colonial Uganda.

Milton Obote, from the Langi ethnic group in northern Uganda, became Uganda's first prime minister in 1962 (Mwakikagile 2012). While gaining much support from the population of northern Uganda, Obote struggled to gain legitimacy for his leadership, particularly among the largest ethnic group of the Baganda in the south (Mwakikagile 2012; Hansen 2013). In 1971, Obote was overthrown in a military coup by Idi Amin, who wanted to end what he perceived as ethnic favouritism towards the Langi and Acholi peoples of northern Uganda (Finnström 2008; Laruni 2015).

It should be noted that while the Acholi people today generally see themselves as a distinct ethnic group, this was less the case prior to colonial

rule[4] (Finnström 2008). The British colonial administration recognised the benefits of more rigid ethnic boundaries in Uganda to control the population more efficiently, and thus deliberately worked towards creating a more unified Acholi identity (Finnström 2008; Branch 2011). The position and level of marginalisation of the Acholi (as well as other ethnic groups) have shifted over the years, not least according to the interest of the current political leadership of the country (Laruni 2015), as illustrated in this section.

Returning to Amin, his brutal years in power led to thousands of deaths of Acholi and Langi soldiers in northern Uganda (Hansen & Twaddle 1998; Amone 2015). In total, hundreds of thousands of Ugandans (including people from the central region) were killed during Amin's reign and an unknown number of civilians and military personnel fled the country to escape the state-sanctioned massacres (Mwenda 2007; Finnström 2008; Serwajja 2014). Amin's dictatorship came to an end in 1979 and Obote returned to power after winning the elections in 1980. Heavy accusations of vote rigging followed the elections, and in response Yoweri Kugata Museveni instituted a rebellion against Obote's second regime (Oloka-Onyango 1997; Finnström 2006a; Branch 2011). After five years of guerrilla warfare in central Uganda, comprising mass killings and the displacement mainly of Baganda people (Serwajja 2014), Museveni eventually captured Kampala and was sworn in as president in 1986 (Branch & Yen 2018). This was immediately after the brief period when the Acholi army leader, Tito Okello, was president of the country after overthrowing Obote in a coup in 1985, but he only remained in power for a few months (Finnström 2006a; Atkinson 2009). Civil conflict in northern Uganda broke out in the year Museveni came to power, a conflict mainly fought by the national army of Uganda People's Defence Forces (UPDF) and the rebel group of the LRA/M led by Joseph Kony (Finnström 2001; Finnström 2008). More details on the conflict and some of its consequences for people in northern Uganda are described in section 2.3.2.

Following many years of mismanagement and civil conflict, Museveni and his National Resistance Movement (NRM) government were now leading a country experiencing severe economic hardship (Mwenda 2007). In this context, Museveni made promises to launch a political era of stability and democracy (Mwenda 2007; Isgren 2018). Another promise was to transform

[4] It is contested whether an Acholi identity existed prior to colonial times. For example, Behrend (1999) argues that no clear ethnic Acholi identity existed in pre-colonial times, while others such as Atkinson (2015) and Dwyer (1972) are of the opposite view.

the economy from a peasant-based one, which Museveni perceived to be grounded in an ideology limiting the entrepreneurial capacities of the population, into a modern industrial economy dominated by a working middle class (Rubongoya 2007; Wiegratz 2010).

Museveni was initially very reluctant to follow Obote's path of adopting neoliberal policies and programmes for development (Hansen & Twaddle 1998; Atkinson 2018). Nevertheless, after experiencing the failure of their own economic programme, Museveni and his government had few options other than to accept advice from the World Bank and IMF (Atkinson 2018). In the coming years, the formerly sceptical Museveni entered into a close partnership with the World Bank and implemented several donor-funded packages of macroeconomic stabilisation and internal structural adjustments (Kiiza 2012; Atkinson 2018). As a consequence of these post-1986 policy reforms, Uganda became a poster child of structural adjustment (Jones 2009; Isgren 2018) and widely acknowledged as a development success story in the 1990s (Mwenda 2007; Wiegratz 2010; Lie 2018). This narrative of success was underpinned by carefully selected statistics of economic growth and poverty reduction (Lie 2018; Wiegratz et al. 2018). Journalists, human rights activist and critical scholars were more sceptical about the portrayal of Uganda as a development success, however, and articulated an alternative narrative of a 'Uganda in crisis' (Wiegratz et al. 2018). While gaining limited support from influential actors such as the World Bank, this counter-narrative revealed more concerning aspects of Museveni's development agenda, such as growing economic inequalities, regional disparities, state violence, the rise of external debt, and widespread corruption within the country (Atkinson 2018). When Museveni altered the constitution in 2005, allowing him to run for a third term in office, it became increasingly difficult for the World Bank and international donors to give wholehearted backing to his leadership and the narrative of success (Lie 2018).

The idea behind the SAPs that Uganda had undertaken since the 1980s was that liberalisation and privatisation would create economic growth, especially in the agricultural sector (Bahiigwa et al. 2005). In the initial stage of SAP reforms, the Ugandan agricultural sector contributed to the vast majority of export earnings and was the foundation of the country's economy (Asiimwe 2018). From the early 2000s onwards, the sector has seen a relatively steady decline in terms of both growth and productivity (Hickey 2013; Asiimwe 2018; World Bank 2018). While the NRM government has

attributed the low productivity of the agricultural sector to reasons such as seasonal climatic varieties, researchers have criticised how such explanations overlook systemic structural problems built into the country's model for agricultural development (Asiimwe 2018; Isgren 2018). Issues such as how the structural adjustments led to the removal of subsidies, cut budgets for research and extension, and made inputs increasingly unaffordable for smallholder farmers (Asiimwe 2018; Isgren 2018; Martiniello 2019) have been suggested as factors that have contributed to the falling growth of the Ugandan agricultural sector (Asiimwe 2018).

The development agenda of the NRM government has remained fairly intact in recent decades (Kiiza 2012), including low public investment in the agricultural sector, continued privatisation of agricultural extension and promotion of large-scale farming, while smallholder farmers have been portrayed as a barrier to modernisation, and often depicted as lazy and unable to benefit from development interventions (Martiniello 2019; Isgren 2018). It is claimed that this development strategy sustains rural poverty and food insecurity (Kiiza 2012; Isgren 2018).

While not all reforms have played out negatively for the entire population, previous research stresses that smallholders have been particularly disadvantaged by past and present agricultural development agendas in post-colonial Uganda (Isgren 2018; Martiniello 2019; Wedig & Wiegratz 2018).

2.3.2 The wider context of northern Uganda

Smallholders in the study villages commonly described how they were still affected and recovering from the most recent armed conflict that ceased about 15 years ago. The conflict started in the aftermath of Museveni's election victory in 1986, and while being widely covered in the literature (see, for example, Finnström 2008; Atkinson 2009; Dolan 2009; Allen & Vlassenroot 2010; Branch 2011; Branch 2013), scholars have presented slightly different explanations of the origins of the conflict (Finnström 2006a). Several authors have pointed to causes linked to the longstanding north-south division of the country, where the LRA/M rebellion against the Museveni government can be understood as an attempt to combat the marginalisation and violent treatment of the northern population (Finnström 2006a; Finnström 2008; Atkinson 2009). Nevertheless, throughout the many years of civil unrest, the international community largely downplayed the conflict in northern Uganda, often accepting a simplistic official narrative of

the government of Uganda (and its allies) as being on the side of good in contrast to the evil LRA/M (Finnström 2008; Atkinson 2009; Branch 2011; Meinert 2020). In reality, the Acholi faced violence from both the government and the LRA/M (Branch 2011; Meinert 2020).

During the conflict, approximately 1.8 million people were displaced, and more than twenty thousand children and youngsters were abducted to join the rebels (Meinert 2020). The Ugandan government organised IDP camps where about 90 % of the Acholi population were forced to stay for several years (Finnström 2006b). Living conditions in the camps were very poor and as the state mainly focused on its military and security apparatus, almost the entire infrastructure of the camps' relief, aid and service provision was run by NGOs and foreign aid organisations (Branch & Yen 2018). Fairly quickly, northern Uganda and the camps became an area for expansive development interventions (Finnström 2006b; Branch & Yen 2018). In many of these interventions, such as the numerous peace-building projects carried out in the camps, various aid agencies attempted to 'teach' the displaced population that they were responsible for bringing about peace and justice and for resolving their own situation and impoverishment, with less attention paid to underlying factors related to the wider economic and political structures causing poverty and sustaining the long-term conflict (Branch & Yen 2018). In the midst of the enforced displacement of the Acholi, the government army and investors established commercial agricultural farming businesses on abandoned fields, thus taking advantage of encampment to identify fertile land for investment (Serwajja 2014).

Between 2006 and 2009, as the armed conflict ceased, the displaced Acholi were encouraged to return to their former home villages (Finnström 2008; Whyte et al. 2014). By 2010, almost all of them had left the IDPs (Esuruku 2012). At this time, basic social services such as education, healthcare and access to clean water were lacking in many rural areas (Esuruku 2012). After clearing the bush that had grown and covered old homesteads, new mud huts and brick houses were built and people could start rebuilding their lives, resuming animal keeping and digging the soil to cultivate the fallow land again. Resettling in villages also included rebuilding the social trust that had been damaged during the conflict (Meinert 2020). The conflict had divided the Acholi because some supported the LRA movement due to resentment towards the government, others supported the

government in response to the rebels' brutal methods, and some remained neutral (Murithi 2002).

The loss of livestock during the conflict left many Acholi poorer and, in this context, keeping pigs was perceived as a quick poverty mitigation strategy for smallholders who had few resources left (Ikwap et al. 2014).

As of today, northern Uganda remains behind the rest of country in most development indicators, with large inequalities in access to land and loss of livelihoods in rural areas (Branch & Yen 2018; UBOS 2022a). These conditions in northern Uganda should not be seen merely as resulting from the armed conflict, but also as a consequence of ongoing forms of state violence in the government's eagerness to please the economic interests of the elites and capitalists (Branch & Yen 2018). For example, in the name of development, large areas of land have been allocated to sugar cane plantations or other large-scale agribusinesses, often run by the government or state elites (Serwajja 2014; Martiniello 2015; Branch & Yen 2018; Buur et al. 2019). Thus, it has been argued that a state-driven form of extractivism, taking advantage of poverty and the breakdown of community solidarity among the rural population, is presently taking place in post-conflict northern Uganda (Sjögren 2014; Martiniello 2015; Branch & Yen 2018).

2.3.3 Study villages

Fieldwork was conducted in two villages in Nwoya district, northern Uganda (referred to in the thesis as village A and village B). The population of Nwoya district has been estimated at 285,000, with approximately 210,500 residing in rural areas (UBOS 2022b). More details on the study context, including common livelihood activities among smallholders and services available in the respective villages, can be found in Paper I.

The study villages are located roughly 320 kilometres northwest of Kampala. At the time of the fieldwork in 2019, elders and village leaders of the respective villages estimated the population of village A to be approximately 1,500 and the population of village B to be slightly over 2,700. Both study villages border the same national park. This has caused problems, particularly in village B, due to elephants regularly entering the village, damaging crops and sometimes harming or killing people. Some community members from the study villages have engaged in illegal hunting in the national park and sold the bush meat to generate income.

Except for a few larger farms (with hired farm workers managing between 110–180 cattle) on the outskirts of the respective villages, the majority of the community members are smallholder farmers who combine crop and livestock production.

The term 'smallholders' in this thesis work refers to people who cultivate relatively small pieces of land, keep fairly small numbers of animals (around one to five pigs for example), largely rely on family labour for farming, and produce mainly (but not exclusively) for subsistence (see also Mbande 2022). That said, despite the common characteristics of smallholders in the studies (Papers I–III), I also acknowledge how they were differentiated by economic and social factors, such as social networks, income and wealth. In this context, the better-off households were generally characterised as having broader and also greater access to vertical social networks (such as connections to people living in urban areas) and skills in how to run a business successfully. Contacts with brokers and traders were also described as more accessible to the better-off community members. Other factors that differentiated the smallholders included their different levels of education, their varied access to extension services, and their ability to pay for them. It should be noted, however, that even the smallholders who were comparatively well off in the study villages, which was a fairly small number, often described themselves as having insufficient access to veterinary services despite being able to pay for them. Moreover, these better-off smallholders were more often able to send their children to school and generally also had access to more land. The families that had been among the first to return from the IDP camps had typically been able to claim more land than those returning later, which meant that they could make money from renting or selling land to neighbours (see also Serwajja 2014). Disputes and conflicts over land were described as fairly common in the study area, and were reported to result partly from a lack of clarity over land ownership, as people moved back to their previous homesteads after the conflict.

Besides engaging in crop and livestock production, some villagers also had small-scale businesses. Smallholders, mainly women, derived income from selling vegetables and other food items in the village centres. Some villagers also brewed and sold alcohol. In both villages, alcohol consumption, particularly among men, was described as a common source of conflict in the local communities and between spouses. In relation to this, several female informants described the tendency among men to spend money

generated from crop and livestock production on alcohol instead of prioritising household needs. It was fairly common for women to have the main responsibility for taking care of the animals on a daily basis, while men controlled the sale and purchase of animals. This lack of control over incomes from livestock production was problematised by many women. Another source of tension between spouses was sometimes evident in cases where the men (mostly elderly) had several wives. Female informants in particular stressed that polygamy increased the risk of intra- and inter-household conflicts.

There were no formal livestock markets in either of the study villages. The larger farmers on the outskirts of the study villages regularly sold cattle to traders who transported live animals to butchers or formal livestock markets. In contrast, the majority of smallholders had few options other than to sell their animals within their local communities. Therefore smallholders commonly sold their animals to neighbours, local butchers or more occasionally visiting traders. Some smallholders also slaughtered pigs at home and sold the pork to local pork retailers in the village centre. A few smallholders also gained access to livestock markets by having relatives in peri-/urban areas who then could buy and manage livestock for them outside of the village settings (such as cattle, which were described as particularly difficult to buy and keep in the study villages). The majority of smallholders, including those who were comparatively well off, described the difficulty of planning pig sales according to the most profitable months, instead tending to sell pigs when they needed cash. Cattle were sold at the highest prices, followed by pigs, goats and poultry (in descending order).

None of the study villages had drugstores for pharmaceuticals, so accessing medication required travel to a larger town or a city. Access to field veterinarians who have a degree in veterinary medicine was described as very restricted in both villages. Paraprofessionals of varied quality and quantity of training in animal health were described as easier to access and, at the time of fieldwork, at least one paraprofessional was resident in village A and several paraprofessionals lived in village B.

Image 1: Centre of study village A. Image 2: Household, where I stayed during the fieldwork. Photos: Anna Arvidsson, 2019.

Image 3: Free-roaming pigs. Image 4: Pigs confined in a wooden pig sty. Image 5. Tethered pigs. Photos: Anna Arvidsson, 2019.

3. Conceptual framework

This thesis brings together concepts of trust (Paper I), the discourse argumentative approach (Paper II), and an analysis of practical knowledge (Paper III). The choice of these theoretical approaches and concepts emerged through a dialectical process in which I departed from the empirical material when searching for relevant concepts to explain emerging patterns, while in turn the theoretical concepts enabled generalisations to be made based on empirics. Overall, the concepts used in the respective papers permitted the identification and examination of dominant development narratives that underpin the Ugandan agricultural and veterinary sectors in order to reflect on the role pigs play for smallholders in northern Uganda and consider some of the implications of the smallholders' extensive reliance on practical knowledge when dealing with pig health issues such as ASF. In this chapter, I define the concepts used in the papers (Papers I–III) and discuss the ways in which they have been helpful in the research process.

3.1 Development discourses: the transformation of smallholder farmers

Agriculture has been a central concern in development discourse ever since colonial powers started steering the direction of development in African countries (Hydén et al. 2020). Smallholders have had a central role in this discourse (Wiggins et al. 2011), often portrayed as the main obstacle to development (Hydén et al. 2020). A narrative that has gained traction in broader African agricultural development policy is that subsistence-based smallholder farming needs to be transformed into modern, market-oriented, large-scale production with the main goal of boosting productivity (Asenso-Okyere & Jemaneh 2012). This way of framing agricultural development

was also evident when exploring dominant development discourses in the Ugandan context (see Paper II).

In this thesis, I draw on the argumentative approach of Hajer (1997), in which discourse is defined as "a specific ensemble of ideas, concepts and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer 1997:44). In contrast to conceptualisations that focus more on the structures of discourse (see, for example, Foucault 1976; Foucault 2001), Hajer (1997, 2009) offers a more agent-centred approach, focusing on the key concepts of discourse, storylines and discourse coalitions (Hajer 1997). It aims to explore the so-called argumentative game in which actors engage, where the use of storylines plays an important role in the possibility of a particular view of reality becoming dominant (Hajer 2009: 1997). Storylines here can be understood as "a condensed statement summarizing complex narratives" (Hajer 2009:61). In this way, veterinary actors' storylines on agricultural development simplify smallholders' more complex and dynamic problem framings. The use of one-dimensional storylines can in this sense be interpreted as a form of agency, where the actors attempt to make their own arguments appear as the most convincing and logical form of reality, thus enabling them to gain influence for their own views (Hajer 2009). For example, I found a common storyline on agricultural development across policy documents and in several veterinary interview responses that concentrated on the need for subsistence farming to be transformed into commercial production. Another associated storyline concerned the need to change smallholders' mindsets to make them more market-oriented and entrepreneurial so that they can escape poverty and become modern (Paper II).

For actors to be able to gain support for their ways of interpreting and narrating reality and influence practices, Hajer (1997) argues that they have to convince their audience of the credibility of their arguments. With this in mind, the discourse analysis in Paper II was attentive to how different veterinary actors positioned themselves in relation to each other, and how this positioning potentially enhanced their opportunities to influence the discourse. In other words, I was interested to see how different veterinary actors legitimised their role within the veterinary sector through their different ways of drawing on credibility, acceptability and trust, and how this positioning played out in terms of which development narratives gained

more influence than others (Hajer 2009). Here, it is relevant to introduce the concept of discourse coalitions, which can be defined as "the ensemble of particular storylines, the actors who support them and the practices through which the discourse involved exerts its power" (Hajer 2009:65). An analysis of how actors within the veterinary sector framed problems with smallholder livestock production and suggested solutions to these revealed how policy-makers, veterinary faculty staff and field veterinarians formed a discourse coalition around certain storylines. Thus, the attention on actors and their strategies in the argumentative approach, and the possibilities this offered to move the analysis beyond text revealed how field veterinarians and veterinary faculty staff drew on factors such as educational backgrounds, positions in the formal veterinary sector and social networks to legitimise their role and expand their room for manoeuvre within the veterinary sector.

In relation to these findings (Paper II), it is interesting to note that despite the long-lasting development discourse advocating the need for smallholder farming to be transformed and for African agriculture to be modernised, in many cases such ideas have proved difficult to implement on the ground (Hydén et al. 2020). Scholars have also shown how the often expert-led and top-down approaches to development, which have underpinned policy ideas and practices in recent decades, have largely failed to bring about the desired change in smallholder contexts in the Global South (see, for example, Doward et al. 2005; Sillitoe & Marzano 2009). In relation to this, counter-narratives challenging dominant development discourse have appeared, acknowledging to a greater extent the need to move beyond so-called blueprint development (see Roe 1991) and stressing the importance of tailoring interventions to smallholders' needs, knowledges and local contexts (see, for example, Richards 1985). For various reasons, such narratives have remained rather marginal in official development discourse and, partly due to the difficulty researchers and extension services encounter when attempting to move beyond western knowledge systems, well-intended interventions have often failed (den Biggelaar 1991).

3.2 The role of trust in wealth creation

As described earlier in the thesis (see section 2.2), pig production has been promoted by donors and the government as a poverty mitigation strategy for smallholders in post-conflict northern Uganda. At the time of fieldwork in

2019, pig production was a relatively common livelihood strategy in the study setting. The fact that pigs reproduce within comparatively short time intervals, have several piglets and are attractive on the local market made many informants perceive pig production as a useful strategy to earn money. Pigs were also more commonly kept for the purpose of trade than other animals in the study setting. However, this role of pigs in the accumulation of individual wealth was also found to be problematic. Informants commonly described how free-roaming pigs frequently destroyed neighbours' crops and how villagers sometimes harmed, stole or killed each other's pigs. Locally this was commonly talked about as an expression of 'jealousy' and seen as a major obstacle to success in pig production. In Paper I, this situation is conceptualised as resulting from a lack of trust.

In trying to make sense of what was going on with respect to the presumed harming and killing of pigs in the study setting (Paper I), I found Sztompka's (1999) theory of social trust helpful. The analytical focus of this theory mainly concerns the role of trust in governing people's everyday actions and interactions (Sztompka 2006). The basic assumption in Sztompka's (1999) conceptualisation of trust is that people act in conditions of uncertainty, implying a sense of constant risk-taking when choosing to trust someone. In other words, trust can be defined here as "…a bet about the future contingent actions of others" (Sztompka 1999:25). In this account, trust is understood to consist of the two main components of beliefs and commitment. Beliefs refer to the expectations we have of another person's future actions, such as how the knowledge of someone's character and behaviour (based on past experience) impact the willingness to trust that person in future. Commitment refers to action, meaning that trust occurs when we decide to act on the beliefs we have about another person (Sztompka 1999). For example, if a smallholder perceives a certain animal health actor to be competent and thus able to cure the sick animal, this will impact the smallholder's willingness to act. Trust occurs when the smallholder decides to make a bet, which in this case could refer to implementing the animal treatment advice provided by the animal health actor. In other words, actions play a central role in this understanding of trust. This meant that except for asking the informants questions such as how they perceived the trustworthiness of community members, it was also important to observe how they acted based on such perceptions, such as who they turned to for advice in pig production or those from whom they potentially avoided taking advice. In choosing between alternative courses of

actions (for example, whether to consult a neighbour or an animal health actor when in need of assistance in pig production), it is assumed here that smallholders have to make a bet and place themselves (as well as their animals) at risk, and in so doing they resort to trust (Sztompka 1999).

