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Research Article

Impact of Communal Cattle Farming Practices on Meat Safety in Central Bushbuckridge, South Africa

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ABSTRACT

Communal farming practices and the release of meat in rural areas of developing countries remains important in ensuring meat safety. Given the uncontrolled slaughter of cattle communally farmed at central Bushbuckridge, this study focused on farming practices that may have a negative impact on meat safety. A structured questionnaire, based on interviews of 76 communal farmers, revealed variability in responses when the frequencies observed were tested for uniform distribution (Chi-square test; $P<0.05$). The results indicated the main reason for keeping cattle was for commercial purposes (93.4%), including trade with other farmers, the public and unregistered slaughter facility owners. All cattle were free roaming in unfenced areas and within households. Before sick animals died, 42% of farmers would slaughter them to recover costs. The study concluded that some cattle farming practices were likely to impact negatively on the production of healthy animals and safe meat.

Key words: Bovine animals, Communal farming, Illegal slaughter, Veterinary public health

INTRODUCTION

Communal cattle farming is the beginning of the meat supply chain in most rural areas. Uncontrolled farming and poor food animal production practices represent a significant number of meat safety threats that could be detrimental to the health of the public. These threats range from poor control of veterinary medicines, the irresponsible use of antibiotics to stimulate animal growth, risk of residues in meat, poor record keeping for traceability, poor pest management during animal feeds storage, contaminated water, poor control and monitoring of animal diseases, wild and domestic animal interchange, to the lack of training of farm workers responsible for growing and keeping food animals (Sofos, 2008).

Measures must be complemented with best animal welfare practices and training of meat animal handlers on good animal handling practices. The integrated farm assurance standard of GlobalGAP can help with these concerns as the standard is designed to provide confidence regarding Good Agricultural Practices (GAP) by controlling environmental impacts, chemical inputs, worker health and safety and animal welfare (GlobalGAP, 2018). The aspects covered in the GlobalGAP (2018) standard, which covers aspects that may have a negative impact on meat safety, include (1) sourcing, identification and traceability, (2) feed and water, (3) animal health and medicine control, and (4) fallen stock disposal. This will not only ensure compliance to the standards but also the quality of meat produced (Codex Alimentarius Commission, 2004).

The study area

The Bushbuckridge region, the name of which was derived from the large herds of bushbuck found there in the late 1980s, is located in the Ehlanzeni District of Mpumalanga Province, South Africa. It is bordered by the Kruger National Park (KNP) in the east, Mbombela local municipality in the south and Limpopo Province in the north and covers approximately 2 590 km^2 (±1000 mi^2) (Hlongwana, *et al.*, 2011). It has a west to east gradient in topography, with different climates, which results in several district land-use zones that range from commercial forestry in the wetter west, to the central parts, which are characterised by relatively high-density, underdeveloped rural villages. Although the main town where the local municipality is positioned is also called Bushbuckridge (Latitude: 24.820496 | Longitude: 31.171039), the greater Bushbuckridge area is divided into 10 sub-districts where Agincourt (Latitude: -24. 827888 | Longitude: 31.219709),

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Orinocco (Latitude: -24.737845 | Longitude: 31.083311) and Rolle (Latitude: -24.733493 | Longitude: 31.236882) form the central parts, which is where the study was conducted. The surrounding sub-districts include Okkerneutboom (north of central), Erlinton (north-east of central), Cunningmore (east of central), Cork (south of central), Marite (south-west of central), Shatale (west of central) and Arthurseat (north-west of central); Erlington, Rolle and Agincourt border the Kruger National Park.

Agincourt, Orinocco and Rolle are mostly rural areas consisting of smaller villages, dominated by a mix of large and small (sometimes rundown) houses, where informal trade along with subsistence and small scale farming activities are rife. As most people in these areas are poor and mainly reliant on governmental allowances, small-scale farming activities are seen as the beacon of hope (Chiloane, Mabiza, & Mbohwa, 2014). To substitute income, most households would cultivate small areas around the homestead and/or arable fields on the periphery of the village or further afield and/or be involved with livestock rearing with variable numbers of cattle, goats, pigs and chickens on communal grazing areas (Chepape, Mbatha & Luseba, 2014).