In Sztompka's (1999) view, trust is considered the precondition for cooperation and the result of successful cooperation. In a social setting where people are able to cooperate, where they generally trust others to do their part in contributing to the common good and to act in a trustworthy way, we can talk about a culture of trust (Sztompka 1999). In the study context, traces of a culture of trust seemed tangible, for example in cases when villagers engaged in community work, helped each other out in times of need or when members of the local savings groups[5] entrusted their money to the treasurer. Beyond the interpersonal level of trust, Sztompka (1999) emphasises the central role of institutions in providing a culture of trust. When integrating this perspective into the analysis, I found that formal institutions, such as public veterinary services, were perceived by the informants to be very absent in their everyday lives. In contrast, informal institutions, such as savings groups or local church congregations, had a more salient role and could thus be interpreted as potential sources of trust (Tillmar 2002). Here, it should be noted that a culture of trust is assumed as more likely to occur in social settings that have experienced gradual and consistent social change (Sztompka 1999), which is quite different from the case of northern Uganda with its rather recent experience of many years of civil unrest. Indeed, previous research has pointed to how the armed conflict led many families and communities to experience a breakdown of social trust (Murithi 2002; Esuruku 2012).

As noted at the start of this section, it seemed that the social setting of pig rearing was characterised by a relative lack of trust, both horizontally between community members in the local study setting (Paper I) and vertically between veterinary actors and smallholders (Paper II). In an attempt to explain this lack of trust, I found it helpful to combine Sztompka's (1999) work with the concept of 'social traps' (Rothstein 2005). While trust according to Sztompka (1999) is the building block for successful cooperation, Rothstein (2005) turns this round slightly and says that non-

[5] The savings groups in the study villages typically included about 20-30 members who met weekly to deposit savings and issue loans from the accumulated savings within the group. A treasurer was appointed by the members of the respective savings groups to deposit and keep the savings.

cooperation is an outcome of a lack of trust. Rothstein (2005) starts from the assumption that everyone would benefit from a situation in which everyone chooses to cooperate. In relation to the study context, it seems obvious that all smallholders would benefit from a situation in which everyone prevents their pigs from damaging their neighbours' crops, and where people have chosen not to harm or kill each other's pigs. The concept of social traps (Rothstein 2005) partly helps explain why this seems not to be happening in the study setting. If people cannot trust that almost everyone else will choose to cooperate, it becomes less beneficial to do so. Non-cooperation can thus become the more rational choice. In other words, lacking trust that others will cooperate is defined by Rothstein (2005) as a social trap, referring to a situation that is worse for everyone. Applying this concept enhanced my understanding of how it was difficult for smallholders to follow local expectations and obligations of a culture of trust when a common experience was that not everyone acted in a trustworthy manner, such as in cases when pigs were harmed or killed by other community members.

Since I am aware that Sztompka's (1999) and Rothstein's (2005) conceptualisations of trust, as well as lack of trust, have emerged and mainly been applied to analyse contexts in the Global North[6], I also included the Bantu concepts of Ubuntu and Umona (Koens & Thomas, 2016) with the aim of contextualising the practices and imaginations of forms of trust. Ubuntu can broadly be understood as "…a belief that individual well-being relies on reciprocal trust and respect among community members" (Koens & Thomas 2016:1643). It should be noted that much colonial scholarship perceived the ethics and philosophy of Ubuntu as an expression of human primitivity and as a barrier to realising western development agendas in sub-Saharan Africa, emphasising the need to conquer the communal aspects of Ubuntu by an ethic of individualism that enabled the rise of western civilisation (Murove 2012). While Sztompka's (1999) and Rothstein's (2005) conceptualisations of trust facilitated a description of the general features of situations of lack of trust that were present in the study context, the concepts of Ubuntu and Umona offered an explanation as to why the possibility to earn money quickly when raising pigs was particularly contentious, and an important reason for the lack of trust and associated expressions of 'jealousy' in pig production.

[6] It should be acknowledged that Tillmar (2002) applied Sztompka's (1999) theory of social trust in her doctoral thesis on small-business owners in Tanzania and Sweden. Awareness of her work was one of the factors influencing our choice to use Sztompka (1999) in Paper I.

Ubuntu can be understood as going hand in hand with Umona, which refers to envy or jealousy (Koens & Thomas 2015; Moyo 2021). In this understanding, people are complying with Ubuntu not only because they want to, but also because they might fear revenge through Umona (Koens & Thomas 2016). If not shared with others, accumulation of individual wealth in this context is believed to cast a shadow of inferiority on other members of the community. Therefore, a successful person who does not share his or her abundance with others needs to be pulled down to maintain the status quo (Ashforth 2005; Koens & Thomas 2016). Indeed, informants commonly emphasised the importance of acting in a trustworthy manner and sharing wealth with less well-off community members in order to avoid getting a bad reputation or becoming the target of 'jealousy'. Applying the concept of Ubuntu thus specifically shed light on the strong principle of community solidarity in the local context, how people were expected to reciprocate trust and redistribute wealth (see also Ramose 2014). In consideration of the co-existence of Ubuntu and Umona, the latter concept revealed the challenge of introducing pigs underpinned by the idea of individual wealth creation in a context where people are expected to favour common wealth over self-promotion in order not to become the target of acts such as the harming or killing of pigs.

It is important to mention that while Ubuntu is a Bantu term and the studied smallholders are not Bantu-speaking people, the concept is embraced more broadly across cultures in Africa. Discussions with Ugandan researchers and the research assistants confirmed that the concepts of Ubuntu and Umona were useful for interpreting what was taking place in the study context.

3.3 Animal diseases and the knowledges around them

Compared with animals such as poultry and goats, pigs have a relatively short history in the study area. In relation to this, many informants found pigs to be particularly difficult to keep healthy, and they often struggled to diagnose and treat sick pigs efficiently. Access to reliable animal health services was described as very limited in the study villages, meaning that smallholders were largely left to the resources and knowledge accessible in their local communities when faced with pig health issues such as ASF. In some instances, uncertainties around pig diseases and the difficulty of

dealing with them, had even made some smallholders abandon pig production altogether. Given this situation, several informants expressed a need for other kinds of knowledge in their pig production to better ensure the health of their animals and benefit more from their investments in this livelihood activity.

When analysing how smallholders understood and acted on pig diseases such as ASF (Paper III), I found it helpful to look at conceptualisations of farmers' local, practical knowledge. More specifically, Paul Richards' formative book 'Indigenous Agricultural Revolution' (1985) proved a good starting point, followed by reading other scholars who have explored the role and acknowledged the importance of farmers' practical knowledge in a variety of farming systems in the Global South (see, for example, Sillitoe 2015; Ainslie 2017; Scott 2020). In these various accounts, smallholders' practical knowledge has commonly been described as being well-adapted to local environments and thus useful for solving context-specific problems in farming (Richards 1985; van der Ploeg 2014; Scott 2020). Scholars have often emphasised the experimental and adaptive elements of smallholders' practical knowledge, and how it constantly evolves through a process of fine-tuning methods in order to identify more accurate solutions to solve the problems at hand (van der Ploeg 2014; Scott 2020). Moreover, practical knowledge is often passed from generation to generation, through observation and practical demonstration (Sillitoe 1998; Munyua & Stilwell 2013; Mtega et al. 2016; Ainslie 2017). In the study context, many informants described how they had learnt how to care for goats, cattle and poultry by observing their parents from a young age. As pigs had been introduced more recently, this possibility to generate knowledge on pig rearing was largely absent, leading smallholders to express greater insecurity in relation to pig management and diseases. This uncertainty was confirmed in the results (Paper III), showing that most smallholders lacked certain forms of knowledge about pig diseases. To conceptualise this, I turned to literature that specifically discusses livestock diseases and the knowledges around them in different, yet somewhat similar contexts in the Global South (e.g. Brown et al. 2013; Waller & Homewood 2017; Beinart & Brown, 2013; Thompson 2021). This enabled me to relate conceptualisations of smallholders' practical knowledge to broader discussions on knowledge forms around animal health and disease among pastoralists and smallholders in other sub-Saharan contexts (e.g. Beinart & Brown 2013: Wolff et al. 2017:

Jones et al. 2020; Ainslie 2017). For example, research on pastoralists in sub-Saharan Africa has revealed that some pastoralists, who are generally understood as having very good knowledge about cattle husbandry and disease management, perceive minor health issues as something normal and thus not necessarily worth controlling, despite the negative impacts this has on their income and cattle production (Waller & Homewood 2017; Wolff et al. 2017). Similarly, the results (Paper III) showed how priorities regarding the prevention and control of pig diseases, such as ASF, sometimes differed between livestock owners and veterinarians.

When specifically looking at the literature on smallholders' knowledge around livestock health and disease, it has been suggested that the concepts of hybridity and pluralism reflect how knowledge systems tend to overlap in smallholders' everyday lives in the sense that many smallholders commonly combine the practical knowledge from within their local communities and the scientific knowledge from external veterinary advisors in their livestock production (Beinart & Brown 2013; Ainslie 2017; Jones et al. 2020; Tasker & Scoones 2022). Considering this, analytical attention was also paid to potential ways in which knowledge systems overlapped in the study setting, thus acknowledging the commonly fluid relationship between different ways of knowing in livestock production (see, for example, Beinart & Brown 2013; Brown et al. 2013; Nwafor & Nwafor 2022).

Applying the concept of practical knowledge in Paper III was useful for acquiring a better understanding of some of the strengths and limitations of this knowledge as a means to deal with pig health issues in the study setting. For example, it shed light on how the locally available treatment methods in livestock production (such as homemade medicine mixes) were often experienced as less efficient when applied to pigs than to other livestock, which can partly be explained by these methods mainly having been developed in relation to goats, poultry and cattle. This aligns with conceptualisations of practical knowledge in which smallholders' skills and knowledge should not be seen as static, but rather as developing over time through constant adaptation in order to solve the problems at hand more effectively (Richards 1985; Scott 1998; Scott 2020). The analysis also brought particular attention to smallholders' perceptions of pig diseases, for example how very few smallholders explicitly talked about ASF, but instead used a variety of names to describe similar syndromes that the co-authors and I interpreted as representing ASF (see Paper III).

The concepts of hybridity and pluralism were also relevant for the analysis, as it was evident that several smallholders had experiences of using pharmaceuticals in their livestock production and at times had also received advice and treatment from an animal health service provider. At the same time, while many smallholders aspired to use pharmaceuticals and incorporate the knowledge of animal health service providers in their livestock production to a greater extent, this was commonly restricted by limited access to and the perceived high costs of these products and services. This partly also explains the smallholders' strong dependence on practical knowledge and locally available resources in their livestock production (see also Nwafor & Nwafor 2022). In considering the potential and limitations of smallholders' local, practical knowledge when dealing with pig health issues, it was also evident that many informants experienced a sense of powerlessness in cases of diseases and death in their pigs. This finding resonates with several other empirical studies, pointing to many rural African livestock owners experiencing high levels of uncertainties when faced with animal health issues in contexts of limited access to veterinary service provision, thus largely being left to their own devices to deal with livestock diseases (Beinart & Brown 2013; Brown et al. 2013; Nwafor & Nwafor 2022).

Moving beyond the case of smallholders and pigs in northern Uganda, it is evident that the role and value of local knowledge and indigenous epistemologies have long been central topics of debate within and beyond Africa (Masoga 2007). Scholars engaging in the field of indigenous knowledge systems (IKS) have presented a broad range of terms (and abbreviations) used to describe and conceptualise these bodies of knowledge. These terms include traditional knowledge (TK), which has often been used more or less interchangeably with terms such as traditional ecological knowledge (TEK), indigenous knowledge (IK), local knowledge (LK) and local ecological knowledge (LEK) (Eyþórsson & Thuestad 2015). Although definitions and interpretations of these bodies of knowledge vary, an emphasis has often been placed on the relational aspects of this knowledge, among other things referring to how these knowledge forms emerge from the complex systems of relationships between humans, other species, the land and the cosmos (see Mapara 2009; Gram-Hanssen et al. 2022). It should be noted here that many scholars have shed light on the more problematic aspects of researching LK or IK, such as how the use of neat labels in research has tended to oversimplify the complex processes involved in these

bodies of knowledge. This simplification opens up the risk of objectifying humans and non-humans by transforming relational aspects of life and knowledge into resources to be managed by scientists and development actors (Li 2005; Wyndham 2017). Criticism has also stemmed from the problematics of terminology in this context, such as defining some knowledge as local, typically referring to the knowledge of the rural poor, in contrast to scientific knowledge that is consequently assumed to represent some kind of universal, detached knowledge (Cameron 2012). Such assumptions ignore how all knowledge is socially situated and thus inherently local (Haraway 1988; Harding 1992).

My intention in analysing smallholders' practical knowledge in pig production was to gain an understanding of how pig diseases were framed, conceptualised and acted upon in the study setting. It is important to acknowledge smallholders' ways of knowing and prioritising in their livestock production when considering how veterinary advice could potentially be used to respond to the expressed need for other kinds of knowledge that can deal more effectively with pig health issues such as ASF (see also Richards 1985; Hydén et al. 2020; Jones et al. 2020).

4. Methodology and methods

In this chapter, the methodological approach and specific research methods are outlined and discussed in more detail than the methodology sections of Papers I-III allowed. The first sections describe the ethnographic fieldwork in Uganda in 2019, followed by the methodological strategies to adjust data collection during the COVID-19 pandemic. Thereafter, I describe the process of data analysis and finally include some critical reflections regarding my own position in relation to the informants.

4.1 Brief note on the research design

The ethnographic approach and specific methods used in my work were chosen with the intention of providing in-depth knowledge of local conditions for pig keeping in rural, northern Uganda. The study design was also adapted to capture broader factors influencing smallholder livestock production, such as an analysis of central policy documents informing the Ugandan veterinary sector and attending conferences and webinars in which researchers and policymakers have discussed pig production challenges such as ASF.

4.2 Ethnographic fieldwork

4.2.1 Participant observation

During my fieldwork I stayed with a Ugandan family in study village A. This provided several opportunities to observe and participate in daily life. None of the family members were Acholi or spoke Luo fluently, which meant that we communicated in English. The field assistant, Alfred, who was Acholi, also stayed in this household during the fieldwork. Selecting the specific

family to stay with was mostly a pragmatic decision; the family was known to several of my supervisors. While staying with a non-Acholi family meant that I could see local customs and culture through the perspective of other 'outsiders', this set-up also implied that I had less insight into Acholi culture. Ongoing discussions with Alfred and other family members meant that we could jointly reflect on a variety of topics relating to language, culture, traditions and everyday life from both an 'insider' and 'outsider' perspective.

In being part of a household, I assisted with daily chores such as preparing food, washing dishes and fetching water. I also helped with farm activities, such as weeding and harvesting in the crop fields, as well as with livestock management practices. During lunch breaks I regularly listened to the news on the radio with household members, which facilitated interesting discussions on the broader social and political life in Uganda. Beyond staying with this family, people in village A generously included me in their everyday lives and informed me when something they considered important happened in the village. For example, one neighbour regularly came by to say when animals were going to be slaughtered in the village centre, which enabled me to observe slaughter practices and interview individuals locally referred to as 'slaughter men'. At other times I was invited to attend events such as primary school graduations, savings group meetings and funerals. This enhanced my understanding of the people and the place of the study. There were also times when something considered more extraordinary happened. One such time was the day when some children knocked on the door of the mud hut in which I was staying and took me to a neighbouring home, where several villagers had gathered to pray for a young woman described as being possessed by a demon. This enabled me to conduct interviews later with traditional healers in village A who, among other things, described the role of animals in their work.

While I remained in study village A during some of the weekends, making it possible to attend church services and other events to which villagers invited me, most of my weekends were spent in the nearest city of Gulu. Taking a step away from the study setting created the necessary time and space for rest and reflection. Stepping back regularly from the field allowed me to reflect critically on what I had seen and heard in the study context, how it related to the overarching research aim, what complementary data were needed, and how the findings could be conceptualised (see also O'Reilly 2009).

There are debates as to whether outsider or insider ethnography is preferable. Those arguing for insider ethnographies have often emphasised that, when conducting participant observation, it can be beneficial to have previous knowledge about the study context. For example, having prior linguistic and cultural competence and being able to blend in more in the study setting could potentially make insider ethnographers more receptive and better equipped for understanding the events and behaviours playing out in front of them (O'Reilly 2009). That said, being too familiar can potentially also be a constraint. Having in-depth knowledge of the study context could, among other things, make us think that we know the answers to our research questions before even going into the field (O'Reilly 2009). Reflecting on this now, I acknowledge that my lack of previous experience of the study context sparked a sense of curiosity that made me interested in learning and listening carefully to all the things that people were willing to share with me. However, it is important to stress that my very limited prior knowledge of the study setting carried risks, such as limited receptiveness from my side. To the best of my ability I tried to bridge this by continuously discussing my interpretations, both with my supervisors and with key informants[7] in study village A, including the field assistants who were both invaluable discussants throughout the study.

One benefit of the researcher taking part in everyday practices in the study context is that it can enhance understanding of the research topic by taking on the perspectives of the informants (O'Reilly 2009). In one of my attempts to learn more about and gain practical experience of the local conditions for livestock production, I bought a goat kid from a neighbour (see also Rudberg 1996). Fairly soon it became evident that the goat was not in good health and was lacking energy and an appetite. After consulting household members and a neighbour, I travelled to a drug shop in Gulu city. Explaining the situation to the retailer, deworming tablets were recommended. Several days into the treatment, the goat still appeared unwell and it was difficult to discern what was wrong. Some time later, the goat died. This experience led to discussions with field assistant Alfred, family members and informants about what had caused the animal to die, such as over-medication or perhaps the goat suffering from a disease that the informants and I were unable to

[7] By key informants I refer to informants with whom I spent more extensive time, regularly discussing a broad range of topics and findings related to my research work throughout the fieldwork. For example, apart from the field assistants, the key informants included one of the family members, elders with extensive experience of livestock production, and a teacher at one of the primary schools in study village A.

identify. This experience drew my attention to the sense of uncertainty about how to deal with various animal health conditions that many smallholders had shared with me in previous interviews and focus group discussions.

Participant observation was helpful for capturing ideas and practices not always explicitly stated in the course of interviews. For example, I was able to recognise that several smallholders stated in interviews that pigs should be confined, while simultaneously observing that very few of them had constructed pigsties or housing for their animals. Thus, participant observation was important for acquiring a better understanding of village life, the informants and the animals in the study area.

4.2.2 Taking field notes

Together with the key method of participant observation, I always had my notebook and pencil with me, allowing me to take detailed field notes throughout the fieldwork on the things being heard and observed and the things I learnt through participating in everyday life (see Emerson et al. 2011). Notes were also taken during interviews, focus group discussions and more informal conversations with villagers. As soon as possible after the respective interview or observation, I typed up the notes on my computer. This meant that most evenings and early mornings were spent re-writing notes to avoid missing out on any details. In this sense, I experienced in practice that: "…an ethnographic maxim holds that every hour spent observing requires an additional hour to write up" (Emerson et al. 2011:48).

4.2.3 Working with field assistants and interpreters

The majority of informants in the study villages spoke Luo and in most cases only knew a few words of English. My lack of knowledge of Luo meant that I was very dependent on working with field assistants to help me translate both the study context and the local language. Working with a translator always means missing out on nuances and details, both in interviews and in everyday small talk. This means that the quotations used in the papers should be read as capturing the sense and meaning of what was said in the interviews or focus group discussions, rather than as literal interpretations.

During fieldwork I regularly set aside time to discuss interviews and observations with the field assistants to make sure that I had understood things correctly. It was also important for me to learn a few words of Luo, such as the names of different animal species and commonly reported livestock

challenges, in order to take part more in the conversations even though the field assistants were translating. In dealing with this language barrier, non-verbal strategies such as conducting participant observation were critical. Triangulation, here referring to the strategy of combining research methods and studying the same phenomena with different people in various contexts, was also important for ensuring the validity of the findings (Flick 2018).

Alfred was the field assistant with whom I worked most of the time. He comes from study village B and has lived in northern Uganda his entire life. Through his experience of working in several research projects in the past, he had extensive knowledge of translation and the different methods used in research. Given that some of the themes in this study could potentially be perceived as too sensitive to share with a male field assistant, Alfred trained a female field assistant, Susan, who was fluent in English and stayed in study village A. Susan had a broad social network in the study area, partly due to owning a restaurant in the centre of village A, which was frequently visited by the community members. Apart from translating during some of the interviews with female informants, Susan also helped facilitate focus group discussions.

During fieldwork, it was evident that people liked spending time with Alfred and Susan. Their ability to build trust with people in the study area was important for gaining access to informants throughout the fieldwork. Alfred had a great ability to connect with people: with elders to whom he listened carefully, with field veterinarians who he treated with great respect, and finally with community members who appreciated his caring personality. When interviewing smallholders digging or weeding in the crop fields, Alfred sometimes comforted their crying babies or helped out with the work. During and after fieldwork, Alfred was an important key informant and co-analyst, as we continuously discussed what the informants had shared and potential ways to interpret their responses. This practice not only served to clarify misunderstandings or identify new research questions, but was also important for starting the data analysis already in the field.

Interviews with field veterinarians in northern Uganda were conducted in English. Alfred was present during all but one of these interviews, and sometimes interjected with valuable questions. Despite the language barrier being less evident in these interviews, Alfred still played an important role, not least as his presence allowed us to discuss the interview responses together afterwards.

Finally, I want to stress that the field assistants, particularly Alfred, were very much part of the enabling, framing and shaping of this research process. Despite Alfred not appearing as a co-author in any of the papers, which was a possibility we discussed throughout this research process, I want to acknowledge that he was much more than an assistant throughout this thesis work. This is important to emphasise, not least due to tendencies of the past and present to make research assistants invisible when the research work is reaching its final stages (see Schumaker 2001; Thompson 2019).

4.2.4 Interviews in the study villages

Interviews with smallholders in study villages A and B were conducted with the aim of gaining more detailed insights into the informants' perspectives on the conditions for farming, with particular attention paid to livestock keeping. The interviews also captured perspectives on broader themes related to everyday life in the study villages. The interviews with smallholders from approximately 70 households (the vast majority from study village A) varied in length, depending on how much time the informants could spare. Whenever possible, I conducted interviews in situations such as when they were managing their animals, working in the crop fields or preparing food, both as an opportunity to learn more about the informants' everyday lives and also to avoid taking up too much of their time. Informants for interviews were purposively selected on the basis of being over the age of 18 and having some previous knowledge of livestock production. While this group of informants are referred to as smallholders in the thesis and papers, I want to acknowledge their additional varied and shifting roles in the local communities. They could instead have been described for example as elders, business owners, traditional healers, pastors or hairdressers, social roles that tended to shape the direction of the respective interview. Interviews were conducted in Luo and simultaneously translated into English. Most interviews in this study were semi-structured, where I relied on a rough topic guide that ensured I covered the issues I wanted to learn more about while staying open to emerging issues that the informants raised during the interview. Some interviews were unstructured as they resulted from extended unplanned conversations with village members. Interviews with smallholders in the study villages were not recorded and thus not transcribed verbatim. Instead I took detailed notes during the interviews and focus group

discussions, and made sure to repeat questions if I felt I had missed something.

In order to allow the informants to express themselves, I had to be consistently self-critical and attentive about how I may have been affecting the interview. For example, the way I chose to formulate my questions potentially shaped the informants' answers (Brinkmann & Kvale 2018). In relation to this, I was aware that the semi-structured interviews were not conversations between equal actors. I was generally the one who approached the informants with requests to interview them, and even though I stayed open to emerging issues, my research focus narrowed my interest and the agenda for the interviews. In addition, the informants also had limited control over how I interpreted their responses (Brinkmann & Kvale 2018) and in the end it was I (and partly also the co-authors) who determined which voices were heard by deciding which quotations to include in the respective papers (England 1994).

4.2.5 Interviews with veterinarians in northern Uganda

With the aim of learning more about veterinary extension work in northern Uganda, I conducted five interviews with field veterinarians and one interview with a District Veterinary Officer (DVO), all working in Nwoya district. Upon request, the DVO (the person responsible for public veterinary work at sub-county level) provided me with a list of field veterinarians. In an attempt to capture varied perspectives on veterinary work, I included all of the names (four men, one woman) on the list for interviews. These interviews were the only ones I could manage to do myself as all the informants were fluent in English. Interviews were conducted in the informants' offices and on one occasion I was invited to accompany one of the field veterinarians during his work. Conducting participant observation on a visit to a large-scale farm in the study area gave me some insights into the work of field veterinarians in northern Uganda.

4.2.6 Focus group discussions including ranking exercises

Aiming to capture a broad range of perspectives on animal health issues and challenges around livestock management, a total of six focus group discussions were held with smallholders from village A (Chambers 1994). Participants were selected based on the criteria of residing in study village A, being over the age of 18, and having previous experience of livestock

production. Focus group discussions were facilitated by one of the field assistants, while the other translated between Luo and English. When deemed necessary, I intervened to ask follow-up questions or for clarifications. The focus groups were initially a mix of both men and women, but as it became evident that some female participants remained more in the background in these discussions, two groups were arranged with just women. In these discussions, participants were asked to choose freely what specific livestock to discuss, with the intention of letting them steer the direction of the discussion. Due to longer experience with goats and poultry, many participants preferred to discuss the challenges with these animals, which in turn restricted the possibilities for collecting data related specifically to pig keeping. In each focus group discussion, the participants were asked to share information about the challenges (not limited to disease) that they had experienced in their livestock production. Thereafter, they were asked to discuss how these challenges could potentially be reduced or resolved. The challenges and solutions were written down on a large paper by the facilitator in Luo and English in front of the group. In all but one of the groups, this was followed by a ranking exercise, in which the participants ranked the challenges in relation to one another, according to perceived significance. The ranking exercise ended when the group had reached agreement on how the challenges should be ranked. This design of the rankings enabled the participants to share their views and critically reflect on each other's opinions, which can be considered a strength compared with the interview situation which is more dependent on the researchers' ability to formulate and ask questions. However, this consensus-seeking also entailed certain risks, such as some of the participants possibly not feeling comfortable about sharing their views due to local power dynamics of which I might not have been aware as an 'outsider' in this context (see also Chenais & Fischer 2021). Nevertheless, the focus group discussions and ranking exercises provided me with a better understanding of how the smallholders framed challenges in their livestock production, and how they perceived the various challenges.

4.2.7 Survey

In the final stage of fieldwork, I designed a survey (see Appendix 1) with Alfred. The survey aimed to quantify the qualitative findings (Patton 2014) in the sense of exploring how frequent the problem framings on livestock production and animal health, which I had come across in individual

interviews and focus group discussions, were in the study area. To ensure that questions in the survey were well adapted to the local context and that the survey could provide relevant information in relation to the overarching aim of this study, the survey was piloted with key informants in study village A. Alfred and I agreed on the survey questions, written on paper in English, with the names of animal species and questions about livestock challenges written in both Luo and English. The survey included questions on demography (such as gender, age and number of household members), a ranking of livestock challenges for different animal species, and questions related to experiences of animal health service provision in the past 12 months. Testing the survey was also important in order to train Alfred to carry out this task. The survey was then revised into a final version printed on paper. The survey was not ready until I was about to return to Sweden, which meant that Alfred carried out the work alone. In total, 101 smallholders (16 from village A and 85 from village B) responded to the survey. The survey was conducted in Luo and responses were written down in English. The fact that Alfred simultaneously translated from Luo into English when writing down the answers from respondents meant that it was difficult to be certain about the exact detail in the wording of the responses. Informants were selected by a mix of purposive and convenience sampling strategies. Smallholders over the age of 18 with previous knowledge of livestock production and who were home at the time of the visit were included. The reason for the predominant number of informants from village B was that it was convenient because this was Alfred's home village. Not being in northern Uganda myself at the time the survey was conducted had several disadvantages, such as not being able to ask the respondents follow-up questions or ensure a fairly equal number of respondents from the study villages. To deal with such disadvantages, I used the results from the survey (Papers I-III) as a complement to other data rather than as the sole basis for analyses and drawing conclusions.

4.3 Additional data collection related to veterinarians and ASF

In addition to the data collection outlined above, I also attended conferences and webinars (in Uganda and online from Sweden) focused on ASF, to gain a better overview of current research and work in this research field.

In 2018, just before the official start of my PhD studies, I had a week-long visit to Uganda with some of the members of the larger research project group. Except for a short trip to northern Uganda, giving me a first glimpse of the place, people and animals shaping this thesis work, I also attended a workshop in Kampala exploring ASF from various angles. In relation to this, I was introduced to a variety of actors associated with the Ugandan pig value chain, such as researchers, staff from the International Livestock Research Institute, farmers and traders.

During the fieldwork in Uganda, I attended a two-day Uganda Veterinary Association Symposium in Kampala, where I made contact with veterinary researchers and field veterinarians from different parts of the country. This symposium gave me insights into how different actors framed and discussed challenges associated with the Ugandan veterinary and livestock sectors.

In addition, I observed three focus group discussions during the fieldwork that included a variety of actors related to the smallholder pig value chain in northern Uganda (see Chenais et al. 2023a). These discussions mainly focused on control interventions in relation to ASF. One aspect that particularly stood out for me when I listened to these discussions was the importance of not considering smallholders as a homogenous group. For example, the participants in these groups generally seemed to have better access to veterinary services and, in addition, greater knowledge of ASF than the smallholders with whom I had interacted in the study villages.

4.4 Distant fieldwork: adjusting to the pandemic

Only a few months after I left Uganda in late 2019, news arrived about the emerging COVID-19 pandemic. Here I briefly outline some of the drawbacks of the adjustments made in response to the pandemic, including cancelled fieldwork. From a broader perspective, the pandemic exposed some of the vulnerabilities of the still common research design of collecting data in the Global South that are eventually written up and produced in the Global North (see also Haelewaters et al. 2021). In relation to my own research work, the pandemic initially created uncertainty, such as not knowing whether more fieldwork would be possible. At the same time, I also realised how fortunate I was to have been able to collect data before the pandemic, which was also an important factor in being able to adjust and find ways to continue data collection despite not being able physically to return

to Uganda. Adjustments in data collection are mainly visible in Paper II in the choice to include an analysis of policy documents to complement ethnographic data, and conduct some semi-structured interviews by telephone and online.

These adjustments limited my perception of local conditions for smallholder livestock production in northern Uganda. First, the survey conducted during the fieldwork in 2019 was initially intended to function primarily as a pilot survey. My plan was to include a larger number of respondents in a second round, and also to ensure a more balanced number of respondents from the study villages. This seemed important for ensuring the representability of the wider informant group and being able to confidently make generalisations about the data (O'Reilly 2009). This drawback was negotiated by not drawing too broad conclusions from the survey data and, in this sense, it was mainly useful for quantifying ethnographic data. In addition to this, during fieldwork in Uganda in 2019, smallholders produced maps of their respective study village that were intended to be complemented by wealth ranking exercises inspired by Jacobson (2013) during subsequent fieldwork. However, it was not possible to collect good quality data through a wealth ranking performed at a distance, and this reduced my ability to capture potential social stratifications in the study villages, describe the smallholders with more nuances, and make visible potential differences between households in the study villages.

4.4.1 Telephone interviews with paraprofessionals

During the fieldwork in 2019, I conducted one semi-structured interview with a paraprofessional from study village A. The intention was to interview more paraprofessionals in the upcoming fieldwork, but owing to the pandemic I instead conducted five semi-structured interviews with paraprofessionals over the telephone, with the field assistant Alfred on site simultaneously translating between Luo and English. Informants for the telephone interviews were identified through snowballing (Noy 2008), meaning that one informant suggested another paraprofessional for interview. With the aim of capturing perspectives of the paraprofessionals' work that were as broad as possible, I deliberately asked the informants to suggest both individuals considered to be competent in their work as well as those considered as working beyond their competence (referred to as 'fake

vets' or 'quacks' by other informants). All the telephone interviews were recorded and later listened to again in order to fill in gaps in the notes.

While the telephone interviews provided new insights into the role and work of the paraprofessionals, there were also some drawbacks to not being there in person. Some things do get lost when you are unable to use senses other than your hearing, such as things not explicitly stated in the interview, the informants' facial expressions and the possibility of observing everyday practices. Furthermore, not being face to face with the informants made it difficult to ensure that the questions did not come across as insensitive or to see if the informants felt uncomfortable in any way. While the telephone interviews provided an important understanding of the paraprofessionals' perspectives of animal health and their work, and enabled me to continue data collection in the midst of a pandemic, these adjustments also delayed the work to some extent. This was particularly evident when the network connection was unstable, meaning that the connection could break down in the middle of the interview. This delayed the work and resulted in additional time required from the field assistant and informants as we had to reschedule and repeat the interview.

4.4.2 Zoom interviews with staff members from the veterinary faculty

Semi-structured interviews with five staff members of the veterinary faculty at Makerere University were conducted via video link on Zoom. The aim of these interviews was to learn more about the content and structure of veterinary education, as well as gain perspectives on veterinary extension work. All of these interviews were recorded, making it possible to listen to the interviews afterwards to fill in gaps in the notes. A key informant working at the veterinary faculty helped me identify potential interviewees and arrange the online meetings. All the staff members participating in the interviews worked at the School of Veterinary Medicine and Animal Resources (MakSVAR), one of two schools in the College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB). With the intention of capturing a variety of perspectives on veterinary education and the veterinary sector, informants were selected based on the criteria of having different educational backgrounds (from a bachelor's degree to a PhD in veterinary medicine) and holding different positions in the veterinary faculty (ranging from a teaching assistant to the dean). I used a prepared topic guide

(see Appendix 2) during these interviews. The interviews were conducted in English and lasted between 45 and 90 minutes.

Overall, I found it valuable to have some prior understanding of the Ugandan veterinary and livestock sectors when conducting online and telephone interviews. This contributed to building trust with the informants and identifying relevant themes and questions for the interviews.

4.5 Data analysis

4.5.1 Analysis of field notes

As mentioned previously, the analysis of data already started in the field, with the recording and revision of field notes enabling me to reflect on the data. Discussing findings with the field assistants and key informants throughout the fieldwork was also of key importance for the first step of analysis when I was looking for potential contradictions and commonalities in the material for further exploration. Returning to the field notes when writing the thesis and the papers (Papers I–III) provided opportunities for further analysis of the material. Although not all the field notes were systematically coded at a later stage of the analysis, these still played an important role in providing understanding of the broader context and, as such, facilitated analysis.

4.5.2 Analysis of smallholder interviews and focus group discussions

Notes from interviews and focus group discussions were rewritten as soon as possible after the respective interview or discussion. Interview and focus group responses were also discussed with the field assistants and key informants, considering how responses should be interpreted and how they related to the overarching aim of the study, such as the role of pigs for smallholders and the obstacles smallholders experienced in their pig production.

In starting to draft the respective papers, I re-read the interview and focus group notes as a way of familiarising myself with the material (Emerson et al. 2011). In this process, the notes were imported into NVivo 12 (QSR International), a software for qualitative data analysis. The initial coding was guided by the overall focus of the thesis on smallholders and pigs, but beyond that it was largely inductive. Within this broad overarching focus, I searched for interesting themes and patterns in the data

and made categorisations according to broader codes, such as 'the role of pigs' (Paper I), 'access to veterinary services' (Paper II) and 'animal diseases' (Paper III). These broader themes were then presented to the co-authors of the respective papers, allowing discussions about how to focus the text and alternative interpretations of the data. Possible ways of interpreting the themes I identified in the data and possible theoretical frameworks to aid interpretation were discussed with the co-authors and tested against the data in an iterative process. As we decided on more specific research questions and conceptual frameworks, the data analysis became increasingly deductive, directed by and tested against chosen concepts and theories. In this stage, more specific topics emerged, such as 'trust' (Paper I), 'pig production development' (Paper II) and 'local treatment methods' (Paper III).

4.5.3 Analysis of survey data

The survey data were entered into a Microsoft Excel spreadsheet. This enabled me to gain an overview of the data, as well as estimate the minimum, maximum and average of the numerical results. The survey data results were discussed with the co-authors of the respective papers (Papers I–III), considering how the results related to the qualitative data and to the research questions of the papers in different ways.

4.5.4 Discourse analysis of interviews and policy documents

With the purpose of learning more about central narratives on agricultural development through livestock production in the Ugandan context, I performed a discourse analysis with guidance from the argumentative approach of Hajer (1997). The specific policy documents that were included for analysis are outlined in Paper II. This analysis paid specific attention to how problems of agricultural development were represented, how potential differences in ways of narrating reality played out in the textual material, and whether coalitions around these narratives or problem framings could be identified (Hajer 1997). As a first step, I carefully read the material (notes from interviews and policy documents) and categorised the data using broadly defined codes, such as 'quacks' and 'extension work'. The broader themes that emerged in this inductive process were then discussed with the co-authors (Paper II). More specifically, we discussed alternative interpretations of the findings and ways to theorise these. In a second step, when

the conceptual framework had been designed (see section 3.1), the analysis continued with a more deductive coding, guided by the concepts of storylines and discourse coalitions, as well as the concepts of credibility, acceptability and trust. In line with the argumentative approach, it was assumed here that actors are actively involved in the production and transformation of discourse (Hajer 1997). Analytically, this meant that except for examining coherent storylines or statements in the textual material, I also paid attention to who was expressing certain storylines and how different actors positioned themselves and others in relation to these.

4.6 Ethical considerations

Ethical issues cut across this research and I did my utmost to respect the integrity of all participants. During the fieldwork, the overarching aim of the study was presented to all the informants. They were also informed that there would be no compensation for their participation and that they would be free to withdraw from the study at any given time without the need to give a reason. All the informants gave their oral consent prior to participation. Before starting the actual research work, I also described the intention of my stay in the study villages to the elders and village leaders.

An important aspect that should be stressed here is that this research was carried out in a post-conflict area. In the initial stage of fieldwork, I found it relevant to learn more about the history of the place, including (but not limited to) to the most recent conflict. This led me to interview and converse with several elders in village A, who among other things shared stories and experiences from the brutal conflict. During these interactions, it was sometimes evident how the atmosphere changed when the informants started describing painful memories from the past. These interviews posed an ethical dilemma for me. It seemed important to explore how the past conflict potentially affected the present everyday life in the study area, but I did not want to ask questions that risked making the informants feel uncomfortable or exploited (see Mwambari 2019). Navigating this, I received a great deal of help from the field assistants who had experienced the conflict themselves and helped me discern how interview questions could potentially be perceived by the informants. At times they reminded me that research can also include or evoke uncomfortable emotions. These interviews and conversations also made me aware of the importance of reminding the

informants throughout the fieldwork that they were free not to answer my questions and asking them for feedback about whether certain questions were perceived as uncomfortable.

In some interviews and focus group discussions, individuals asked me to contribute money to their families and the local community. A few informants also asked how this research would contribute to improving their general life conditions. In such situations, some informants mentioned that white people had come to their village in the past to carry out research or development projects, in some instances resulting in material benefits for the community, and they therefore expected that this would also be my role in the study area. In such situations, it was important for me to communicate the slow process of research work and underline how their participation in the study would not necessarily lead to any improvements in their everyday lives in the future.

Staying with people over a few months, I could sense that they were becoming increasingly used to having me around. For example, I was entrusted with the task of mediating in conflicts in the household where I was living and given information by traditional healers working in secret, and I listened to the experiences of informants who were in deep pain. Despite being careful about informed oral consent, there was a risk of the informants feeling that they told me more than they would initially have intended (Ramazanoglu & Holland 2002). With the aim of respecting the integrity of all the informants, their names and those of the study villages have been changed for anonymity, as promised during the fieldwork. The field assistants asked me to use their real names in the papers and in this thesis, which is why they have been included.

4.7 Positionality and reflexivity

Fieldwork is laden with power relations and constant attention needs to be paid to these (England 1994). One of many situations during fieldwork when I became particularly aware of my 'otherness' and privileged position in the research context (see Madison 2022) was the day when the goat that I had bought from a neighbour died (see section 4.2.1). Losing a goat meant something totally different for me than if a smallholder in the study area loses an animal. To me, although a distressing experience, losing this animal meant

losing a bit of spending money, whereas for a smallholder, the loss of an animal could mean losing the opportunity to send a child to school that term.

While attempting first and foremost to listen to the perspectives and concerns of the informants and be willing to be affected by these (Gram-Hanssen et al. 2022), such research practices never removed tensions stemming from the evidently hierarchical power relations throughout this research process (England 1994). That said, reflecting on my own positionality in relation to the informants – of being a white, fairly young PhD student from a rich country like Sweden – is still important for making visible my privileges, biases and responsibilities in relation to this research work (Madison 2022). In so doing, I have consistently asked myself questions, such as who will ultimately benefit from this research, how my cultural and educational background will affect the ways in which research questions are formulated and how the findings are theorised (England 1994; Madison 2022). In relation to this, Farahani (2011) advocates a self-reflexive methodology in which "…one should pay attention to the construction of one's own experience, questions and interpretations as well as how these interpretations have come about" (Farahani 2011:115). I understand this self-reflexivity to include responsibility for how I might have shaped the study context, for the decisions I made about how to carry out the research work, and what conclusions I drew from what I observed and heard. In this self-reflexivity, it is not only critical to consider how I perceived and positioned the informants, but equally important to think about how they positioned me (Farahani 2011). For example, whenever I was about to travel to a city, villagers often warned me of thieves and urged me to never expose my mobile phone or money in public. Raising this in a conversation with Alfred and two key informants, asking whether I should also be protective of my personal belongings in the village, I was ensured that I had nothing to worry about. They explained that this was because the villagers knew that the place where I was staying was the same place where other white people came to stay during visits. In this conversation, Alfred and the informants explained that there was nothing to fear as long as there is a "mono" (referring to a white person) in the household. They told me that people would fear punishments by the police if a white person accused them of doing something wrong, and some villagers believed that white people had guns and would use them if someone tried to steal their belongings. Such conversations made me particularly conscious of my own role in the study setting and how the

informants potentially positioned me in this context. The idea that white visitors might have guns for protection suggests fear, as opposed to the trust that is key to undertaking ethnographic fieldwork (Hamal 2020). Moreover, it shed light on how my research work is situated in a wider context of colonial relations, which also need to be carefully considered.

Finally, it should be noted that my positionality was constantly shifting, depending on the specific situation in which I found myself and the specific individuals with whom I was interacting during the fieldwork. In interviews with field veterinarians, for example, the fact that I was a young female student, willing to learn from their expertise in animal health, seemed to enable me to build trust with these informants. In another context, during an interview with a paraprofessional in study village A, I was positioned as the expert (although I have had no training in veterinary medicine myself) and was asked to provide advice on pharmaceuticals and ASF. This meant that I had to constantly evaluate my own role and how power potentially shaped behaviours and actions in relation to the various interactions and engagements throughout the fieldwork.

5. Summary of Papers I-III

5.1 Paper I: Pigs as a shortcut to money? Social traps in smallholder pig production in northern Uganda

The paper titled "Pigs as a shortcut to money? Social traps in smallholder pig production in northern Uganda" was published in the *Journal of Rural Studies* in 2022.