It was necessary to determine the agricultural and hygiene practices followed by farmers in Bushbuckridge, as this had never been done before. This article aimed at identifying farming practices that have the potential to cause health effects to consumers. A clear understanding of the farming and hygiene practices can assist policy makers, law enforcers and the communal farming industry to identify possible breaches in meat safety control that could require interventions.

MATERIALS AND METHODS

The study was conducted in central Bushbuckridge, South Africa, which consisted of three sub-districts, namely Agincourt, Orinoco and Rolle. Structured interviews were used to collect data from communal farmers. The questionnaire included open- and closed-ended questions and compiled with the consideration of local and international legislation, standards and codes of practice. Due to the total number of farmers being unknown, farmers were identified by means of a convenience (non-probability) sampling technique. In most cases, a farmer being interviewed referred the researcher to the next farmer who was then individually interviewed. Interviews were done with the support of a research assistant who was a qualified Environmental Health Practitioner and was familiar with the study area and fluent in Xhitsonga, the native language of the study areas. In order to prevent bias and ensure a common understanding, the research assistant was trained regarding the content of the interview questionnaire prior to the start of the data collection period. Prior to an interview, each respondent was informed about the nature and aim of the study and was requested to provide consent for participating by means of signing a consent form.

In total, 76 questionnaires were completed from Agincourt (n=24), Orinoco (n=17) and Rolle (n=35) sub-districts. Due to the nature of the questionnaire, not all the questions were answered by all respondents and therefore the n-values of the variables will differ. The frequencies observed within the categories of each question were tested for even distribution by a 1:1 ratio using a Chi-square (χ^2) test. In cases where there was strong evidence against a 1:1 ratio, regrouping was done for even distribution of frequencies in categories. Furthermore, Row x Column frequency tables were constructed of meaningful combinations and a Chi-square test for independence (association or pattern) was performed. Results were considered meaningful when $P<0.05$. All data analyses were done using SAS Statistical software, and graphs were done using MS Excel 2010.

RESULTS

The results highlight aspects of farming practices that could be contributing to the production of unsafe meat.

Socio-demographic information

Regarding the three sub-districts, Agincourt, Orinoco and Rolle, Figure 1 illustrates the educational and demographic information for the communal farmer respondents farming in these areas.

Contrary to general belief that men are mostly involved with farming, females (average 63.3%) played a significant ($\chi^2_{(df=2)}=6.09$; $P=0.0476$) role in communal farming in central Bushbuckridge. However, 72% of the male respondents (n=46) indicated their direct involvement with farming practices and it may be deduced that the older respondents (>60 years of age), who are typically pensioners, become more involved with farming practices.

Regarding education, there was no difference between the three sub-districts ($\chi^2_{(df=4)}=8.88$; $P=0.0641$). Surprisingly, most of the respondents (Agincourt 70.8%; Orinoco 70.6%; Rolle 71.5%) had educational levels below grade 9, which is the minimum legal educational level in South Africa or no school education (Agincourt 20.8%; Orinoco 17.7% and Rolle 48.6%).

General farming practices

Farmers in all the sub-districts agreed that farming with cattle, pigs, goats and chickens forms part of their cultural tradition. The majority of farmers (93.4%; n=76) indicated they farm with cattle for commercial purposes, including trade with other farmers, the public and with slaughter facility owners. Although 71% (n=76) of the farmers in the sub-districts indicated they were members of farming organisations ($\chi^2_{(df=2)}=0.511$; $P=0.774$), 70.3% of these were members of a so-called 'Group 10' committee and the remaining 29.7% were members of 'Group 13' ($\chi^2_{(df=2)}=6.157$; $P=0.046$). Both of these groups are informal committees formed by farmers around governmental cattle dipping stations to control ticks; the majority (90.7%; n=75) relied on routine dipping for the control of ticks. The infrastructure for dipping stations are provided by the South African government as an incentive for farmers to present their animals for weekly inspection and disease interventions (Stevens *et al.*, 2007). This is in line with the finding that 89.5% of farmers indicated that veterinary services were rendered by the government; none of the respondents made use of private veterinary services.