The Ugandan pig sector has experienced dramatic growth in recent decades. In relation to this, the government and donors have promoted pig production as a poverty mitigation strategy for poor smallholders. This article is based on data from four months' fieldwork in rural northern Uganda, and explores the challenge of social tensions arising from pig production in smallholder communities.

The findings revealed that smallholders particularly valued pigs for enabling income generation and accumulation of individual wealth. Many smallholders engaged in pig production in the hope that it would improve their everyday lives and future. Such hopes were closely associated with aspirations of being able to escape farming and a rural life for a more comfortable lifestyle in urban areas. Concurrently, smallholders described pig production as often being a source of social tension in their communities. Most smallholders had their pigs free-roaming, frequently resulting in pigs destroying crops in nearby fields. The pig owner was expected to compensate people for such destruction, something that rarely happened in practice, creating social tensions in the communities. Another reason for social tensions in relation to pig production was the possibility of accumulating individual wealth through this activity. Accumulation of wealth was particularly linked to pigs in the study setting, as pigs could be sold at higher

prices than goats and poultry, for example. The results showed that there were strong moral obligations for the better off to contribute to the common good and share their wealth with individuals with less resources, with the purpose of not leaving anyone behind. Social tensions were defined locally in terms of 'jealousy' and manifested through the harming, killing or stealing of each other's pigs. It should be noted that several smallholders perceived jealousy as a more significant problem than diseases in pig rearing.

By applying the concepts of trust and social traps, we aimed to provide understanding of how these manifestations of jealousy came about and, moreover, why they were more common in relation to pigs than other animals kept in the study setting. Smallholders' descriptions of acts of jealousy and the stealing, harming and killing of each other's pigs indicated a lack of trust among community members. The difficulty many smallholders faced of not being able to trust that everyone would contribute to the benefit of all and choose cooperation in pig production was interpreted as a social trap – a situation that made things worse for everyone. In contrast to the lose-lose situation of the social trap, smallholders would have benefited from a situation where they do not harm or kill each other's pigs, which would also enhance their possibilities of accumulating wealth through pig rearing.

This article sheds light on some of the difficulties of promoting pig production, in particular the underlying idea of individual wealth creation in a social context in which people who accumulate wealth are expected to share their material abundance with others and not leave anyone behind. Consequently, we conclude that while pig rearing can potentially contribute to reducing rural poverty in this post-conflict setting, the community rather than the individual needs to be at the centre of such development initiatives.

5.2 Paper II: Diverging discourses: Animal health challenges and veterinary care in northern Uganda

The paper titled "Diverging discourses: Animal health challenges and veterinary care in northern Uganda" was published in the journal of *Frontiers in Veterinary Medicine* in 2022.

The adoption of structural adjustment programmes in the late 1980s and early 1990s drastically changed the Ugandan veterinary sector, resulting in, among other things, the downscaling of services offered by the public veterinary sector. In this article we aimed to contribute knowledge about the

current structure of veterinary support in rural Uganda. We also aimed to acquire a greater understanding of dominant agricultural development narratives in contemporary policy and among various veterinary actors, and how such narratives affected smallholders' abilities to deal with animal health issues at the local level. In addition, we paid attention to the role and work of paraprofessionals, individuals who are typically more accessible and affordable for smallholder farmers than their professional counterparts, but who were of varying quality and had had a varied length of training in animal health (some with no formal training in animal health at all).

In this article we combined a discourse analysis of policy documents informing the Ugandan veterinary sector with semi-structured interviews with faculty staff members, field veterinarians and paraprofessionals. In addition, the article also draws on ethnographic data from fieldwork among smallholder farmers in rural, northern Uganda.

Applying the discourse analytical approach (Hajer 2009), we identified a discourse coalition of faculty staff members, field veterinarians and policy makers. These actors commonly suggested that rural poverty could be reduced by transforming smallholder farming into large-scale, industrial agriculture. It was also commonly perceived that for this to happen, smallholder farmers needed to replace their traditional mindset into an entrepreneurial one. In this way, much focus was placed on the need for smallholders to change their mindset and practices, with less attention paid to the wider structural factors influencing the local conditions for livestock production in rural areas. In contrast to the dominant discourse of agricultural development found among faculty staff members, field veterinarians and policymakers, many smallholders perceived pig production as a potential launch pad out of farming, rather than as a means to becoming large-scale farmers. Such alternative views of agricultural development among smallholder were widely overlooked in the dominant discourse.

The findings showed agreement between policymakers, staff members, field veterinarians, paraprofessionals and smallholders concerning the very limited capacity of the public veterinary sector. As a consequence of the currently understaffed and underfunded public veterinary sector, smallholders had very limited access to field veterinarians when faced with animal health issues in their pig production. In the absence of field veterinarians, paraprofessionals played a significant role in providing animal health services in rural areas. In relation to this, staff members and field veterinarians were found

to tend to refer to paraprofessionals as 'quacks', actors with limited training in animal health who provide faulty advice and treatment under the pretence of being qualified veterinarians. While this study revealed some risks in the work of paraprofessionals, such as some of the paraprofessionals included in this study regularly providing smallholders with incorrect advice about ASF, we argue that a general framing of paraprofessionals as quacks downplayed their important role in the veterinary sector and the positive impact of paraprofessionals working within their competence.

Based on the findings from this study, we conclude that a closer collaboration between veterinarians and paraprofessionals would be beneficial both to the livelihoods of smallholders and to the health of their animals. Finally, we underline the importance of acknowledging the role of paraprofessional within the Ugandan animal health care sector, including them in training courses and in the development of policy relating to animal health, and finally listening more carefully to smallholder farmers' own needs and aspirations in their livestock production.

5.3 Paper III: Limitations and opportunities of smallholders' practical knowledge when dealing with pig health issues in northern Uganda

The paper titled "Limitations and opportunities of smallholders' practical knowledge when dealing with pig health issues in northern Uganda" was submitted for publication in January 2023.

Paper III investigates smallholders' conceptualisations and responses to pig health issues, with particular attention paid to the severe and often fatal disease of African swine fever (ASF). Drawing from ethnographic data from fieldwork in northern Uganda, the findings showed that many smallholders had less experience with pigs than with other livestock such as goats, poultry and cattle, which have a longer history in the study setting. In relation to this, many smallholders said that they felt unsure about how to interpret, prevent and treat pig diseases. It should also be noted that very few smallholders talked explicitly about ASF, but instead used a variety of names to describe a group of syndromes that led to the rapid death of several pigs. We interpreted such descriptions as representing experiences of ASF, based on previous research on ASF epidemiology in eastern Africa as well our knowledge about documented and undocumented ASF outbreaks in the study area. Moreover,

the findings showed that there were different opinions among the smallholders as to whether ASF was curable or not. Several smallholders who perceived ASF as possible to treat said that the main problem for them to stop pigs dying was lack of access to efficient pharmaceuticals. We also found that several smallholders found it difficult to distinguish whether a pig had died from poison or disease, exacerbating the general sense of uncertainty around ASF in the study setting. The findings also demonstrated that smallholders generally only took action against diseases when there were visible signs of sickness in their pigs, pointing to how the concept of prevention was not an obvious one in the study setting. In relation to this, the results indicated that smallholders could perceive veterinary advice on the prevention and control of ASF, such as confinement of pigs, to be more relevant if it is motivated by reducing social tensions due to free-roaming pigs destroying crops rather than by preventing and controlling pig diseases.

In applying the concept of practical knowledge, we identified some limitations of smallholders' practice-based knowledge as a means for dealing with pig health issues such as ASF. Smallholders commonly expressed a need for other kinds of knowledge and resources than were accessible in their local communities in order to reduce the negative impacts of pig health issues. Thus, from the smallholders' point of view, the lack of access to veterinary services severely constrained their abilities to deal with pig health issues such as ASF adequately. Some smallholders who had lost their pigs due to disease without knowing what to do if the disease appeared again in future in new pigs had decided to abandon pig production altogether.

Based on the findings, we conclude that the potential of pig production as a poverty mitigation strategy could be enhanced by, among other things, improved access to veterinary services in rural areas. It is also important for veterinary practitioners to be attentive to smallholders' own priorities and ways of conceptualising animal diseases to ensure improved communication and for veterinary advice to have relevance in the local setting.

6. Discussion

In this chapter I discuss the key findings from Papers I–III in light of the overall aim of the thesis of contributing knowledge about the challenges faced in pig production by smallholder farmers in northern Uganda, with a particular focus on African Swine Fever (ASF).

6.1 Pig production as a pathway out of poverty

This thesis shows that pigs played an important role in the livelihoods of the smallholders studied. Pigs were considered to grow comparatively quickly and reproduce rapidly, and could be sold at relatively high prices (Papers I–III). Therefore, pig production was an important strategy for accumulating individual wealth and, similar to the description given by Hoag (2018) of the role of sheep and goats in Lesotho, pigs were closely associated with aspirations to leave rural life behind for a more comfortable existence in an urban area (Paper I). At the same time, pig rearing was associated with the risk of disease and with pigs being stolen, harmed or killed by other community members (Papers I and III). In the thesis, I interpret this practice of harming and stealing each other's pigs as a social strategy to avoid some people accumulating more wealth than others and thus maintain the status quo in the community (see also Ashforth 2005; Koens & Thomas 2016). Social tensions of this kind arising out of pig production as a form of individual wealth creation, locally described as 'jealousy', were perceived by several smallholders to represent a greater barrier to pig production than diseases (Papers I and III). The notion of 'jealousy' has briefly been mentioned in previous veterinary research on ASF epidemiology. For example, a study from the Kenya-Uganda border demonstrates that farmers deliberately spread ASF via pig carcasses, which the farmers described as

acts of jealousy performed against their neighbours when their own pigs had died (Nantima et al. 2016). Another study from East Timor reveals that some farmers suspected their neighbours of deliberately spreading ASF to their pigs. Here too, farmers referred to this as an act of jealousy and, as in this thesis (Paper I), the farmers in East Timor understood such acts to be an expression of some neighbours wanting to stop certain community members from becoming more successful than they themselves were (Barnes et al. 2020b). In my thesis I take this analysis a step further and suggest that the reason that pigs in particular seem to be locally connected with acts of jealousy is related to how pigs have been introduced as a way of building up individual wealth. Another important finding from the thesis is that smallholders did not generally conceptualise diseases and acts of jealousy as distinctly separate phenomena – many of them found it difficult to distinguish between various diseases and between a pig that had died from poisoning or from disease (Papers II–III).

The conclusion in Paper I that pigs were harmed and killed because of their central role in the quick acquisition of wealth by individual smallholders draws attention to an important issue in the way both international donors and governments in the global South in recent decades have approached development through individual wealth creation and competition (Konings 2011; Ibrahima & Mattaini 2019; Hydén et al. 2020; Veltmeyer & Bowles 2022). As revealed through the discourse analysis in Paper II, the Ugandan government and veterinarians have not acknowledged that this approach can have negative effects. Instead, Ugandan policymakers and various veterinary actors shared a common development narrative suggesting that smallholder farming needed to be transformed into large-scale commercial agriculture. According to this dominant development narrative, a perceived prerequisite for poverty reduction and modernisation is that smallholders must abandon their so-called traditional mindsets in favour of an entrepreneurial and business-minded one, which is heavily reliant on individual wealth creation. The findings in Paper I make it clear that such an approach has had significant negative impacts in the study villages in northern Uganda. Furthermore, the idea of modernisation through the upscaling and commercialisation of farming also goes against many smallholders' own wishes of wealth creation representing an opportunity to get out of farming rather than become more deeply involved in it (Papers I-II). A variety of challenges in smallholders' pig rearing also made the linear

pathway of development envisioned by veterinarians and policymakers extremely unrealistic for many smallholders. Some smallholders decided to abandon pig production due to difficulties managing diseases or experiences of having their pigs harmed or killed by neighbours (Papers I and III). Here I want to stress that this linear view of development is not restricted to specific veterinary actors or policy documents in present-day Uganda. Rather, it reflects a larger, ingrained discourse around development that was already evident in the British colonial era (see, for example, Kaberuka 1987; Mwanika et al. 2021; Nayler 2021) and also goes well beyond Uganda, as evident in the vast literature in critical development studies (see, for example, Li 2007; Escobar 2012; Scott 2020).

In parallel with the narrative that smallholders needed to change their mindsets in order to become entrepreneurial and conform to ideas of upscaling and commercialisation, the idea that scientific knowledge was unquestionably better than, and opposed to, local or traditional knowledge also featured (Paper II). The thesis shows that the way in which field veterinarians placed scientific knowledge in opposition to local knowledge became problematic because advice was rarely adapted to the local context. Advice predominantly modelled on scientific knowledge and commonly tested for its practical relevance on research stations or in large-scale farming settings was often inappropriate for delivering the desired response in the smallholder setting. Simultaneously, paraprofessionals, who often had detailed contextual understanding of livestock rearing and were in fact often the only ones available to give advice to smallholders, were commonly disregarded as 'quacks' by veterinarians (Paper II). These findings contribute to a large body of literature that points out the general situatedness of all knowledge (see, for example, Haraway 1988; Harding 1992), and specifically the way in which agricultural (including veterinary) training and knowledge has been modelled on large-scale commercial farming, making it less suitable for providing helpful advice and technologies for smallholders (McCorkle 1989b; Hebinck et al. 2011; Fischer 2016; Chenais & Fischer 2018; Scott 2020). My thesis follows a long tradition of study that reinforces the need for research and advice on farming and livestock management to pay more attention to local perspectives, knowledge and realities on the ground (see, for example, Richards 1985; Mosse 2004; Scott 2020). More concretely, an approach that embraces this perspective, and that my findings suggest would be more successful in terms of helping smallholders, would

be to provide training and support to paraprofessionals so that they became better equipped to fill the gap between absent veterinarians and rural smallholders.

6.2 Rethinking animal disease control

This thesis contributes important perspectives for ongoing discussions (see, for example, Ebata et al. 2020; Penrith et al. 2021; Thompson 2021; Chenais et al. 2022; Penrith et al. 2023) on how to adapt ASF biosecurity measures more effectively to the smallholder setting. For example, keeping pigs confined, which is the basis for many biosecurity measures, was not easily implemented in the study setting due to the perceived high costs of building a pigsty (Papers I-III). The poverty constraints in the study setting also meant that smallholders had to let pigs at least partly find their own feed through scavenging. Furthermore, smallholders did not generally seem to understand confinement as being critical to the prevention and control of ASF as many were uncertain about how the disease spreads, and thus equally uncertain about how investing in housing would help prevent it (Paper III). This was clearly exemplified by how some smallholders would like to build pigsties to protect their pigs from acts of jealousy, but mentioned this less often as being important for protecting pigs from ASF; in any case, most of them were unable to afford to build pigsties (Papers I–III).

The findings from Paper I about how accumulation of wealth through pig rearing risks attracting acts of jealousy also suggest that biosecurity measures built on community cooperation rather than individual protection (which is the common approach in recommended biosecurity measures) have the potential to be more effective. This is supported by a recent interdisciplinary study exploring the potential of a community-based approach to biosecurity implementation in the Ugandan smallholder setting (Chenais et al. 2023a; Chenais et al. 2023b). In that study, participants particularly stated that group collaboration was central to the successful implementation of changes in biosecurity practices.

While the findings (Paper III) indicate that smallholders both want and need more knowledge on ASF prevention and control, I argue that veterinarians simultaneously need more insight into how advice can be better adapted to local needs and priorities (Papers II and III). As shown in Papers II and III, to be effective, such veterinary knowledge must be translated into

local practices that are implementable and that make sense in the local context. Paraprofessionals, if better supported, can play an important role here. While the government, NGOs and donors have promoted pig production in rural Uganda, more attention needs to be paid to ensuring the outcomes and longevity of such initiatives. Instead of investing in infrastructure and veterinary services, the government continues to pay far less attention to the pig sector than to the country's other livestock sectors (CGIAR 2020; Twine & Njehu 2020), indicating the underlying notion that this sector is supposed to grow organically without much state support (Twine & Njehu 2020). The responsibility for the development of pig production, including the prevention and control of infectious diseases, is thus largely placed on smallholders, who in turn rely on paraprofessionals to ensure their animals remain healthy. In a narrative that blames smallholders for the lack of development in pig production (see also Isgren 2018; Hydén et al. 2020), insufficient attention is paid to issues associated with the design of an intervention (for example, the promotion of pig production focusing on individual wealth creation) or to compensation mechanisms for ASF-related losses (Papers I–II).

6.3 The benefits of an interdisciplinary approach

Given the very limited number of ethnographies exploring smallholder pig rearing in contemporary Uganda (or even more widely in Africa), this thesis contributes important knowledge with regard to the role of pigs for smallholders, local disease management and broader structural factors influencing opportunities for development through pig production (Papers I-III). Thus, this ethnography is in response to the acknowledgement that a veterinary medical approach in research has its limitations when it comes to ASF in the smallholder setting and that more knowledge is needed on the social and cultural aspects of smallholder pig production in Uganda (see Chenais 2017).

While this thesis has applied an ethnographic approach (Papers I–III), it has nevertheless been embedded within a larger interdisciplinary research project involving social scientists and veterinary epidemiologists. The respective disciplines and perspectives have been combined to contribute understanding of smallholders' problem framings and suggested solutions for dealing with the challenges they face in their pig production such as ASF

(see also Sollod & Knight 1982; McCorkle 1989a; Jones et al. 2020). While this ethnographic approach enabled me among other things to capture local conceptualisations of various pig health issues, the contributions of the veterinary epidemiologists allowed me to compare and contrast smallholders' descriptions of challenges in their livestock production with veterinary medical descriptions, and reflect on differences in a way that would not have been possible if I had not been able to discuss my findings with veterinarians on the project. Thus, in acknowledging both the strengths and the limitations of our respective disciplines, such as the types of knowledge our different epistemologies can contribute on animal diseases including ASF, this project illustrates how interdisciplinary collaboration within the emerging field of veterinary anthropology can offer important knowledge about infectious diseases such as ASF in relation to other challenges faced in smallholder pig production.

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Popular science summary

The Ugandan pig sector has experienced tremendous growth in recent decades. Most of the country's pigs are kept by smallholder farmers living in rural areas. Pig production has been described as a potential pathway out of poverty for poor smallholder farmers and consequently the Ugandan government and donors have promoted pig production as a means to reduce rural poverty.

This thesis is situated in rural, northern Uganda, a part of the country that has experienced many years of fighting and is still recovering from the most recent armed conflict that ended about 15 years ago.

The purpose of this thesis is to contribute knowledge about the challenges faced by smallholder farmers in their pig production. Specific attention is paid to how smallholders perceive and deal with African swine fever (ASF), a viral disease that causes the death of many pigs in the country. There is no cure or vaccine available for ASF, meaning that smallholders need to use other strategies to prevent and control this disease, such as confining pigs to prevent healthy pigs from coming into contact with infected pigs or infected material.

The thesis combines a discourse analysis of agricultural policy documents and interview data from veterinary actors, with ethnographic data from fieldwork undertaken in smallholder communities in northern Uganda.

The findings showed that pig production provided the smallholders with important income. However, pig production also had its downsides, creating social discord in the study villages. A central reason for social tensions arising in relation to pigs was the possibility of accumulating individual wealth from pig production. There were strong social expectations in the study setting for wealthier individuals to share their excess with individuals who had fewer resources. Smallholders who increased the number of pigs

without sharing their wealth could therefore be at risk of being targeted by others, as manifested in the stealing, harming or killing of pigs. Social tensions also occurred when free-roaming pigs destroyed crops in nearby fields without the pig owner providing compensation for losses.

It was also established that smallholders had very limited access to veterinary services and therefore mainly used the knowledge and resources available in their own communities when faced with pig diseases such as ASF. Paraprofessionals, referring to individuals who may have had animal health training of varied length and quality, were more affordable and accessible to smallholders than veterinarians. The research showed that even though paraprofessionals played an important role for smallholders, they sometimes provided the wrong advice in relation to pig diseases such as ASF.

Most smallholders had started with pig rearing fairly recently and consequently many found it hard to diagnose and treat sick pigs. Smallholders generally also experienced high levels of uncertainty in relation to ASF. Some of them had decided to abandon pig production altogether due to the difficulties they encountered dealing with pig diseases or other challenges in pig production.

The analysis of policy documents and veterinary interviews revealed a dominant narrative on agricultural development among policymakers and veterinary actors, in which the transformation of smallholder farming into large-scale agriculture was commonly suggested as the main strategy for rural development. The results showed that few smallholders aspired to become large-scale farmers, but rather hoped that pig production would enable them to escape farming altogether and to live a more comfortable life outside of their villages.

Based on the findings of this thesis, it is concluded that while pig production could potentially reduce rural poverty in the study setting, the general conditions for pig production need to be improved. This includes better access to veterinary services and more locally adapted veterinary advice in relation to ASF and other pig diseases. Another conclusion is that the quality of veterinary services would improve if there were closer collaboration between field veterinarians and paraprofessionals. Finally, for animal health advice to have relevance in the smallholder setting, it is critical that veterinary actors pay close attention to smallholders' priorities and knowledge with regard to livestock production.

Populärvetenskaplig sammanfattning

Den ugandiska grissektorn har haft en enorm tillväxt de senaste årtiondena. De flesta grisar i landet hålls av småbrukare på landsbygden. Grisproduktion har beskrivits som en möjlig väg ut ur fattigdom för fattiga småbrukare och följaktligen har den ugandiska regeringen och biståndsgivare satsat på grisproduktion som en strategi för att minska fattigdomen på landsbygden.

Denna uppsats är situerad på landsbygden i norra Uganda; en del av landet som upplevt många år av stridigheter och fortfarande återhämtar sig från den senaste väpnade konflikten som avtog för cirka femton år sedan.

Syftet med uppsatsen är att bidra med kunskap kring de utmaningar som småbrukare upplever i deras grisproduktion. Särskild uppmärksamhet riktas mot hur småbrukare uppfattar och hanterar afrikansk svinpest (ASF), en virussjukdom som gör att många grisar i landet dör. Det finns inget tillgängligt botemedel eller vaccin mot ASF, vilket innebär att småbrukare behöver använda andra strategier för att förebygga och kontrollera denna sjukdom, så som inhängning av grisar för att förhindra att friska grisar kommer i kontakt med infekterade grisar eller infekterat material.

Avhandlingen kombinerar en diskursanalys av jordbrukspolicydokument och intervjudata med veterinäraktörer, med data från etnografiskt fältarbete i småbrukarsamhällen i norra Uganda.

Resultaten visade att grisproduktionen gav småbrukarna viktiga inkomster. Det fanns samtidigt svårigheter med grisproduktionen då den skapade social oenighet i studiebyarna. En bidragande orsak till att sociala spänningar uppstod i relation till grisar var möjligheten att skapa individuellt välstånd genom grisproduktionen. I studiekontexten fanns det starka sociala förväntningar på mer välbärgade individer att dela sitt överskott med de individer som hade mindre resurser att tillgå. Småbrukare som fick fler grisar utan att dela med sig till andra kunde därför riskera att bli en måltavla, vilket kunde ta sig i

uttryck i att dennes grisar blev stulna, skadade eller dödade. Sociala spänningar uppstod också när frigående grisar förstörde grödor i närliggande fält i de fall då grisägaren inte kompenserade för sådana skador.

Det påvisades även att småbrukare hade väldigt begränsad tillgång till veterinärtjänster, och att de därför främst använde de kunskaper och resurser som fanns att tillgå i deras lokalsamhällen i hanteringen av grissjukdomar så som ASF.

Så kallade 'paraprofessionals', vilket syftar på individer som kan ha utbildning i djurhälsa av varierande omfattning och kvalitet, erbjöd ett mer överkomligt pris och var mer tillgängliga för småbrukare än veterinärer. Forskningen visade att även om 'paraprofessionals' spelade en viktig roll för småbrukarna så gav de ibland felaktiga råd i relation till grissjukdomar så som ASF.

Majoriteten av småbrukarna hade börjat med grisuppfödning relativt nyligen och som en konsekvens av detta upplevde många att det var svårt att diagnostisera och behandla sjuka grisar. Småbrukarna upplevde generellt också en hög grad av osäkerhet i relation till ASF. Några hade bestämt sig för att överge grisproduktionen helt och hållet på grund av svårigheter med att hantera grissjukdomar eller andra utmaningar i grisproduktionen.

Analysen av policydokumenten och veterinärintervjuerna påvisade ett dominant narrativ kring jordbruksutveckling bland beslutsfattare och veterinäraktörer, i vilket transformationen av småbrukar- till storskaligt jordbruk ofta presenterades som den främsta strategin för landsbygdsutveckling. Resultaten visade att få småbrukare önskade bli storskaliga jordbrukare, utan snarare hade förhoppningar om att grisproduktionen skulle göra det möjligt för dem att lämna jordbruket helt och hållet för att leva ett mer bekvämt liv utanför deras byar.

Baserat på resultaten i denna avhandling så dras slutsatsen att även om grisproduktion potentiellt sett skulle kunna bidra till att minska fattigdomen på landsbygden i studiekontexten så behöver de generella förutsättningarna för grisproduktionen förbättras. Detta inbegriper bättre tillgång till veterinärtjänster och en mer lokalt anpassad veterinärrådgivning i relation till ASF och andra grissjukdomar. En annan slutsats är att kvaliteten på veterinärtjänsterna skulle förbättras genom ett tätare samarbete mellan fältveterinärer och paraprofessionals. Slutligen, för att rådgivning kring djurhälsa ska ha relevans i småbrukarkontexten så behöver veterinäraktörer rikta närmre uppmärksamhet på småbrukarnas prioriteringar och kunskap i relation till djurproduktionen.

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Appendix 1: Survey

Survey: Smallholders
Northern Uganda 2019

Village name: ..... Household No: .....
Date of interview: ..... Interviewed by (name): .....
Name of person(s) interviewed: .....
Ask if there is anyone at home who is involved in farming. If not, go back later.

BACKGROUND INFORMATION
1) Who are you speaking to? (circle more than one if appropriate):
Man (age): ..... Woman (age): .....

2) Who lives in this household? (only those who live in it, not those belonging to family but living somewhere else)
Number of adults (over 18): ..... Number of children (under 18): .....

3) Who does the farming in this household? (circle more than one if appropriate)
Man Woman Children

LIVESTOCK
Which animal(s) do you have? (circle)
For chickens, goats and pigs: rank the problems *(biggest problem is 1 and smallest problem is 5):*

GWENO (chicken): YES NO
..... (1, 2, 3, 4 or 5) NYEKO/KWOR (jealousy/thieves)
..... (1, 2, 3, 4 or 5) ORERE (outbreaks)
..... (1, 2, 3, 4 or 5) TOK (small insects around the eyes)
..... (1, 2, 3, 4 or 5) AONA (coughing)
..... (1, 2, 3, 4 or 5) DAKTA PE (no veterinarian to ask for help)
..... (1, 2, 3, 4, 5 or 6) MUKENE (other, specify): .....

DYEL (goat): YES NO
..... (1, 2, 3, 4 or 5) NYEKO/KWOR (jealousy/thieves)
..... (1, 2, 3, 4 or 5) CADO PIKWIDI (diarrhoea caused by worm)
..... (1, 2, 3, 4 or 5) AONA (coughing)
..... (1, 2, 3, 4 or 5) OCELCEL (crying and then die)
..... (1, 2, 3, 4 or 5) DAKTA PE (no veterinarian to ask for help)
..... (1, 2, 3, 4, 5 or 6) MUKENE (other, specify): .....
MUKENE (other): .....

OPEGO (pig): YES NO
..... (1, 2, 3, 4 or 5) NYEKO/KWOR (jealousy/thieves)
..... (1, 2, 3, 4 or 5) ORERE (outbreaks)
..... (1, 2, 3, 4 or 5) DAKTA PE (no veterinarian to ask for help)
..... (1, 2, 3, 4 or 5) PEKECAM (lack of feed)
..... (1, 2, 3, 4 or 5) BALOJAMI (destroying crops)
..... (1, 2, 3, 4, 5 or 6) MUKENE (other, specify): .....
MUKENE (other): .....

DYANG (cattle): YES NO
ROMO (sheep): YES NO
ATUDO (duck): YES NO
Others (specify which animal): .....

VETERINARIANS

4) a) Do you have a phone number for a veterinarian? Yes No
b) If **YES**: Do you know the name of the veterinarian?
.....
c) Have you been in contact with a veterinarian this year? Yes No
d) If **YES**: How many times have you contacted a veterinarian this year? ..... times
e) If **YES**: Why did you contact a veterinarian (what was the problem)?
.....
.....
f) If **YES**: What was your experience of your contact with the veterinarian?
.....
.....

g) If **YES**: How much money did you pay the veterinarian? ..... UGX
h) How much money have you spent on drugs this year (if you bought them from a drug shop and not from the veterinarian)? ..... UGX

Appendix 2: Interview guide

Interview guide: Faculty staff at Makerere University
Interviews via Zoom 2020/2021

Background information
Name:
Age:
Home district:
Mother tongue:
Educational background:
Current position:

Working with veterinary education
1. What do you enjoy most about your work?

2. What are some of the challenges you face in your work?

3. How would you describe a "typical" veterinary student at Makerere? (For example: gender, age, home district, occupational background of parents.)

4. What subjects and courses are most popular among students in the veterinary school?

5. What kinds of jobs do you think most veterinary students want to apply for after graduation?

6. To your knowledge, how has the veterinary programme at Makerere University changed and developed over time?

Veterinary profession (with focus on farm animals)
7. Other than knowing about animal diseases, what other things do you think are important for veterinarians to know about?

8. Can you please describe how the work of District Veterinary Officers (DVOs) and veterinary officers is structured in Uganda?

9. In general, how much training in extension work do veterinary students get at Makerere?

10. What are some challenges veterinarians can face when working with farmers?

11. When I interviewed veterinarians in Northern Uganda, they often mentioned challenges with “fake vets” (sometimes also described as “quack vets”). Have you also heard about so-called “fake vets”? If so, can you please describe how they operate?

Papers I-III

I

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Pigs as a shortcut to money? Social traps in smallholder pig production in northern Uganda

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ABSTRACT

Recent decades have seen a growing market for pork in Uganda. The government and donors have promoted pig rearing as a potential route out of poverty for poor smallholders. The idea is that upscaling and commercialisation of smallholder pig production can be a successful way out of poverty. Drawing on the concepts of trust and social traps, this article describes how pig production fails as a pathway out of poverty in post-conflict communities in northern Uganda due to tensions created by the focus on individual wealth creation. Results from ethnographic fieldwork reveal that there is a strong moral obligation in the studied communities for individuals who fare better to contribute to the community and share their wealth. Social tensions remaining from the period of conflict are stoked by the focus on individual wealth creation in pig production, resulting in acts of harming, stealing and killing other people's pigs. Locally these acts are said to be caused by "jealousy", which for many smallholders is a more significant problem than disease in pig production. The findings suggest that poverty reduction measures would be more successful if they focused on distributed approaches aimed at raising the general level of welfare in communities and supporting the collective rather than the individual.

1. Introduction

One afternoon, Alfred, a research assistant helping with fieldwork in northern Uganda, started telling the story of how mama Ellen killed her neighbour's pig:

> *"So, there was this day when Michael's* [the neighbour's] *pigs came into the compound. Ellen got really annoyed with the pigs walking around and started hitting one of them with a big wooden stick. The pig was not fully grown, but somewhere between a piglet and a mature pig. Ellen continued hitting the pig and eventually it stopped moving. Sometime later the pig died. And so this caused a lot of tension with Michael's household later on."*

Ellen is the mother of the family with whom we stayed during fieldwork. Every morning, she would sweep the floors of our huts and every evening cook our food over the fire. Alfred continued the story:

> *"The pig started screaming louder and louder the longer Ellen hit it. When the pig couldn't move anymore, it couldn't escape, so it was stuck on the compound where she had hit it. / … / Later, Ellen had to sit down with her husband, the village leader and the neighbours to solve the problem."*

The Ugandan government and donors have promoted pig farming as a quick way for smallholders to earn returns on investment. In northern Uganda, a part of the country particularly affected by poverty, small-scale pig production has grown significantly in recent years. Some smallholders in this study described pigs as "a shortcut to money". For example, smallholder David explained that: *"For us here, keeping pigs is like a shortcut to get money. After only 3–4 months you can start to sell off some animals and so they bring in a lot of money. I plan to sell some of my pigs soon to pay the school fees for my children."* Pigs as "a shortcut to money" commonly referred to how pigs multiplied rapidly, required little feed to grow, and could easily be sold at relatively high prices compared with poultry and goats for example. The above story about mama Ellen and the pig, however, indicates that this shortcut to money does not always go smoothly. In fact, the story directs our attention to a central issue for smallholders engaged in pig farming: the harming and killing of each other's pigs. Contestation related to wealth creation among pig-keeping smallholders, often manifested in what the

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informants called "jealousy", was experienced by smallholders as a threat no less significant than animal health issues in pig production. This means that pigs are not only a possible "shortcut to money" for smallholders, but also a point of tension, creating fear of being left behind when neighbours accumulate more wealth by succeeding with their pigs and worries that your success may also be your downfall since becoming more prosperous than others carries the risk of attracting jealousy.

In this article, we use the concepts of trust and social traps to contribute to understanding of how these acts of jealousy come about and why they are particularly common when it comes to pigs and pig keeping. This understanding allows us to draw some conclusions about why pig production has not as yet contributed significantly to poverty reduction in the study area. Before outlining the conceptual framework and results, we will provide a brief background of the place where mama Ellen and her neighbours farm their pigs.

2. Background

While Uganda has experienced economic growth in the past two decades, the country is still far from reaching the ambitious development agendas stated in, for example, the Uganda 2040 Vision and The Third National Development Plan (NDPIII) 2020/21–2024/25 of becoming a middle-income country with a predominantly urban population working in non-agricultural sectors (Myers et al., 2021). Agriculture is the cornerstone of Uganda's economy and the majority of the population survives on subsistence agriculture (UBOS, 2021). Increased productivity and commercialisation of agriculture have often been suggested as key poverty mitigation strategies in national and international policy (AGRA, 2020; MAAIF, 2020; Mwavu et al., 2018; NAP, 2013). Nevertheless, poverty remains a serious challenge, particularly in rural areas where most of the poor reside (Myers et al., 2021; UBOS, 2014).

This study is located in Nwoya district, northern Uganda, an area sometimes referred to as 'Acholiland'. Compared with the national average, poverty levels in the region are high (Okello et al., 2019), partly due to the many years of civil unrest. The most recent conflict started in 1986 and was mainly fought by the Ugandan government and the Lord's Resistance Army (LRA) rebels. The conflict led to hundreds of thousands of deaths and the displacement of around 1.8 million people (Meinert, 2020). The conflict divided the Acholi people: some supported the rebel movement due to resentment towards the government, others backed the government in response to the rebels' brutal methods, while others still remained neutral (Meinert and Whyte, 2017; Murithi, 2002). The armed conflict ceased in around 2006 and people started returning from what were known as Internally Displaced Person (IDP) camps run by the government (Atkinson, 2015; Finnström, 2006) to their former villages, building new homesteads and resuming agricultural activities (Finnström, 2008). Overall, the long-term exposure to armed conflict and the lasting insecurity significantly damaged social trust and cohesion within families and communities (Esuruku, 2012; Murithi, 2002).

The Acholi lost most of their animals during the conflict and as a consequence were left poorer (Kaplan, 2009). Against this backdrop, the government and donors have promoted pig keeping as a viable option to generate income quickly and contribute to the rebuilding of rural livelihoods (Ikwap et al., 2014). Between 2002 and 2008, the number of pigs rapidly increased in northern Uganda from about 100,000 to almost 350,000 (UBOS, 2008). Pig production has emerged as a commonly promoted poverty mitigation strategy among smallholders in Uganda at large (Muhanguzi et al., 2012) and is sometimes described as a potential pathway out of poverty for poor smallholders (Ampaire and Rothschild, 2010; Randolph et al., 2007). Pigs are generally appreciated for being comparatively cheap to acquire, requiring a relatively small amount of space and reproducing quickly with many offspring, which make them an animal whose qualities facilitate quick upscaling with limited means (Nantima et al., 2015; Okello et al., 2020).

3. Material and methods

This article is based on ethnographic fieldwork among smallholder farmers in two villages in Nwoya district, northern Uganda, undertaken in November 2018 by the first and second authors and in September to December 2019 by the first author. It combines participant observation and semi-structured and unstructured interviews with smallholders for the purposes of gaining a better understanding of the role of livestock in general and pig production in particular. The vast majority of data were collected in what is referred to here as the main study village, which is the village where we stayed during fieldwork and where research contacts were established prior to this study. Due to our limited knowledge of the local Luo language, we worked with two field assistants who lived in the study villages and who translated between Luo and English. All the quotations in the text are from the English translation, which has been discussed with the field assistants. Some follow-up interviews were held between October and November 2020 by a research assistant on site and communicated to the first author over the telephone. Prior to participating, all research participants were informed of the purpose of the interview and the expected outcome of the study, asked for their oral consent and informed that they could withdraw their participation for any reason at any time. To ensure the anonymity of the informants in this article, their names have all been changed and the names of the two study villages are not included. To learn more about how smallholders conceptualise and frame their problems in animal production, we held six focus group discussions in the main study village. In these discussions smallholders were asked to provide exhaustive lists of the challenges they faced in livestock production, and subsequently prioritise the challenges with regard to rearing different livestock that are common in the studied communities. In two of these groups, smallholders chose to discuss pigs. For the purposes of validating the interview and focus group responses, 101 smallholders (16 from the main study village and 85 from the second study village) were asked to respond to a survey where they were requested to rank the key challenges in livestock rearing stated in interviews and focus groups.

The main study village has a few privately-run primary schools in which the number of pupils varies greatly over the school year, depending on the households' ability to pay the required school fees. The small village centre has some local businesses, including a small market, hairdressers, bars and a slaughter place. Villagers can receive treatment for minor medical problems in one of the two health clinics also located in the centre. Access to a formal livestock market and pharmaceuticals require travel to a larger town or city. Most smallholders trade animals within the village, but traders from nearby towns and Gulu city occasionally visit the village to buy healthy-looking pigs, as well as crops and other animals. The village can only be reached on dirt roads, approximately 30–40 min by motorbike from the main road connecting the nearest city of Gulu with the capital Kampala. The second study village is located approximately 30 km from the main study village along the main road. This village served as an IDP camp during the conflict.

4. Conceptual framework

4.1. Trust

We explore the challenge of jealousy in pig production by focusing on the role of trust (or rather the lack of it) in the studied villages. We draw on Sztompka's (1999) conceptualisation of trust, which centres on people's possibilities to act in uncertain conditions and making bets "about the future uncertain, free actions of others" (p. 25). In this definition, trust includes beliefs and commitment, where beliefs point to the expectations we have of another person's future actions. Thus, beliefs can relate to the knowledge a smallholder has about a neighbour's behaviour and character, and this knowledge will have an impact on the smallholder's willingness to trust that person in future. Commitment

refers to action, meaning that trust occurs when we decide to act on the beliefs we have about another person (Sztompka, 2019: 34–35), for example when we lend money to a friend or act on animal management advice given by a neighbour.

Although scholars such as Fukuyama (1996) claim that trust is rooted in culture, Sztompka (1998, 1999) instead emphasises the role of formal and informal institutions when discussing trust, arguing that functioning institutions can be sources of trust and further provide a culture of trust in which people generally tend to trust each other. While formal institutions, such as government institutions, play a marginal role in the studied smallholders' everyday lives, informal institutions such as church congregations and village leadership, which we define here as being "less formalized and owned by local people" (Tillmar, 2002: 275), play a more prominent role.

While a culture of trust has greater potential to be present in societies in which social change has happened gradually, in a consistent direction and in a way that people could predict (Sztompka, 1999: 123), social life in the context we study here has drastically changed in recent decades and social relations have been greatly negatively affected by the long-lasting conflict. How such a culture of distrust (Sztompka, 1998, 1999) can be conceptualised will be outlined in the following section.

4.2. Distrust and social traps

When trying to understand what is going on when smallholders harm and kill each other's pigs, which is described by the informants in terms of jealousy, a helpful answer is given by the concept of social traps (Rothstein, 2005). The logic of the social trap is that everyone would win from choosing cooperation if almost everyone else also chooses cooperation. However, if people cannot trust that almost everyone else will cooperate, it becomes less beneficial to do so. In these situations, not cooperating could be the more rational choice. A situation where trust in others is lacking and most people choose not to cooperate is defined by Rothstein (2005) as a social trap, a situation that is worse for everyone. Even though smallholders understand that they would profit both individually and collectively from not harming or killing each other's pigs, it becomes difficult to follow norms of a culture of trust if the experience is that most people are not following them.

The concepts presented so far have emerged and often been applied in contexts distinctly different from the one studied here. A more Afrocentric analysis of trust and distrust can be achieved by introducing the Bantu concepts of Ubuntu and Umona (Koens and Thomas, 2016). These concepts direct analysis towards collaboration and human interconnectedness, in contrast to the Cartesian, Eurocentric view of humanity that instead places the individual at the centre (Chilisa and Ntseane, 2010; Ibrahima and Mattaini, 2019). In short, Ubuntu refers to "… a belief that individual well-being relies on reciprocal trust and respect among community members" (Koens and Thomas, 2016: 1643). Ubuntu co-exists with Umona, which refers to envy or jealousy (Moyo, 2021). People do not comply with Ubuntu solely due to social obligations or because they want to, but also because they fear revenge through Umona (Koens and Thomas, 2016). The accumulation of individual wealth without sharing is believed to cast a shadow of inferiority on other members of the community. Therefore, a successful person who does not share needs to be "pulled down" to maintain the status quo (Ashforth, 2005; Koens, 2012; Koens and Thomas, 2016). This is similar to an Ugandan proverb that says "Ffenna tufilwe",[1] meaning "better that we all lose". The proverb emphasises the difficulty of becoming more prosperous than others and points to beliefs about life being a zero-sum game in which all individual profit is gained from someone else's loss (Ashforth, 2005; Austen, 1993).

[1] Personal communication, J. Kiguli, Makerere University Uganda, 2020-11-05.

5. Results

5.1. Pigs as a shortcut to money

While cattle, goats and poultry have been present for a long time in the study area, pigs have arrived more recently. Some informants were introduced to pigs during their time in IDP camps, while others started to engage in pig keeping after the conflict. Smallholders kept "indigenous" pigs and what were referred to as "exotic" or "hybrid" pig breeds. Indigenous ones are black in colour, smaller in size and sold at lower prices than the exotic breeds. The exotic pigs were referred to as "white" and are pale pink in colour. Due to their rapid growth, they were often preferred over local pigs, but at the same time were frequently described as being less tolerant of heat and generally in need of more management to keep healthy than the local black pigs. The pigs were generally fed cassava, swill, maize or rice bran and were mostly free-roaming or tethered for a part of the day. Very few smallholders in the study area provided shelter or housing to protect the pigs.

In contrast to cattle and goats, pigs are not embedded in traditions or Acholi culture and so are not commonly used in witchcraft, dowries or festivities. Pigs were mainly appreciated for their economic value, and pig production was understood locally as a way to quickly gain a return on investment compared with, for example, poultry that are worth less and goats that produce far fewer offspring with a lot longer in between. Pigs were often described by smallholders as a 'shortcut to money'. Keeping pigs means that smallholders had easy access both to cash by selling off pigs and also to financial security in the form of a buffer that could be used in times of need. In this context, pigs were often perceived as having a central role in smallholders' attempts to become a *dano ladit* (meaning big man in Luo), referring to being respected and to have much *lim* (wealth).Being a "big man" is about "getting somewhere" in life, often referring to individuals who have an education and a paid salary outside the rural setting. Pig production is one of the few available strategies for allowing this journey to happen, as pigs are often associated with hopes of a more prosperous future. If people have enough faith in their pigs and their way of managing them, and they work hard, their dream to become prosperous in future might come true. Nevertheless, pig keeping and accumulating individual wealth also have their downsides.