Table 1: Summary of responses to questions posed to bovine farmers on aspects important to animal health and medicine control

	Agincourt n=24		Rolle n=17		Orinoco n=35		Total response out of 76	Yes %	No %	χ^2 (df=2)	P
Questions	Yes	No	Yes	No	Yes	No					
Do you have animal health inspection routine in place and recorded?	9	15	17	18	11	6	76	48.6	51.3	2.948	0.229
Are medicines that are used for treatment approved for use by relevant authorities?	11	1	17	0	7	2	38	92	8	4.196	0.380
Do you know what zoonotic diseases are?	4	20	7	28	5	12	76	21	79	1.016	0.602
Do you know what "controlled diseases" are?	2	22	4	13	8	27	76	18.4	81.6	2.379	0.304
Do you know what "notifiable diseases" are?	2	22	9	26	2	15	76	17	83	3.474	0.176
Do you notify the provincial office of Veterinary Services of illnesses regarded as "controlled" or "notifiable" diseases	13	11	6	11	15	20	76	44.7	55.3	1.526	0.466
Do you keep a record of the medicines purchased, stored and administered?	2	20	1	15	4	31	73	9.5	90.5	3.490	0.840
Do you sell cattle to another farmer before the withdrawal period expires?	0	16	0	8	4	13	41	9.7	90.3	8.215	0.084
Are medicines stored in accordance with label instructions e.g. refrigeration?	21	3	13	3	25	10	75	78.6	21.4	2.272	0.321
Do you use any natural / traditional remedies to treat sick animals?	8	2	5	2	15	3	35	36.8	63.2	0.446	0.800

Table 2: Disease occurrence (%) as reported by bovine farmers in the Bushbuckridge district of South Africa

Diseases	Agincourt		Rolle		Orinoco		Total response	Yes %	No %	χ^2(df=2)	P
	Yes	No	Yes	No	Yes	No					
Tuberculosis	1	15	2	13	1	16	48	8.3	91.7	0.716	0.699
	n=16		n=15		n=17						
Brucellosis	10	10	7	9	23	9	68	73.5	26.5	4.394	0.111
	n= 20		n=16		n=32						
Rabies	1	12	3	13	5	14	48	18.8	81.2	1.757	0.415
	n=13		n=16		n=19						
Foot and mouth	12	7	7	7	22	9	64	64.0	36.0	1.851	0.369
	n=19		n=14		n=31						

In a question that prompted farmers (n=75) to indicate the general challenges faced by communal farmers, stock theft was highlighted as the biggest problem (39.9%), followed by a lack of market (30.7%), diseases with cattle (18.7%) and lack of information (10.7%) on best cattle farming practices. Approximately 97.4% of farmers (n=76) indicated they supported the idea of a registered red meat abattoirs, as they believed it would alleviate some of the challenges most of the farmers were faced with, namely lack of markets and hoping there would be a reduction in stock theft cases. Most farmers indicated they were using shepherds to watch over their livestock during grazing in the field. There was no difference ($\chi^2_{(df=2)}$ =0.901: P=0.637) between the use of shepherds in the three sub-districts (79.1% for Agincourt; 82.4% for Orinoco; 87.9% for Rolle).

Evaluating responses to questions around sanitation facilities within the three districts of central Bushbuckridge, pit latrines were available at most households (92.3%) while the remaining sanitation facilities consisted of septic tanks, municipal sewerage systems or Ventilation Improved Pit (VIP) toilets. However, according to farmer respondents, over 75% of their shepherds used bushes as toilets while herding livestock. There was a difference ($\chi^2_{(df=2)}$ = 0.144: P=0.001) between the use of the bush as toilets by the shepherds within the respective sub-districts, with all the shepherds in Orinoco using the bush, 73.9% from Agincourt and 85.3% from Rolle.

Grazing with other animals and pets may pose a risk as diseases may be transferred to bovine. Regarding grazing patterns, Figure 2 shows the level of grazing with other (1) domesticated animals, e.g. chicken (*Gallus gallus domesticus*), goats (*Capra aegagrus hircus*), pigs (*Sus demesticus*) and (2) wild animals, e.g. warthog (*Phacochoerus africanus*), meerkat (*Suricata suricatta*) or buffalo (*Syncerus caffer*) that had escaped from the Kruger National Park (KNP). For example, 63.6% of the farmers from Agincourt reported that wild animals were grazing with their cattle; something that can be expected as it is the district closest to the KNP. Furthermore, over 90% of farmers (n=75) across all study districts reported that stray dogs were wandering around cattle grazing fields.