5.2. Key challenges with pigs

Pigs caused more social tension in the community than goats or poultry. Free-roaming pigs tend to destroy crops. Such disturbance often added to already existing social tensions, for example linked to remnants from the past conflict, or resulting from competing land claims as people moved back from the IDPs. The following quotation by smallholder Betty illustrated this problem with pigs: *"I often leave them* [the pigs] *free ranging, but it would be better to tie them. Pigs require more work than the other animals, and they also lead to more fighting with neighbours than chickens and goats."*

Another central cause of social tension in relation to pigs was expressed as the downside of the key value of pigs: the possibility of escaping poverty and becoming a *dano ladit*. The common perspective was that, due to limited resources available for sharing, not everyone would be able to become a *dano ladit*. The fear was that someone in the village would become a *dano ladit* by succeeding in pig production, while others would lag behind. The fear of lagging behind and the punishment of those community members who appeared to succeed in individual wealth creation were often described as jealousy, and among other things this was materialised in the injuring and killing of pigs.

The extent of the problems that jealousy caused in pig production can be exemplified by the responses in the focus group discussions and survey. In the two focus groups in which smallholders discussed challenges in pig production, jealously was listed as the second or third most important problem out a total of seven listed problems. The only

problems given higher priority were disease outbreaks (unspecified) and access to veterinary services. In the survey that aimed to validate and quantify focus group and individual interview responses, jealousy and theft (which were grouped together as one problem in the survey) were ranked as the most pertinent problem faced by smallholders (followed by unspecified disease outbreaks and lack of access to veterinary services). It should be noted that jealousy was indeed listed as a problem in focus groups and the survey in relation to other livestock as well, but it was only with pigs that the issue was listed as a major problem.

5.3. The importance of cooperation and trust

Smallholders commonly recognised the benefits of cooperation, not least in the context of animal production. Informants repeatedly emphasised the importance of advice and support from their friends, neighbours and family members when managing animals. Support was sought for everything from questions concerning what to feed animals to identifying and treating diseases. This illustrates how smallholders entrust important resources (in this case animal welfare) to each other, thereby making "a bet" about "the future uncertain, free actions of others" (Sztompka, 1999: 25), and placing themselves at risk of loss if the advice proves unhelpful. Trust can thus also be understood as "placing valued outcomes at risk to other's malfeasance, mistakes or failures" (Tilly, 2005: 12). When smallholders share knowledge of livestock production and give each other advice, we could interpret this as a strategy for dealing with the limited presence of formal veterinary support. A complementary interpretation of this, however, is as a strategy for preventing future acts of jealousy, which illustrates the co-existence of Ubuntu and Umona in this context. This interpretation is supported by what Andersson (2015) noted in her study on smallholder crop production in eastern Uganda: "Women in particular explicitly said that they informed neighbours about their activities and openly shared their knowledge with others in order to 'avoid jealousy' and social difficulties" (p. 297).

In the study village, informal institutions such as community schools, church congregations and village savings groups play an important role in creating a culture of trust. Vulnerable groups in the community, such as widows and the sick, receive support from fellow village members who share food, small amounts of money or smaller animals such as poultry. Staying in the village also includes expectations of participating in community work. At village meetings, latecomers and absent village members need to compensate for their lateness or absence through payments in money or in kind. In other words, people are expected to take part and give in order to be socially accepted and considered a trustworthy person by other community members. The importance of generating and sustaining a culture of trust can further be exemplified through a quotation from a village elder called Charles, who during a funeral explained that:

> "*In the Acholi tribe, if someone is in trouble, the neighbours will help you out. Like today, when men came to dig the burial ground in the morning and others came to help arrange the funeral when a community member died. The burial place is where people are united. If we lose someone in our family, we announce it to the neighbours and the word is spread. You receive help with arranging the event, digging the ground, preparing the food, preparing the body for burial.*"

Charles' quotation sheds light on how belonging and being united also means that no one should stand out in terms of either failure or success. In the context of pig production, being too successful without adhering to Ubuntu comes with the risk of attracting Umona and becoming the target of another person's jealousy. The harming and killing of pigs are not only obstacles to accumulating individual wealth and becoming a *dano ladit*, but the fact that such harming takes place so frequently indicates that the community is caught in a social trap, a situation that is worse for everyone.

5.4. Pigs and jealousy: the downside of individual wealth creation

There was a broad repertoire (Tilly, 2006) of practices that smallholders drew upon for hurting and killing each other's pigs. Throwing stones, cutting the animal with a machete or crushing legs or other body parts were frequently mentioned. Other common practices were to feed pigs painkillers intended for humans, homemade poison or poison obtained from witchdoctors. Smallholders also described how it was common to steal piglets from a neighbour who had more pigs. If your own pig happened to give birth close in time to the neighbour's pig, this was seen by some as a good opportunity to steal some of the neighbour's piglets as it would be difficult for the owner to reclaim the stolen pig since the piglets would be indistinguishable.

While acts that served to punish a specific wrongdoing or avenge previous events, such as when the neighbour's pig had damaged your crops, were sometimes made in the open, acts referred to as jealousy were often performed in secret, with perpetrators intending to remain anonymous. There was a significant risk involved in stealing, harming or killing animals if there was not a clear and locally acceptable reason for retaliation. For example, the perpetrator could be banned from the market and thus lose opportunities to buy or sell items in the village centre. However, there was something else at stake here: their social standing. People who failed to reciprocate trust and meet the needs and expectations of the community were sometimes referred to by informants as having a "bad name" or a "bad heart". Smallholder George explained some practical consequences of this:

> "*If you are doing bad things, you can't expect other people to help you out anymore. In the village here, if you don't have all the things you need and you do bad things to others, you can't expect others to assist you. In the end, you will not even have salt to put in your food. If neighbours know that you have been jealous of them, maybe you killed their pig, they might not even want to give you some salt.*"

This quotation not only emphasises the risk associated with harming others' pigs, but also indicates the importance of the community and the moral obligation to act aligned with a culture of trust. The worst thing that can happen to you is that your neighbour is no longer willing to share resources with you or support you in times of need. As such, this quotation serves to emphasise the importance of social ties (Hyden, 1980, 2012).

While the way in which the extensive repertoire of strategies for killing and hurting other people's pigs was readily described by smallholders, indicating the commonality and social acceptability of this practice, the level of violence that the repertoire above exemplifies should also be interpreted in light of the decades of violence and death to which some community members became accustomed during the most recent conflict (see also Meinert, 2020). At the same time, there is nothing to indicate that the general presence of jealousy as a problem in livestock production is anything new. This is also indicated by frequently being mentioned with regard to chicken and goats as well. However, it was much more common in relation to pigs, which was explained by their higher monetary value and the general focus on individual wealth creation connected with this animal species.

5.5. Dealing with social traps

One major challenge when smallholders end up in a social trap, such as in the case presented with the frequent harming of each other's pigs, is that "distrust breeds distrust" (Sztompka, 1998: 14). Thus, it often takes more time and effort to build trust than to destroy it (Rothstein, 2005; Tillmar, 2002). The following quotation from smallholder Bettina demonstrates the difficulty encountered by many smallholders of not being able to trust others to cooperate and how this leads to a social trap that is materialised in the harming of animals: "*With jealousy… Yes, you can be very friendly to all your neighbours, but still they can hurt your animals. It's hard to trust people that way*".

How then should the lack of trust be dealt with and what strategies could enable smallholders to escape social traps? We can identify two different types of strategies here: one follows the norms of Ubuntu and Umona by managing conflicts together as a community and serves to rebuild social trust, while the other seemingly accepts the status quo of distrust and focuses on protecting one's own resources through individual confinement of pigs. The latter is also the strategy suggested by development actors and veterinarians as the correct way to do things in pig production, ensuring biosecurity and raising productivity levels by focusing on farming as an individual activity directed at capital accumulation.

The informants commonly suggested that acts of jealousy should be reported to village leaders and elders, who could then assist in negotiating between the conflicting parties. Another strategy was to call out the wrongdoer who then was expected to compensate the community for previous breaches. The village chairman, James, described this as follows: *"To correct bad behaviour, you show people that they have done wrong, you want to make the person feel ashamed so it doesn't happen again. If someone is drunk and starts a fight, they have to do some community work."* We see this way of punishing and aiming to rectify bad behaviour through community work as an effort to rebuild trust in the community (see also Carpiano, 2006).

The contrasting strategy suggested by many smallholders, and also promoted by development agents and veterinary actors, was to confine pigs – something many smallholders suggested as a useful strategy, but that very few implemented due to financial constraints. Smallholder Beatrice described this as follows: *"To avoid pigs getting killed, you have to keep them inside a house. Most people around here don't have a house for their pigs, but it would be good. If you have a house, then you can be the one with the authority to give food for pigs and not let others in."* We interpret the informants' strong emphasis on this measure as an indication that many struggled with a culture of distrust, finding it difficult in general to trust other community members. The frequent suggestion by smallholders that this was the best way to prevent acts of jealousy also indicates the perceived difficulty of escaping the social trap in this context.

6. Discussion and conclusions

Pig production has emerged as an important proposed route out of poverty for Ugandan smallholders, promoted by both the government and donors (Ikwap et al., 2014; Muhanguzi et al., 2012; Tatwangire, 2014; Twine and Njehu, 2020). The focus of these programmes is essentially on poverty reduction, by stimulating individual smallholders to build up a stock of pigs, improve productivity and learn how to run a business (Mugonya et al., 2021). This vision of transforming smallholder farmers into commercial producers is strongly associated with the belief that the capitalist market will play a key role in solving poverty related issues (Amanor, 2005). The findings presented in this article point to significant flaws in this strategy, mainly because the emphasis on individual wealth creation, in a situation where smallholders lack trust in each other, fuels social tension in local communities rather than reduces it.

The long-term civil unrest in northern Uganda has not only had a devastating impact on economic development in the region (Fiala, 2015; Rohner et al., 2013), but has also led to a persistent breakdown in cooperation and trust between people (De Luca and Verpoorten, 2015; Esuruku, 2012; Murithi, 2002; Rohner et al., 2013). In this article we show how the situation of a lack of trust between smallholders in the studied communities can be interpreted as a social trap, with smallholders choosing non-cooperation because they do not trust that everyone will contribute to the benefit of all. It should be emphasised here that the reason why smallholders may harm or kill their neighbours' pigs, even if it means an economic loss for the neighbour and contests moral norms of cooperation and trust in the wider community, is not because they or their culture suffer from some kind of moral defect (Rothstein, 2005: 120). Rather, it implies that there is little to gain from being the only honest player in the game.

A lack of trust in others can be seen as particularly problematic in the studied context, as previous research indicates that the connection between social cohesion and equality is particularly important in poverty-stricken communities (Bongomin et al., 2020; Khambule and Siswana, 2020; Koens and Thomas, 2016; Nussbaum, 2003). The community provides important social security for its poorest members in a situation where a government-funded welfare system is largely absent or vastly insufficient and where formal institutions for conflict management are weak or lacking (Rodrik, 1999; Woolcock and Narayan, 2000). It is relevant to note here that the importance of social belonging, and the related social obligation to share resources in the presented case, contrasts with how reciprocal relations are usually defined and conceptualised in contexts of the global North, where these are assumed to emerge from voluntary associations (e.g., Robert et al., 1993). Instead, as visualised through the concepts of Ubuntu and Umona, expectations of sharing accumulated wealth with others and ensuring equal resource distribution among community members were a strong norm in the communities studied (see also Koens and Thomas, 2016; Ramose, 2014). The strong moral obligation to share and the fear of lagging behind might thus also be seen to sanction actions of harming individuals who accumulate wealth (in this case from successful pig keeping) without sharing. In other words, concepts and theories around reciprocity and trust that are developed based on experiences from contexts in the global North are not necessarily applicable to a context such as the one studied here (Ibrahima and Mattaini, 2019).

Findings in this study further illustrate how strong moral norms of reciprocity and ideas among smallholders of life being a zero-sum game (see also Ashforth, 2005; Austen, 1993) are increasingly being challenged by the more recently introduced economic and social orders of capitalism, entrepreneurship and privatisation that all focus on individual wealth creation (Ibrahima and Mattaini, 2019; Konik, 2015; McDonald, 2010; Mwipikeni, 2018), orders that have also underpinned the promotion of pigs in Uganda. In fact, a growing consensus holds that ethics and practices of Ubuntu are not compatible with capitalist relations (Hofmeyr, 2013; Moyo, 2021; Terreblanche, 2018), including the associated priority given to the individual over social relations and community expectations such as fulfilling the basic needs of the other (Gyekye, 1997).

In conclusion, our findings point to the difficulty of introducing pigs without acknowledging local practices of reciprocity or the common fears among the smallholders of lagging behind in individual wealth creation. We would like to suggest that pig keeping can play an important role in the wellbeing of the studied communities. For this to happen, however, we believe that poverty relief programmes and promotion of pig production need to have the collective at their heart, building on existing institutions for cooperation and conflict resolution, such as local churches and other community organisations recognised locally. This also echoes previous studies that shed light on the importance of expanding social welfare provision and improving general welfare in a given context if poverty measures are to succeed (Hajdu et al., 2020a, 2020b). Pigs may be a shortcut to money, but not if the importance of the community is overlooked.

Ethics statement

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Author contribution

Anna Arvidsson: Investigation & Methodology, Conceptualization & Formal analysis, Writing – original draft. **Klara Fischer:** Investigation & Methodology, Conceptualization & Analysis, Supervision & Funding acquisition, Writing – review & editing. **Kjell Hansen:** Methodology, Conceptualization & Analysis, Supervision, Writing – review & editing. **Juliet Kiguli:** Conceptualization & Analysis, Supervision, Project administration & Funding acquisition, Writing – review & editing.

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II

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Diverging Discourses: Animal Health Challenges and Veterinary Care in Northern Uganda

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People in northern Uganda are currently rebuilding their lives after a lengthy period of conflict. To facilitate this, the Ugandan government and donors have promoted investment in pigs as an important strategy for generating income quickly and ensuring livelihood security. In this context, animal health issues are an acknowledged challenge, creating uncertainty for animal owners who risk losing both their animals and income. This paper draws on policy documents guiding the veterinary sector, interviews with faculty staff at Makerere University and with veterinarians and paraprofessionals in northern Uganda, and ethnographic fieldwork in smallholder communities. The aims of this study were to contribute to an understanding of the structure of veterinary support and its dominant development narratives in policy and veterinary education and of the way in which dominant discourses and practices affect smallholders' ability to treat sick animals. Particular attention was paid to the role of paraprofessionals, here referring to actors with varied levels of training who provide animal health services mainly in rural areas. The results suggest that veterinary researchers, field veterinarians and government officials in agricultural policy share a common discourse in which making smallholders more business-minded and commercializing smallholder production are important elements in reducing rural poverty in Uganda. This way of framing smallholder livestock production overlooks other important challenges faced by smallholders in their livestock production, as well as alternative views of agricultural development. The public veterinary sector is massively under-resourced; thus while inadequately trained paraprofessionals and insufficient veterinary support currently present a risks to animal health, paraprofessionals fulfill an important role for smallholders unable to access the public veterinary sector. The dominant discourse framing paraprofessionals as "quacks" tends to downplay how important they are to smallholders by mainly highlighting the negative outcomes for animal healthcare resulting from their lack of formalized training. The conclusions of this study are that both animal health and smallholders' livelihoods would benefit from closer collaboration between veterinarians and paraprofessionals and from a better understanding of smallholders' needs.

Keywords: discourse coalitions, Africa, disease prevention, animal health services, paraprofessionals

INTRODUCTION AND BACKGROUND

This study explored aspects of animal health challenges in a setting where animal production is a key feature in many people's lives. Agriculture remains the cornerstone of Uganda's economy and contributes ∼28% of total GDP. Over 70% of the population are engaged in agricultural activities, mainly for subsistence (1). The Ugandan government sees the shift from subsistence farming to commercial agriculture as a key strategy for reducing widespread poverty in the country (2). In the general efforts to reduce poverty through the commercialization of agriculture, the Ugandan government and donors have particularly focused on livestock as an opportunity for smallholders. Pigs especially have attracted interest due to their short generation interval, minimal space requirement and rapid multiplication rates (3, 4)[1]. However, their potential as a route out of poverty is limited by, among other things, disease and health problems (5–8). Smallholders have limited access to veterinary services, with the main providers often being paraprofessionals (9, 10). The quantity and quality of paraprofessional training varies, with the result that they can offer important advice and support to smallholders as well as cause severe animal suffering due to inappropriate treatment (9, 11). Consequently, even seemingly minor and non-fatal problems, such as worms and diarrhea, significantly constrain production and lead to livestock loss (12). In light of this, veterinary services play a key role in the government's efforts to reduce poverty through agricultural commercialization in general and pig production in particular.

In this paper we examine the government's focus on agriculture commercialization, concentrating on livestock production as a route out of poverty, and the factors perceived to influence smallholders' achievement of this goal. The aims were to acquire a better understanding of how veterinary actors and central policy documents frame the issues that hinder smallholder livestock production and the solutions offered (13, 14). Particular attention was paid to the role of paraprofessionals and how they fulfill an important function in giving advice to smallholders, but are nevertheless constructed as a problem in the dominant discourse. Applying the analytical concepts of storylines, narratives and discourse coalitions (15, 16), the intention was to establish how smallholder agricultural development is framed and the extent to which the challenges perceived by smallholders are addressed in policy and veterinary education.

The Rise of Pig Production in Northern Uganda

While pork used to be taboo among large sections of the Ugandan population (17–19), demand is now growing and pig production nationwide has increased (20). Most pigs are kept in traditional smallholder systems, in which the animals are free-roaming, tethered or confined to a pig sty (21). In 1959, the country had 15,669 pigs [(22), p. 95]; by 2018 that number had exceeded 4 million (23). Today, Uganda has the highest per capita consumption of pork in East Africa, with average consumption of 3.4 kg per person per year (24). Therefore, pigs are now recognized as an important source of income for smallholder farmers and described as a potential route out of poverty (25–27). Policymakers and researchers identify the main obstacle to the upscaling of pig production to be African swine fever (ASF) (28), a haemorrhagic infectious disease with a very high mortality rate in domestic pigs (29) and that is endemic in Uganda (30). There is no cure or vaccine for it, making disease prevention the only strategy to limit its spread (31).

Geographically, this study focused on northern Uganda. The majority of people in this area belong to the Acholi people and speak Luo. The region is particularly badly affected by poverty and marginalization due to repeated conflicts resulting in a loss of livelihood assets in the past, including livestock (32). The most recent conflict in this part of the country started in 1986 and was mainly fought by the Ugandan government and the Lord's Resistance Army (LRA) rebel group. Approximately 1.8 million people were displaced during the conflict, and the vast majority of the population was forced to stay in camps for internally displaced people (so-called IDP camps) run by the government (33). Opportunities for agricultural activities in the camps were very limited and many smallholders lost their animals either to fighting forces or cattle raiders who exploited the opportunities resulting from instability during the conflict (34). People started returning to their former villages between 2006 and 2009, and slowly resumed animal keeping and cultivation (35). The loss of livestock during the conflict left many Acholi considerably worse off than they were prior to the conflict. Against this backdrop, the government and donors promoted pig production as a quick method of poverty mitigation for farmers who had few other resources (21).

The smallholders in this study live in two different villages (referred here as to village A and village B) located in Nwoya district, northern Uganda. Village A can only be reached on dirt roads, ∼30–40 min by motorbike from the main road. The small village center has some local businesses, including hairdressers, local bars and a slaughter place. Village B served as an IDP camp during the conflict and is located alongside the main (tarred) road connecting the nearest city of Gulu with the capital Kampala. Village B therefore has better connections with urban markets. Most smallholders in this study had access to small plots of land for crop cultivation. Those engaged in pig production generally kept one to five pigs (local, cross and exotic breeds) that were mainly fed with cassava, swill, maize or rice bran. Access to pharmaceuticals and formal livestock markets generally required travel to Gulu city or a larger town that few of the studied smallholders could afford.

Structural Adjustment and the Downsizing of the Veterinary Sector in Uganda

To better understand the current situation as regards uncertain access to veterinary services and the role of paraprofessionals, it is useful to explore some of the recent history of agricultural

[1]The fact that pigs are appreciated for these particular material qualities is also interesting in itself, and points to how different animals with their diverse materialities and relations with humans have the ability to have different impacts on human societies, but is not explored further in this article.

policy. In the late 1980's and early 1990's, the Ugandan government adopted structural adjustment programmes (SAPs) under conditions attached to loans from the World Bank and the International Monetary Fund. This led to major structural changes in the provision of veterinary services. Loan conditionality commonly included the downsizing of public services, liberalization of markets, privatization of public enterprises and major reductions in government subsidies to agriculture, export promotion and other policies aimed at boosting economic growth (36–38). In Uganda, the previous government-led public veterinary sector was transformed during this period into a decentralized and privatized structure of clinical veterinary services, which included the downscaling of public services (11, 39, 40). These changes, among other things, led the Ugandan government to adopt a reactive service delivery rather than a proactive one (11, 27). For example, instead of being part of a preventive practice, vaccinations are generally administered by the public veterinary sector during disease outbreaks (27). The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) remains responsible for vaccinating animals against epidemic diseases, imposing quarantines and controlling tsetse flies, and deliver those services for free, but clinical services, breeding and spraying for tick control are now privatized (41). Field veterinarians and paraprofessionals working in the public sector also provide clinical services for which farmers are expected to pay (11). In parallel with the downscaling of the public veterinary sector, state subsidies in animal healthcare were withdrawn and the veterinary drug market liberalized (42). The simultaneous processes of reduced access to veterinarians and increased access to pharmaceuticals through private retailers resulted in both smallholders and paraprofessionals frequently turning to drug retailers for animal health information. However, the differing levels of competence among these retailers in combination with the circulation of counterfeit, diluted and expired pharmaceuticals often exacerbated rather than addressed the issue of lack of access to trained veterinarians (28). Another consequence of this privatization is that many paraprofessional actors providing veterinary services to farmers today do so without sufficient supervision, making it hard to ensure that accurate advice is given and regulations are followed (43, 44).

The Role of Paraprofessionals in Uganda's Veterinary Sector

In today's free market of veterinary service providers, veterinarians operating under MAAIF and local governments at district level work with private practitioners, including veterinarians and paraprofessionals (7). In this specific situation, paraprofessionals are authorized by the Veterinary Statutory Body to perform certain tasks under the supervision and responsibility of a veterinarian (45). The approach of letting paraprofessionals fill a gap previously covered by government veterinary services was initially a response to the failed privatization of veterinary services in many countries in the Global South, and was intended to deal with less complicated animal health problems in communities that had limited access to qualified veterinary care (46). However, paraprofessionals in Uganda rarely work under such supervision and few are mandated by the Veterinary Statutory Body to carry out their work (9). Since the 1990's, there has been no formal institution providing paraprofessionals with specific training in veterinary medicine in Uganda (41). Due to their current unregulated training, paraprofessionals' knowledge varies greatly: some hold a certificate or a diploma in general agriculture or animal management, while others have only had a few months' training through an NGO or no relevant training at all (40, 47).

CONCEPTUAL FRAMEWORK

Our analysis in this study was based on the assumption that "the political conflict is hidden in the question of what definition is given to the problem, which aspects of social reality are included, and which are left undiscussed" [(16), p. 43]. Based on this guiding idea, the analysis explored how actors within the Ugandan veterinary sector frame the factors hindering smallholder livestock production and what solutions are developed to address these specific problems (13, 14, 48). The discourse analysis aimed to identify narratives on development through livestock production among actors within the Ugandan veterinary sector. It draws on the "social-interactive" discourse theory in which it is claimed that "actors can only make sense of the world by drawing on the terms of the discourses available to them" [(16), p. 53]. It was therefore of interest to explore how veterinary actors talk about and act on animal disease and development in different ways, and how these descriptions and practices reinforce or challenge particular discourses. The term "discourse" here refers to "a specific ensemble of ideas, concepts and categorizations that are produced, reproduced, and transformed in a particular set of practices, and through which meaning is given to physical and social realities" [(16), p. 44]. The term "practices" in the previous sentence is understood here to mean both language and actions. Veterinary work is thus conceptualized in the analysis as an important extension and practical implication of the discourse. Our exploration of how the practices and descriptions of the studied actors support or challenge particular discourses drew on the concept of an "argumentative game." Actors who engage in an "argumentative game" seek to achieve discursive hegemony by using particular narratives (or storylines, see below) to communicate and seek support for their view of reality [(16), p. 59]. In this argumentative game, actors depend on credibility, acceptability and trust to gain and maintain support for their way of narrating reality and influencing practices (16). Thus, analyzing how actors were given credibility, acceptability and trust by others allowed an understanding of the position given to these actors in the argumentative game. Here, it was also useful to look for truth claims, as these are key for upholding a specific discourse (49, 50). The way that "truths" are constructed in a discourse means that particular worldviews are portrayed as natural and obvious, whereas alternative ways of thinking and acting becomes unthinkable and thereby discredited in the discourse (51).

The way actors actively seek to achieve discursive hegemony by using particular narratives can be analyzed through the

concept of storylines. A storyline can be defined as "a generative sort of narrative that allows actors to draw upon various discursive categories to give meaning to specific physical or social phenomena" [(16), p. 56]. In short, a storyline can be understood as "a condensed statement summarizing complex narratives" [(52), p. 61], thus functioning to simplify complex narratives and suggest unity, despite the presence of competing or contradictory narratives. Actors can position themselves using storylines, and thus finding convincing storylines becomes an important form of agency. However, people might not intentionally use storylines as a way of positioning themselves, but rather assume that their way of describing reality is just how things should be thought and talked about.

To succeed in having a perspective dominate in policy not only requires efficient communication strategies, but just as importantly the building of political and economic alliances, for example. Here the concept of "discourse coalitions" is helpful in analyzing how certain actors come together and support the same discourse. A discourse coalition can be defined as "the ensemble of particular storylines, the actors who employ them, and the practices through which the discourse involved exerts its power" [(15), p. 61]. As such, the term "discourse coalition" moves the power analysis beyond text and acknowledges that it also matters who it is who joins particular alliances and supports a certain discourse.

MATERIALS AND METHODS

The study draws on policy documents, semi-structured interviews with staff working in veterinary education at Makerere University in Kampala and with field veterinarians and paraprofessionals in Nwoya district, and ethnographic fieldwork in two villages in Nwoya district. **Table 1** provides an overview of the qualitative data methods used and **Table 2** presents the different animal health service providers mentioned in this paper.

The majority of ethnographic data were collected in village A, where the first author stayed for 4 months with a Ugandan family during fieldwork. Additional data were collected in village B. The distance between the two villages is ∼30 km. The first author made detailed notes during all the interviews and focus group discussions. Interviews conducted in English were recorded for the purpose of filling in gaps in the notes, but were not transcribed in detail. Interviews conducted in smallholder communities were simultaneously translated between Luo and English by the field assistants. These interviews were discussed with the field assistants directly after the interviews to fill in gaps and provide clarification. Prior to participating, the interviewees were informed of the purpose of the interview and the expected outcome of the study, asked for their oral consent, and informed that they could withdraw their participation at any time for any reason. The names of the two study villages are not included and the names of all interviewees have been changed to maintain their anonymity. The quotations serve to give life to the findings and should not be taken ad verbatim.

TABLE 1 | Overview of qualitative data collection: methods and informants.

Type of method	Category of informants	Total no. of participants
Semi-structured interview	Staff at Makerere University[a]	5
	Field veterinarians and DVO	6
	Paraprofessionals[b]	6
	Smallholders	70[c]
Focus group discussion & ranking exercise[d]	Smallholders	43
Questionnaire in survey	Smallholders	101
Paticipant observation[e]	(N/A) village life and farming	(N/A)
	Field veterinarians	1
	Paraprofessionals	1

[a] *All interviews were conducted online via video link.*
[b] *Five out of six interviews were conducted over the telephone with a field assistant on site translating.*
[c] *The total number of 70 refers to households and not to individuals, with all but two households located in village A.*
[d] *All but one focus group discussion included a ranking exercise.*
[e] *Participant observation in study villages A and B was not focused on following particular smallholders, therefore no specific number is given here. See Section Participant Observation for further details.*

Policy Documents

The following policy documents that inform the Ugandan livestock and veterinary sector were analyzed to explore discourses on the role of veterinary actors, livestock production and development: the National Agricultural Extension Strategy (NAES) 2016/17-2020/21, the National Agricultural Extension Policy (NAEP) and the Extension Guidelines and Standards, which were all approved by MAAIF in 2016. The Ethical Code of Conduct for Agricultural Extension and Advisory Service Providers approved by MAAIF in 2019, the National Agriculture Policy (NAP) and the National Adaption Plan for the Agricultural Sector (NAP-Ag) approved by MAAIF in 2013 and 2018, respectively, were also included. Several of the above policy documents refer to the Uganda Vision 2040, described as the Ugandan "30-year development master plan" [(53), p. 61], produced by the National Planning Authority and launched by president Yoweri Kaguta Museveni in 2013. This document was therefore also included in the analysis. Finally, to explore correlational and potentially contradictory narratives in national and international policy documents on the livestock sector, the EAC Livestock Policy adopted by the East African Community in 2016 and the report of Business and Livelihoods in African Livestock published by the World Bank in 2014 were also analyzed. The selection of documents was guided by the aim to cover a wide range of veterinary and agricultural policy frameworks and was restricted by the online availability of national policy documents.

Interviews With Staff at Makerere University

Semi-structured interviews were performed with staff in the veterinary faculty at Makerere University in Kampala with the

TABLE 2 | Description of formal and informal animal health service provider terms mentioned in this paper.

Term	Type of employment	Definition
Veterinary field officers/field veterinarians	Public and private sector	Individuals with a degree in veterinary medicine from a veterinary institution
District veterinary officer (DVO)	Public sector	Individuals responsible for government-led veterinary work at sub-county level
Faculty staff members	Public sector	Individuals working in veterinary education at Makerere University in Kampala, Uganda
Paraprofessionals	Public and/or private sector	Used here as an umbrella term to describe individuals who: i) have received formal training at certificate or diploma level in animal health or general agriculture (in the literature often referred to as *paraveterinarians*) ii) have received very limited or no formal training in animal health, but may have acquired knowledge through practical experience (in the literature often referred to as *community animal health workers)*
Doctors	Public and private sector	Individuals with a degree in veterinary medicine from a veterinary institution (veterinarians), referred to by smallholders and paraprofessionals in this study as "doctors"
Scientists	Private sector	Individuals without formal training or a degree in veterinary medicine or animal health, but who other community members may know to be qualified in animal healthcare through their practical experience
Extension workers/staff	Public and/or private sector	An umbrella term used to describe a wide range of actors who assist farmers with crop and/or livestock production
Quacks	Private sector	A term used to describe individuals with limited or no training in animal health/veterinary medicine who provide incorrect advice or treatment under the pretense of being skilled in veterinary medicine

aim of understanding the structure and content of veterinary education and capture perspectives on veterinary education and extension work. These interviews were conducted remotely via video link in December 2020 and January 2021. The staff work in the School of Veterinary Medicine and Animal Resources (MakSVAR), one of two schools in the College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB), referred to in this paper as "the veterinary faculty." The interviewees were selected by a key informant working in the faculty based on the criteria of having broad knowledge of the work of veterinarians and of education at the veterinary faculty, which is the only one in Uganda. In addition, with the aim of capturing broad perspectives on veterinary education and related topics, the staff informants selected have differing educational backgrounds, ranging from a bachelor's degree to a PhD in veterinary medicine. Staff members held the following positions at the veterinary faculty: teaching assistant, senior lecturer, associate professor (two informants) and dean. The interviews were semi-structured, following a pre-defined topic guide (see **Annex 1**). Interviews were conducted in English (all informants were fluent in English) and lasted between 45 and 90 min.

Interviews With Field Veterinarians and Paraprofessionals

Veterinarians and paraprofessionals working in Nwoya district were interviewed with the purpose of acquiring a better understanding of veterinary and animal health work in northern Uganda. Field veterinary informants were selected by the district veterinary officer (responsible for government-led veterinary work at sub-county level). To capture perspectives on professional veterinary work that were as broad as possible, all the field veterinarians suggested for inclusion in the study by the district veterinary officer were interviewed. The first paraprofessional informant lived in village A, and additional informants in this category were identified through snowball selection (54), with one paraprofessional suggesting another. With the aim of approaching a variety of actors referred to as paraprofessionals, the paraprofessionals were deliberately asked to recommend both those who were considered competent and those who had a poor reputation and were referred to as "quacks." The interviews with the veterinary field officers and district veterinary officer were conducted on site in English by the first author (all the informants were fluent in English). One interview with a paraprofessional was conducted on site with a translation between Luo and English. The remaining interviews with paraprofessionals were conducted over the telephone in April and May 2021, with the field assistant on site translating.

Ethnographic Fieldwork

Smallholder perspectives were captured through ethnographic fieldwork carried out between September and December 2019. The fieldwork was conducted with the purpose of gaining a broad understanding of the role of pigs and the general conditions for livestock production in this setting. The area for ethnographic fieldwork was strategically selected due to reports of ASF in the past and the authors having established research contacts prior to this study. One field assistant lived in village A and the other in village B, but during the ethnographic fieldwork both of them spent most of their time in the village A.

Participant Observation

The key method for data collection on smallholders' use of pigs and their perspectives on animal health and access to veterinary services was participant observation (55). The first author stayed

with a Ugandan family in village A for 4 months, took part in daily chores and engaged in village life, while continuously taking notes and actively reflecting and asking questions about what she participated in and observed. Participant observation was complemented and triangulated (56) with individual interviews, focus group discussions and a survey, as described below.

Individual Interviews With Smallholders

Interviews with smallholder households in study villages A and B were conducted with the purpose of gaining more detailed insights into informants' perspectives of pig production and access to veterinary services. The interviews varied in length, depending on the time the participants had available. In several households, more than one person participated in the interview, and several households were interviewed more than once. Participants were purposively selected on the basis of being household members aged over 18 with previous knowledge of livestock production. The interviews were semi-structured and aimed to capture broad perspectives about smallholders' livestock production. All the interviews were conducted with the help of a field assistant who translated between Luo and English.

Focus Group Discussions

With the purpose of capturing a broad range of views on livestock management and animal health issues, six focus group discussions were held with smallholders from village A. Special attention was paid in the focus groups to allowing the participants to steer the discussion toward subjects of interest to them. One field assistant facilitated discussions and another translated between Luo and English. The first author took detailed notes and intervened when clarification was needed. Participants were purposively selected on the basis of being residents of the study village with previous experience of livestock production, as well as having the time and a willingness to participate. Four groups contained both men and women, and two further groups had only women in them. The purpose of the separate women's groups was to ensure that the women could speak freely in discussions that otherwise risked being dominated by the views of male participants. Participants were asked for detailed descriptions of problems with their livestock production, as well as potential ways to prevent or resolve the issues raised. Problems and solutions were written down on a large piece of paper in both English and Luo by the facilitator in front of the group. In five of the focus groups, participants ranked the problems in relation to one other, according to their perceived magnitude (**Annex 2**).

Survey

Based on the initial findings from individual semi-structured interviews and focus group discussions with smallholders, a survey was designed (**Annex 3**) to quantify smallholders' framing and prioritization of livestock problems, as well as their perception of access to and costs of veterinary services. The survey was written in English and translated into Luo by the field assistant, and was conducted during interviews in which the field assistant, trained by the first author, interviewed respondents in Luo and noted down their answers in English. Respondents were selected based on a mix of purposive and convenience sampling strategies. The inclusion criteria were adult household members who lived a manageable travel distance from the field assistant's home, had previous knowledge of livestock production and were at home during the time of the field assistant's visit. For convenience, the survey (101 responses) was mainly conducted in village B (85 responses) where the field assistant lived, with some additional data collection in village A (16 responses).

Data Handling and Analysis

Field notes from interviews and focus group discussions were transcribed as soon as possible after each interview. Except for the survey, all material was analyzed by the first author using Nvivo software (QSR International). In the initial stage of the analysis, the first author read all the material thoroughly and inductively categorized the data according to broadly defined codes such as "livestock challenges," "extension work," and "quacks." The content of the broad themes was then reviewed in dialogue with the second and third authors, discussing what was interesting and how this could be interpreted. The conceptual framework (Section Conceptual Framework) was designed and subsequently used in a second round of iterative inductive-deductive process coding for narrower themes and patterns guided by the conceptual framework, but open to emerging themes from the data. Narrower themes included, for example, "knowledge transfer," "mindset change," "ASF," and "entrepreneurship." This round of analysis also examined the argumentative structure in the textual material and looked for coherent statements and storylines, as well as who expressed them and how they were positioned in relation to other actors and statements. Data from the survey were collected on paper questionnaires by the field assistant and entered into a Microsoft Excel spread sheet by the first author, supported by the fourth and fifth authors, to gain an overview of the data as well as estimate the minimum, maximum and average of the numerical results (**Annex 4**).

RESULTS

The findings showed that all the actors in this study agreed that underfunding of the veterinary sector is a real and significant challenge to improving livestock health in the country, as described in the following section. The actors did not agree on the underlying causes or possible solutions to this, however, as described in subsequent sections of the results. These findings illustrate that there is a dominant discourse centered on commercialization of smallholder agriculture as a route out of poverty, which is maintained by a discourse coalition of staff at the veterinary faculty, government officials and, to some extent, field veterinarians. The key features of this dominant discourse are described in Sections Entrepreneurship, Market Orientation and the Coalition Around Them to The Problem With "Quacks". Paraprofessionals and smallholders challenged this dominant discourse, but the analysis indicated that expressions challenging the dominant discourse were less coherent and did not form a strong united discourse coalition.

Widespread Agreement on Underfunding of the Veterinary Sector

The analysis of policy documents and interviews with veterinary actors and smallholders confirmed the results of previous studies and showed that all the actors equally acknowledged smallholders' lack of access to veterinary advice as a key issue, particularly in northern Uganda. In policy documents, understaffing and underfunding of the veterinary sector were repeatedly described as real and major problems (57, 58). For example, in 2016, the ratio of extension staff (which includes all government actors who assist farmers with crop and livestock production) to farmers in Uganda at large was more than 1:5,000 compared with the recommended ratio of 1:500 [(57), p. 14)]. Interviews with staff at the veterinary faculty revealed that there were fewer students on the veterinary programme from the northern and eastern regions than from the central and western regions of Uganda. Several members of the veterinary faculty perceived it to be less likely that people from rural, remote areas would be able to afford veterinary education. This was thought to be connected to recent increased competition for government sponsorships, which has made it even harder for poorer families to send a household member to university. According to respondents in the veterinary faculty, it used to be more common to have students with a background of rural poverty; today, however, most students come from better-off families where at least one of the parents has had a higher education.

Related to the above issue, veterinary faculty respondents also emphasized that veterinary students from northern Uganda preferred to take jobs in central Uganda after graduating, since salaries are generally higher closer to the capital and aspirations to a modern lifestyle involve staying in a large city. In addition, according to the veterinary faculty staff and field veterinarians interviewed, the lack of laboratories and work facilities in the public sector made it less attractive to apply for jobs in the northern region. However, both veterinary faculty respondents and field veterinarians believed that this tendency could be changed by recent improvements in salaries in the public veterinary sector.

Field veterinarians working in the public sector were paid a basic salary, but were expected to receive compensation for fuel, material and pharmaceuticals from farmers. Some field veterinarians described how this led them to approach large-scale farmers rather than poor smallholders to ensure that they would be compensated for their work. Several smallholders said that they called the veterinarian as the last resort when nothing else had worked. Field veterinarians explained how this made it difficult for them to be successful, as animals often were very ill and beyond saving by the time they were called. If animals did not recover after being treated, smallholders were sometimes unwilling to pay for their services, something that field veterinarians described as causing them stress and increasingly leading them to focus on large-scale farmers who are more able to pay. When discussing the difficulty smallholders had in accessing veterinary services, field veterinarians generally stressed that veterinary services are demand-driven and that it is the responsibility of smallholders to approach field veterinarians. In the words of field veterinarian Charles: *"You see, if someone is sick, then the person must go to the hospital to see the doctor; the doctor can't know that someone is sick if they stay at home. That's how it works. So, farmers should reach out to us."* However, several field veterinarians also understood that the problem was connected to previous structural changes in the veterinary sector. In the past, some veterinary services were provided for free, whereas today the public sector has been downscaled and farmers are expected to pay for veterinary services themselves.

Entrepreneurship, Market Orientation and the Coalition Around Them

When exploring narratives relating to the desired development of agriculture and livestock production, one clear storyline was repeatedly found across all policy documents in slightly different variations: "To transform the sector from subsistence farming to commercial agriculture" [(59), p. 14, (60), p. 34]. The idea that smallholders need to leave the subsistence level of farming in order to become developed was also clearly expressed in policies specifically targeting the veterinary sector with wording such as: "…to provide agricultural extension services in order to support sustained progression of smallholder farmers from subsistence agriculture to market oriented and commercial farming" [(57), p. 3]. This storyline binds together broader narratives of agricultural development with ones about the role of the veterinary profession specifically, and describes an "agricultural revolution" in Uganda (57, 59) where smallholders need to be part of a modernization process, start contributing to economic growth by scaling up their enterprises, and become integrated in the formal liberalized market. This discourse implies that policymakers do not acknowledge any particular strengths of small-scale farming. Instead, what captures the political imagination is promises that large-scale farms will generate capital and play a key role in transforming the livestock sector [(61), p. 46]. This discourse, found in fairly similar versions in the various policy documents, was intertextually connected with "Uganda Vision 2040," an overarching development policy for the country that aims to provide development paths and strategies whose stated overarching goal is to achieve "a transformed Ugandan society from a peasant to a modern and prosperous country within 30 years" [(2), p. 3]. It further states that "Uganda aspires to transform the agriculture sector from subsistence farming to commercial agriculture" [(2), p. 45], and to achieve this aspiration, the "right attitudes and mindsets" of the population are needed [(2), p. 4].

Investigating the role given to the veterinary sector in the proposed agricultural transformation in more detail, it became clear that there are a number of key issues and associated solutions that guide action in this sector. Apart from an acknowledgment that the sector is understaffed and underfunded, the main reason for smallholders not implementing veterinary policies was framed as a problem of information. The documents suggest that information is a fixed entity that should be packaged and conveyed to smallholders, with the aim of getting smallholders to adopt and adjust their practices in line with the information given,

as exemplified in the following quotation stating that the strategic mission of the National Extension Strategy is to "promote application of appropriate information, knowledge and technological innovations for commercialization of agriculture" [(57), p. 16]. That this envisioned change of smallholders into entrepreneurs did not happen in practice was primarily explained as a problem of communication. There were two sides to it: a problem with how the information is communicated by extension workers, leading to the conclusion that "extension workers need to be adequately equipped with content and methodology to deliver them to beneficiaries" [(57), p. 12], and a problem that smallholders do not follow the recommendations, frequently described as an issue with smallholders' mindsets, as also seen in the previous quotation from Uganda Vision 2040. There was no questioning of whether the solutions proposed in the policy fitted with smallholders' wider contexts and practices. Rather, smallholders needed to "change their mindsets" so that they would better appreciate the services provided and better understand the importance of being business-oriented [(62), p. 25]. In addition, claims that smallholders had previously failed to adopt new innovations and technologies (63) led to the conclusion that smallholders needed to be educated and "sensitised." The essence was that if smallholders could be sensitised, educated and willing to change their attitudes and mindsets, they would be able to take this route out of poverty that includes the commercialization of small-scale farming.