Cattle identification and sourcing

In terms of the South African Animal Identification Act 6 of 2002 (South Africa, 2002), it is compulsory for owners to mark cattle, sheep, goats and pigs with an unique and registered mark that will link animals with the farmer/owner. Over 90% of the farmers (n=75) did not individually identify their live animals with a permanent marker; in most cases (91.3%; n=75) animals were identified by phenotypical traits such as appearance, horns, colour and hide pigmentation. Figure 3 shows the methods used for animal identification between the three areas of the study.

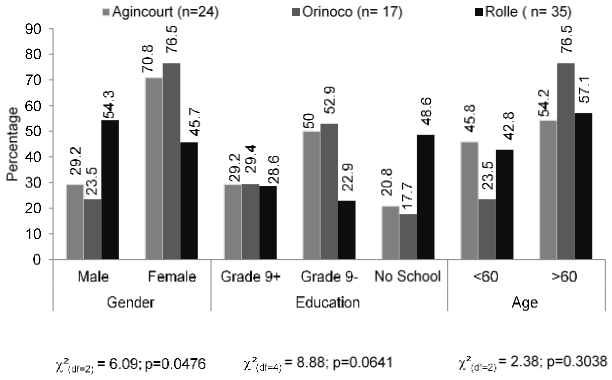

Fig. 1: Demographic information of farmer respondents of the three sub-districts of the study area.

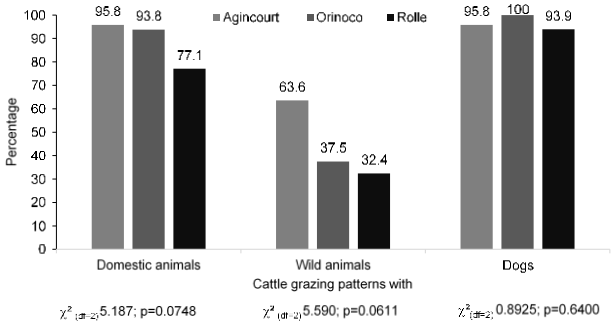

Fig. 2: Grazing patterns, mixing with other domestic; wild animals and wandering dogs.

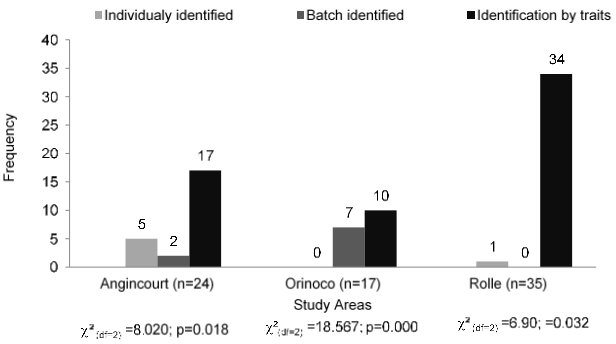

Fig. 3: Differences in the methods of animal identification used by farmers (n=76) across the study areas.

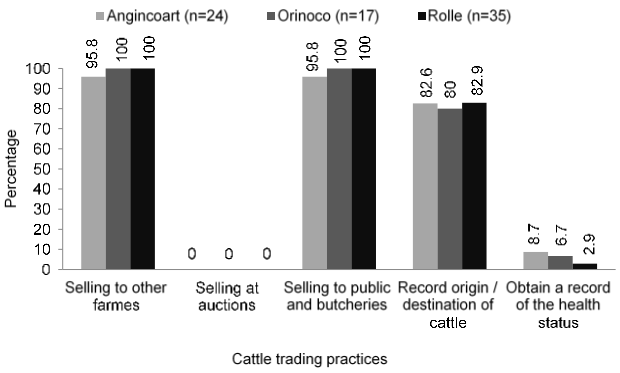

Fig. 4: Bovine trading practices and the related records kept across sub-districts of central Bushbuckridge.

Farmers can be seen as the primary source of livestock offered for slaughter and are at the beginning of the supply chain. It was therefore important to determine from where farmers sourced their animals and how they ensured traceability on the farm. The study revealed farmers were selling and buying live animals from each other and selling to the public and other butchery owners for immediate slaughter and sale (Figure 4).

No animals were sold or bought from auctions as there was no public auction available for trading, instead trade was mostly done amongst animal owners within the study area or the wider Bushbuckridge (Figure 4). None of the farmers provided or obtained any record on the veterinary/drug treatment history of the animals, however records kept addressed issues of stock ownership. Farmers (n=76) indicated the reasons for keeping these trading records were to monitor stock theft as well as assist with stock theft investigations.