The Importance of Smallholders Becoming Business-Minded

Field veterinarians in northern Uganda and staff at the veterinary faculty commonly questioned smallholders' priorities and saw their small-scale livestock enterprises as a barrier to escaping poverty. Thus, as with the dominant discourse emerging from the policy documents, there was a strong idea among these informants that subsistence farming was problematic and that smallholders needed to be "sensitised" to think more in terms of business and entrepreneurship in order to succeed as farmers. Maxime from the veterinary faculty described this matter in terms of "*treating the psychology of farmers*," implying that it is important to understand how farmers think for the purpose of changing their mindsets: "*As a vet in extension work, I mean, it's both about treating the psychology of farmers as well as treating the physical body of animals."*

In this narrative, large-scale farming is both the main option and end goal for smallholder farmers. In the university, the veterinary curriculum had been adjusted to support this narrative in that there has been a greater focus in the last few years on business and entrepreneurship in the training of veterinary students. As a result, the training now concentrated more on the role of veterinarians in turning smallholders into market-driven and business-oriented entrepreneurs. It was believed that a shift in smallholders' mindsets would play a key role in achieving the envisioned transformation of the agriculture and livestock sector. In line with this narrative, several veterinary faculty respondents emphasized in interviews that it was important for veterinary students to have the ability to convey a business mindset to smallholders.

The same narrative was also found among field veterinarians, who commonly problematised smallholders' subsistence levels in rural areas, and emphasized the need for rural smallholders to become more like large-scale farmers closer to urban areas, who were believed to be better educated and both demand and market-driven. In sum, a discourse coalition of field veterinarians, faculty staff and policymakers could be identified that adhered to and supported a dominant discourse about upscaling, entrepreneurship and business orientation as a route out of poverty.

The Simultaneous Challenge and Importance of Transferring Knowledge

The dominant discourse coalition described the transfer of knowledge as a central means for transforming smallholders' mindsets. The veterinary sector needs to develop ways of doing this that will enable farmers to become 'sensitised' and farmers are required to contribute by taking part in the training opportunities offered to them and embracing the suggested approaches of entrepreneurship.

In interviews with field veterinarians and staff members at the veterinary faculty, it was evident that they faced challenges regarding the "transfer" of scientific knowledge to smallholders who often did not share their views on livestock production or relied on other sources of information. Field veterinarian Adrian illustrated this problem, saying that: *"To me, the biggest challenge is the farmers. Their way of thinking and their backward beliefs. I learnt things in school, but farmers hesitate to follow our advice; instead they want to use leaves and other stuff to treat their sick animals. It is this challenge that we* veterinarians *meet in the field, of communicating scientific facts to farmers who rely on their religion and traditions in the villages."* In this discourse, science becomes the better way of knowing and, as a consequence, "religion and traditions" are constructed as a problem. While field veterinarian Adrian describes the challenge that he and his colleagues face in the mission to 'change smallholders' mindsets', this quotation also reveals that their experience of such challenges does not lead veterinarians to question the wider discourse framing smallholders' mindsets as the key problem.

Both field veterinarians and veterinary faculty respondents repeatedly stated that if only smallholders could become "enlightened" and "sensitised," they would become part of "modernity" and experience a transformation from subsistence to commercial agriculture. This narrative implied that the persistence of small-scale farming was a result of smallholders' unwillingness to adopt new information and technology.

In interviews with veterinary faculty staff, they commonly suggested that the challenge of changing smallholders' mindsets could potentially be reduced by boosting the practical skills of veterinary students during their studies. Faculty staff also noted that despite the curriculum expanding its practical elements in recent years, after graduation many students still experienced a gap between their theoretical studies and the practical characteristics of clinical work in rural areas. The boosting of

the practical component was thus mainly seen as a means of getting smallholders to understand and adapt their practices in line with the "correct" information. This idea of knowledge as a fixed entity and of scientific knowledge as always better than other ways of knowing and acting was also found in how field veterinarians and veterinary faculty members discussed paraprofessionals' perceptions of animal disease, for example how they differentiated between their own scientific knowledge and "pseudo medicine," "gambling," and "lack of science" when discussing a perceived knowledge gap among paraprofessional actors. Here, the credibility of scientific knowledge was also an important way for veterinarians to legitimize their role in the veterinary sector.

The Problem With "Quacks"

When staff at the veterinary faculty and field veterinarians identified challenges in the livestock sector, they often talked about individuals who called themselves veterinarians or paraveterinarians but had no formal qualifications, inadequate training or no knowledge of veterinary medicine at all. In interviews with veterinarians, they were referred to as quacks (i.e., a person performing quackery) and defined as someone performing veterinary work without the required competence or supervision by a professional. The actors described as quacks were individuals with limited or no training in animal health and medicine who provided incorrect advice or treatment under the pretense of being skilled in veterinary medicine, even calling themselves veterinarians. The veterinary informants believed that the liberalized market of veterinary pharmaceuticals, which means that almost all drugs can be bought over the counter without a prescription, had exaggerated the problem of quacks. Several field veterinarians and paraprofessionals in this study had witnessed the misuse of pharmaceuticals by actors in the field who worked by an approach of "trial and error" rather than relying on "evidence-based medicine." The issue of quacks was perceived by the veterinary informants to be linked to underfunding of the veterinary sector and the unregulated training and supervision of paraprofessionals. Staff member Maxime at the veterinary faculty described this problem of paraprofessionals performing quackery, in particular when dealing with ASF in villages: *"Like with ASF, a major disease in the north, there are some local paravets who think it should be treated like any other common disease. In the end, they* [paraprofessionals, referred to by this informant as "paravets"] *themselves transmit it to several places. Farmers in the communities believe in them and that ASF should be treated because it is cheap and easy to access the treatment from paravets. Sometimes, it may look like the pigs recover, but it's a big challenge because the work of paravets instead makes things much worse."* Staff members at the veterinary faculty and field veterinarians commonly perceived ASF to be one of the greatest threats to boosting pig production in the country, and furthermore a major constraint to the vision of transforming subsistence pig farming into commercial agriculture.

Overall, quacks were perceived to be a problem by all veterinary and paraprofessional informants, not only because they spread false information to smallholders and lead to animals being lost, but also because they undermine and contradict the work of field veterinarians and competent paraprofessionals. In this context it should be noted that while two paraprofessional informants were recommended for interviews based on smallholders and paraprofessionals classifying them as quacks, all the paraprofessionals in the study (including these two) distanced themselves from quacks.

Field veterinarian Amos explained the difficulty smallholders had in differentiating between animal health service providers and consequently how poor advice from a paraprofessional or quack would result in smallholders losing trust in the veterinary profession as a whole: *"Farmers can say "I called a vet," but then an unqualified person comes to the village. So farmers assume that it was a vet that came. To a farmer, that person was a vet, but he wasn't really."* Amos continued by describing how the faulty advice provided by untrained people (who smallholders perceived to be field veterinarians) caused problems for field veterinarians who then had to both solve emerging animal health issues as a result of the wrong advice and try to explain to farmers that the previous advice they had received was in fact incorrect: *"It's hard for us because we then need to do de-advice work."*

Local Perspectives Challenging the Dominant Discourse

Smallholders' Perspectives

As mentioned above, all the actors in this study agreed that the presence of field veterinarians in rural areas was limited. As can be seen in this section, this made smallholders turn to more affordable and locally available paraprofessionals.

Smallholders in this study generally combined crop and livestock production. Farming was often framed as a necessity to sustain their families, rather than something desirable or preferable in itself. Smallholder Morris, who engaged in crop and livestock production, dreamt about something other than farming when he envisioned his children's future: *"I don't want my children to follow in my footsteps. I want them to go to school, get a degree and then I hope they'll find good jobs. Digging in the garden is just for me, what I have to do, but my hope is that my children will be able to leave village life and farming, because if you leave the village you can get more opportunities in life. There are more possibilities in the cities compared to the village."* In this context, livestock production was often inscribed with a hope of escaping farming. Upscaling livestock production was perceived as one of several strategies to increase the chances of a better life, eventually escape the countryside and live a modern life with a paid job in an urban area. Thus, according to several smallholders, upscaling livestock production was seen as a potential launch pad to a better life rather than an end goal in itself.

In contrast to cattle and goats that have longer histories in this area, pigs are not embedded in local traditions and are not used in witchcraft or dowries, which also means they can be sold more easily. Pig production was understood as a way of obtaining a quick return on investments as compared with, for example, poultry that have less economic worth, goats that produce fewer offspring with far longer in between, and cattle that are much more expensive and very rare in the villages after the most

recent period of conflict. Pigs were repeatedly described by smallholders as "a shortcut to money." Keeping pigs meant easy access both to cash, by selling off pigs, and to financial security as a buffer that could be used in times of need. Despite these benefits of pig production, many also complained about free-roaming pigs destroying crops, which added to already existing social tensions among neighbors. Another challenge was animal health issues. Many smallholders generally found it difficult to distinguish between different animal diseases, but the lack of experience of how to care for pigs made it even more difficult to interpret symptoms and signs of sickness in pigs. The uncertainty and frustration caused by animal disease was expressed well by smallholder Iris: *"I feel that there is not much to do when my animals get sick. How to know which drug to give them? They just die."* When discussing disease in pigs, several smallholders recognized clinical signs that could be related to ASF, such as skin color changes, loss of appetite, fever and rapid death after showing the first signs of disease. However, few smallholders linked such clinical signs to ASF specifically, but rather referred to them as malaria, fever or "orere" (a Luo word for unspecified disease outbreaks). Smallholders believed that many livestock problems (including ASF) could potentially be solved by better access to veterinary care, but not everyone could spend money on such services due to the relatively high costs in relation to potential incomes from livestock production.

The smallholders in this study had very limited access to veterinary care and pharmaceuticals (**Annex 4**). The purchase of pharmaceuticals incurred the costs of traveling to a town or city, something that few were able to prioritize. Instead, most smallholders used locally available resources such as ash, leaves and washing powder to treat sick animals. Several smallholders believed that their pig production could be improved by constructing housing for their pigs (which is one important biosecurity measure to limit the spread of ASF as well as other diseases by limiting the intermingling of pigs from different households). Housing was seen as a good way to protect pigs from disease and also reduce social conflicts among neighbors due to the destruction of crops by free-roaming pigs. However, owing to more acute household needs and a lack of capital, few smallholders could prioritize such investments. Only 11 of the 101 survey respondents stated that they had the contact details of a veterinary actor and had contacted them for animal check-ups or consultations in the past 12 months. None of these veterinary actors was identified by the smallholders (or by the field assistant) as a professional veterinarian. Seven of these veterinary actors were identified as paraprofessionals with no or limited formal training in livestock production. The other four veterinary actors could not be identified either as a field veterinarian or a paraprofessional.

The Role and Perspectives of Paraprofessionals

The paraprofessionals in this study all worked and lived among smallholders in villages in Nwoya district. Thus, in contrast to field veterinarians who were based in towns and cities, paraprofessionals were closer and more easily accessible for smallholders than field veterinarians. All except one paraprofessional (who worked on livestock projects for a local NGO) worked privately and had limited contact with field veterinarians at sub-county level. In contrast to many of the field veterinarians active in the region, the paraprofessionals all belonged to the Acholi people and spoke Luo, which they recognized as being important for communicating with smallholders in the area.

The length and content of the training varied among paraprofessionals. Three were trained in animal production and management, with either a 2-year certificate or a 3-year diploma. Two had been trained in general agriculture, with a focus on crop production, but had joined the animal health sector due to work opportunities in rural areas. Lastly, one paraprofessional, Francis, had a BSc in human medicine. In contrast to the other paraprofessionals who classified themselves as "real vets," Francis called himself a scientist. However, the fact that he had an education and kept more animals than most of the other villagers meant that he was often approached by nearby smallholders in need of help. While he was commonly perceived to be a veterinarian, for Francis, however, it was important to avoid being classified as a veterinarian or a paraprofessional as he did not want to be one of those individuals *"…doing bad things in the name of a veterinarian."*

Francis can be seen as the exception that proves the rule: unlike him, paraprofessionals gained legitimacy and credibility by constructing themselves as veterinarians. This way of identifying themselves played a crucial role both in terms of how they perceived their own work and role and how they were perceived by smallholders. The paraprofessionals differentiated themselves from field veterinarians, referring to them as doctors. According to the paraprofessionals, the doctors spent a great deal of time reading books, but often lacked the knowledge important for veterinary work, such as knowledge of the culture and practices and understanding of the local conditions of smallholder farmers. Thus, the emphasis on understanding smallholders' contexts and having practical skills were important aspects for legitimizing their role in the veterinary sector. Nevertheless, it was also in relation to field veterinarians that paraprofessionals risked losing legitimacy and credibility. Two paraprofessionals in this study had experience of working with field veterinarians and recognized that their subjectivities shifted in this context. For example, one paraprofessional, George, said that he was not called *"a real veterinarian"* by his professional counterpart, but instead was referred to as *"my child."* Paraprofessional Richard had a similar experience, explaining that he was called *"an assistant"* when he worked with a field veterinarian. It should be noted here that smallholders had no method for distinguishing between the various animal health service providers, and paraprofessionals were widely considered by smallholders to be veterinarians. However, if they failed to cure smallholders' animals, they were at risk of being classified as quacks—a group with which no one wanted to be associated.

All except one paraprofessional in this study had been trained in some aspects of entrepreneurship and business. However, in contrast to the dominant discourse, paraprofessionals did not make the connection that smallholders becoming more business minded would be a key route out of poverty. Rather, they saw this training as helpful in building their own businesses

and become more entrepreneurial themselves. Paraprofessional Jacob described this focus of becoming more business-oriented in his own work: *"You have to be smart and plan your own business. It's important to know the market and try to modernize your work. You need to understand farmers and find ways to get good prices for treating animals in the communities."* Even though paraprofessionals believed that it was important that they themselves became more business-minded, they did not imply that smallholders had to follow the same route. However, like field veterinarians and faculty staff, paraprofessionals also believed that it was important to transform the mindsets of smallholders, particularly in relation to how they understand animal disease. Here it was interesting to note that the majority of paraprofessionals treated clinical signs of ASF, and that three of them claimed to regularly vaccinate pigs as a prevention measure for this disease, even though there is currently no ASF vaccine on the market. In this context, changing the mindsets of smallholders was perceived to be important in order to make them more willing to pay for vaccines and pharmaceuticals supplied by paraprofessionals. Paraprofessional Jacob described this here: *"What I see from farmers is that they still have traditional mindsets. For instance, if pigs are suffering from ASF, they don't know how to use animal medicines to treat the particular disease that the medicine was created for. The tendency among farmers here is to use local techniques, to treat diseases like in the old days. Changing their mindsets is not easy. But they need to understand that ASF and other diseases need to be dealt with by using our medicines, but farmers always try to avoid the costs."*

Even though the paraprofessionals questioned smallholders' mindsets in relation to how they dealt with animal disease, especially ASF, they did not assume that the scale of smallholders' livestock production was the main problem. Overall, paraprofessionals were more accepting of the current state of smallholders' small-scale enterprises compared with other veterinary actors, and they did not perceive it to be their role to foster them toward commercialization [cf (57), p. 3].

DISCUSSION

This study combined an investigation of the structure of the Ugandan veterinary sector and the availability of veterinary support to smallholders with a discourse analysis of how central actors in the sector framed the key challenges and solutions. The focus of the study was on northern Uganda, a region particularly dominated by past conflicts, with resulting high levels of poverty and marginalization (32), and on pigs, an animal that has become increasingly popular in the country and is promoted as a comparatively cheap and rapidly reproducing livestock, facilitating smallholder upscaling and poverty reduction (4, 28, 64, 65).

The findings revealed that many smallholders engaged in pig production with the hope of increasing their chance of escaping rural poverty. However, a lack of finance made investments difficult, and the burden of diseases diminished the financial potential of pig production. Furthermore, the findings showed that all the informants, who are formally and informally involved in the Ugandan veterinary sector from national to local level, agreed that underfunding in the sector created major problems for service delivery. This is a general tendency in agricultural development in Africa, where downsizing of the public sector and privatization of extension services have led service providers to turn to the wealthier farmers who can pay, leaving smallholders behind (66–68).

There was less consensus in how the various actors constructed the causes and solutions to the overarching problem of a lack of veterinary support for smallholders. A dominant discourse, supported by a discourse coalition of policymakers, veterinary faculty staff and field veterinarians, constructed upscaling and commercialization of agriculture as the route out of poverty for smallholders. They believed that this would necessitate a change in smallholders' mindsets to make them more business-minded and entrepreneurial. In this context, smallholders were positioned as "backwards" and in need of being "sensitised" in order to be willing to conform to a narrative where upscaling and modernization of livestock production are seen as the key to escaping poverty. A plethora of studies on agricultural development in Africa in recent years reflects a similar picture of dominant discourses of agricultural development in effect turning a blind eye to structural reasons behind the downscaling of the public sector, instead framing smallholders' lack of entrepreneurial will as the main problem (37, 69–73). Such constructions of smallholders being the cause of, and thus also bearing responsibility for, their own poverty are ahistorical and apolitical, and serve to uphold and support dominant neoliberal narratives (14, 32, 69, 74). Previous research further demonstrates that intervention strategies focusing mainly on attitudinal and behavioral change have a limited impact, particularly in poverty-ridden contexts, if underlying structural inequalities are not properly addressed (75–78). The focus on individual attitudes also diverts attention away from these structural inequalities. In contrast to the dominant discourse of the upscaling of farming as the ultimate goal for poor smallholders, our findings showed how smallholders' narratives of development and the role of livestock production are diverse, but often frame upscaling livestock production as a launch pad to a better life outside farming rather than an end goal in itself. In this context, it is important to note that numerous studies show that many young people in Africa aspire to a future outside the agricultural sector and have other hopes than becoming farmers (79–83). However, despite evidence of this also being the case among smallholders in the present study, there was no acknowledgment of this in the dominant discourse [cf (84)].

This study, like previous ones (9, 11, 44) showed that paraprofessionals fill an important gap in veterinary service provision as there are too few qualified veterinarians. Those that are qualified are often reluctant to work in rural areas due to the small profits involved (9). The services of paraprofessionals are usually more affordable and more accessible to smallholders than those of qualified veterinarians (4, 9, 28). At the same time, our findings highlighted important knowledge gaps in livestock

management and animal disease among some paraprofessionals, occasionally resulting in severe negative effects for both animal welfare and smallholder livelihoods. Incorrect advice and treatment could, for example, contribute to the spread of ASF. Closer collaboration between veterinarians and paraprofessionals could be an important part of a solution to this, starting with recognition by veterinarians and paraprofessionals of the complementarity and value of each other's competence. Several studies have shown the important role that paraprofessionals can play in disease prevention and even eradication (85–87). A second component for paraprofessionals to play a key role in disease prevention and eradication is revived and standardized training of paraprofessionals, something that is also emphasized in other studies (88, 89). Smallholders also need to have strategies to distinguish between the relative qualifications of the various veterinary actors providing services (90).

A weakness of the present study is the limited number of veterinary and paraprofessional informants involved and the fact that, due to travel restrictions during the Covid-19 pandemic, it was not possible to conduct interviews with faculty staff and paraprofessionals (except one) in person. This was mitigated by drawing more heavily on policy documents in the discourse analysis, discussing findings with key informants, and ensuring that the conclusions did not go beyond what the data supported.

CONCLUSIONS

A lack of qualified veterinarians in Uganda and smallholders' inability to pay for them has led to paraprofessionals with varying levels of training being key providers of animal healthcare advice to smallholders in rural northern Uganda. This currently entails risks to animal health. The findings of this study revealed that veterinary work and policy are dominated by a discourse that emphasizes smallholders' lack of an entrepreneurial mindset and paraprofessionals' lack of knowledge in livestock management and disease as key reasons for smallholders failing to upscale their livestock production and escape poverty. The discourse ignores the underlying structural reasons for this situation and overlooks paraprofessionals' competence and the possibility that they could play an important role in the provision of animal health care. Paraprofessionals are often familiar with smallholders and their environments, and thus have extensive knowledge of the local conditions of livestock production in rural areas. As such, they have important practical skills and knowledge when it comes to smallholders' needs and an awareness of the options available to them.

In conclusion we have identified three factors as key to improving access to good quality veterinary support for smallholders in this context:

1) revived certified training of paraprofessionals
2) strategies to help smallholders interpret the different competences of actors working in livestock management and health so that they can identify and reject poor advice
3) improved collaboration and communication between veterinarians and paraprofessionals.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Makerere University College of Health Sciences (ref 2019-062). Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

AA, KF, KH, EC, and SS-L: study design and methodology. AA: manuscript original draft and data collection with support from KF, KH, EC, and SS-L. AA, KF, and KH: conceptualization. KL, KH, EC, and SS-L: reviewing and editing of all versions of the draft. All authors have read and approved the final manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fvets.2022.773903/full#supplementary-material

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This thesis explores smallholders' challenges with regard to pig production and African swine fever (ASF). While ASF represents a significant challenge to pig production, it is not seen as separate from or necessarily more significant than other pig production challenges. Lack of opportunities to invest and of access to veterinary services posed significant constraints to livestock production. The thesis concludes that interventions focusing on collaboration in pig production have a greater chance of success than those targeting individual wealth creation.

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