Feed and water

Animals were free roaming (100%) in unfenced areas and grazed on the natural forage available. Only a small percentage (21.4%: n=75) of farmers indicated they supplemented feed with lucerne (*alfalfa*) during winter or during periods of drought. However, only 56% (n=16) of these farmers stored the supplemented feed off the floor to minimise contamination from the natural environment. None of the farmers supplemented feed with commercial feed. All the farmers indicated that own mixed feed, such as the mixing of protein, corn, oats and wheat, to supplement natural grazing was never used. Only two indicated they sometimes used mineral blocks as a supplement.

Most farmers (n=71; 80.3%) indicated they sourced water from a dam or river, while the remaining 19.7% obtained water from boreholes. In the latter case, the water was pumped into drinking troughs. Only one farmer indicated having fenced the water source where animals were drinking as a form of contamination prevention and restriction of entrance to the site.

Animal health and medicine control

Diseased animals increase the risk of transfer of zoonotic diseases to meat consumers. Pavlin, Schloegel and Daszak (2009) indicated the simplest way to minimise the risk of zoonotic disease is the reduction of opportunities for transmission of diseases from wildlife to humans. The majority (80.3%: n=76) of farmers in the respective sub-districts relied on provincial veterinary services for the treatment of sick animals ($\chi^2_{(df=2)}$ =1.296; P=0.523), while the others indicated they treated sick animals themselves. Table 1 depicts a summary of responses to aspects important to health and medicine control in animals.

It is noteworthy that there were no significant differences (P>0.05) between the responses to the various questions of the respective sub-districts, which is an indication the farming practices were similar. In general, the farmers' knowledge with regard to notifiable, zoonotic and controlled diseases was low across all study areas. Referring to Table 1, 81.6% of farmers did not know what controlled diseases were, whilst 83% indicated unfamiliarity of notifiable diseases and 79% to zoonotic diseases. This was confirmed by the practice of not notifying veterinary services regarding the occurrences of any of these diseases. Most (91.3%: n=73) of the

farmers indicated they did not keep any records of the medicines purchased, the suppliers name, the date of purchase, the batch number, the expiry date, the administration date, nor the withdrawal periods. Approximately 10% of these farmers reported to be selling animals that had been subjected to veterinary medication before the expiry of the withdrawal period. Of additional significance is the fact that this information was never given to the buyer of the cattle.

Although 58% of farmers (n=76) indicated they treated animals until they were cured or healed, the remaining 42% indicated that in most cases they would slaughter sick animals before they died to recover some cost. Though not verified, the researcher was informed that these sick slaughtered animals were consumed by the farmer and his family and other community members. Farmers indicated having seen or experienced foot and mouth disease (*Aphtae epizooticae),* brucellosis *(Brucella abortus),* rabies *(Lyssavirus)* and tuberculosis *(Mycobacterium tuberculosis)* amongst their livestock. Regarding diseases surveillance by provincial animal health authorities, 95.9% and 94.6% of farmers indicated their cattle were tested for brucellosis and tuberculosis, respectively. Table 2 depicts the occurrence of these diseases amongst the cattle as reported by the farmers.

It was interesting to note there were no differences in the reported occurrences of the abovementioned diseases within the sub-districts. The higher number of occurrences of brucellosis and foot and mouth disease in Orinoco sub-district is unclear as the general geographical characteristic of Orinoco is similar to the other two sub-districts.

Regarding the use of medicinal plants, aloe was the only natural remedy mentioned for the treatment of sick animals, mostly for the control of internal parasites.

DISCUSSION

As established by Sithole, Bekker and Mukaratirwa (2019), the situation of livestock farming is similar in developing countries. In central Bushbuckridge, it was discovered that animal farming was mainly a cultural practice that had been going on for as long as the farmers could remember. In most cases, animal farming was done for a number of reasons, especially to alleviate poverty. The animals are milked and the milk is sold to the public, live animals are sold to other community members during traditional ceremonies, and/or to other farmers, and/or trading of such animals to butchery owners who will later slaughter and sell to the public. It is expected these practices will be sustained in the near future. It is for these reasons that farmers in central Bushbuckridge acknowledge the importance of organized livestock farming practices that will include the development of farming organizations, where information on best farming practices could be shared. At the same time, such farming organizations will enable some form of control, which could include the monitoring of farming practices. The formation and affiliation to informal farming organizations such as ‘Group 10’ and ‘Group 13’ in central Bushbuckridge is in line with best practices and these are expected to assist with improved livestock production and quality of produce (Ndoro, Mudhara, & Chimonyo, 2014).

Worldwide, farmers including small-scale animal producers are expected to ensure that feed, water and veterinary medicine used during animal raising are safe for animals as well as consumers of the meat product (Codex Alimentarius Commission, 2004). Morales *et.al* (2013) reported that more and more consumers were becoming inquisitive of what they were buying, however a different scenario exists in developing countries where in most cases, there are no rules governing the safe production of meat animals by farmers. When these regulations are available, they are not applied uniformly and the non-monitored farmers continue to not comply with set standards thus leading to the production of meat animals that are suspected of being unsafe for human consumption (Lagerkvist *et.al,* 2013).

General farming practices

Researchers such as Sithole, Bekker and Mukaratirwa (2019) have documented extensively the risks of using bushes as toilets, especially with respect to the continued spread of the life cycle of *Cysticercus* and human infection. This situation is no different at central Bushbuckridge, as the majority of farmers indicated that while guarding livestock in the fields, shepherds used the bushes as toilets in the absence of other sanitation facilities. Of special note is that Rolle had a lower incidence of the usage of the bush as toilets. Regarding Rolle, a more populated village named Thulamahashe, with proper sanitary facilities, is located within Rolle, which may have contributed to the higher use of these sanitary facilities by shepherds, thus explaining the reason for the statistical difference between the three sub-districts.

Stray dogs also roamed freely in the grazing fields of domestic animals increasing the risk of *Echinococcus granulose* (dog tapeworm) infection of domestic animals and later humans when such animals are slaughtered in the absence of effective meat inspection (Dupuy *et al.,* 2014).

Cattle sourcing and identification

The poor existence of records of cattle sourcing and animal identification means that processes of traceability as well as monitoring and control of animals subjected to veterinary medicine will be difficult. Hamidu (2014) confirms that lack of a controlled market and individual identification of cattle may play an important role in the increase of stock theft, uncontrolled slaughter and release of such meat to the public, be it for monetary or for cultural reasons. This lack of identification also makes it difficult to monitor and effectively identify animals that have tested positive for any specific diseases so as to facilitate isolation and/or removal from the food supply chain (Francisco, Orloski, & Roberts, 2014). Improper identification of live animals may lead to the slaughter of animals that are not supposed to be slaughtered, and may interfere with recall procedures or back tracing of slaughtered animals thereby exposing consumers to unknown risks including residues from veterinary medications as well as diseases (Wall, 2014).

Feed and water

When food animals are free roaming, strict measures must be in place to ensure that animals are protected from consuming contaminated feed and water (Ademola, 2014). In general, animal husbandry researchers agree that although measures of contamination identification and prevention during feed production may have been taken, contamination occurring at farm level due to improper storage was significant and should be prevented. In uncontrolled environments, where animals feed around households, next to roads and in agriculture fields, these animals are frequently exposed to waste that is inadequately dumped in open sites, a situation that could be detrimental to the health of the animal and the consumer, should the animal be slaughtered and consumed (Gramss & Voigt, 2014). A similar situation exists in central Bushbuckridge, where domestic animals are observed grazing around households and dumping sites, a situation that is unfavorable especially since such animals are in most cases slaughtered without adhering to hygiene and slaughter standards, including meat inspection. It can be assumed that cattle are subjected to faecal matter from other animals, disposed used diapers and other types of waste, such as plastic and metals, during grazing. In some cases the animals' health can be affected adversely even before slaughter.

Animal feed and water could also be contaminated during production. It is for these reasons that when feed supplements are given to animals, such feed must be properly stored to prevent any contamination that may introduce harmful chemicals as well as microorganisms to the feed (Miller, Hofacre, & Holmstrom, 2008).

Animal health and medicine control

Central Bushbuckridge has, in the past, experienced some disease outbreaks including those that are classified as controlled diseases, such as foot and mouth, rabies, rift valley fever, brucellosis and tuberculosis (Moerane, 2013).

The role of veterinary services, as administered by the animal health division in central Bushbuckridge, can never be over emphasized. These include training of farmers on treatment of sick animals, disease prevention, good animal husbandry, as well as information sharing on a continuous basis (Table 1). These findings support the conclusion by Brückner (2014) that veterinary field services rendered by government is important especially pertaining to the application of disease control and prevention, as required by animal health legislation.

Although a significant number of farmers were still involved with practices that may spread diseases, such as slaughtering of sick animals as well as non-reporting to authorities on suspicion of a controlled diseases in their herd (Table 1), this could be attributed to lack of knowledge of controlled as well as notifiable diseases.

Farmers indicated they slaughtered animals that showed signs of being sick to salvage some money. This practice remains dangerous because of the spread of zoonotic diseases such as brucellosis, anthrax and tuberculosis to the slaughter operators and the public (Profitós, Moritz, & Garabed, 2013). The practice of selling for slaughter animals that were subjected to any form of veterinary drug remains one of the leading modes of introducing residues to the unsuspecting consumer (Gómez-Pérez *et al*., 2014). This may be due to uncontrolled trading practices as experienced in central Bushbuckridge, where animals subjected to veterinary medication were not recorded and the farmer's knowledge with respect to risk associated with consumption of sick or treated animals, remains low. The fact that high percentages of farmers indicated low knowledge levels of zoonotic diseases, notifiable diseases and controlled diseases, a significant number was slaughtering sick animals. Table 1 indicates that in central Bushbuckridge, the public could be exposed to animal diseases and parasites such as *Cyctercircus bovis*.

The increased risk of possible interaction between cattle and wild animals from the neighboring Kruger National Park (Figure 2), especially in Agincourt and Rolle which are closest to the KNP where the above-mentioned diseases are endemic, means there is a significant chance that diseases from wildlife could be transferred to domestic animals (cattle). Bekker, Hoffman and Jooste (2012) comprehensively listed zoonotic diseases from wildlife and indicated that these diseases can be transferred to domesticated animals due to their interactions. When this happens, not only is the health status of herds compromised, there is a great risk of human infection from close contact with infected animals. Insofar as foot and mouth disease is concerned, the Kruger National Park and adjacent private wildlife parks are considered as endemically infected due to the presence of persistent infected African buffaloes (*Syncerus caffer*) (Stevens *et al*., 2007). By virtue of central Bushbuckridge being located within the control zone for foot and mouth disease, this requires a bigger farmer role to prevent the occurrence and spread of foot and mouth disease. Furthermore, there are farming practices that may increase the transfer of diseases from infected to non-infected herds, such as uncontrolled movement of animals and animal products, lack of routine inspection of livestock, and uncontrolled slaughter of infected animals (Horby *et.al*, 2014).

The use of *Aloe spp*. is usual for the control of internal parasites in livestock. For example, a study conducted in South Africa showed *Aloe ferox* (different parts thereof and sometimes in combination with other plants or non-plant materials such as Epsom salts, flour, butter, potassium permanganate, rock salt and oil cakes) was the plant most used for controlling helminths in goats (Sanhokwe *et al*., 2016). Marandure (2016) also reported on the use of different *Aloe spp*. (*Aloe spicata*, *Aloe vera*) used for the control of internal parasites as well other conditions, such as Coccidiosis and treatment of septic wounds.

Conclusions

Although communal farming plays a role in poverty alleviation at central Bushbuckridge, communal farmers were faced with diverse challenges that could influence the production of healthy cattle herds and subsequent slaughter for safe meat production. These challenges can be attributed to a lack of knowledge on best farming practices related to cattle identification, stock theft, cattle diseases and control thereof, free range grazing patterns within the communities and exposure to household waste, the continued interface of livestock with wildlife and stray

dogs, and a lack of sanitary facilities for shepherds while guarding animals. Farming practices monitoring and training is key to ensuring compliance by farmers. Support to communal farmers by stakeholders, such as governmental Veterinary Services, farmer organizations and non-government organizations, is essential in (1) sharing information and training regarding farming practices, animal disease control and prevention, and (2) the creation of trading platforms. The results of this study can be used to influence decision makers on the importance of proper channeling of resources to support farmers in central Bushbuckridge, especially on issues of farming practices, stock theft and illegal slaughter practices.

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