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Investigation of Challenges Faced by Small-Scale Sheep Farmers in the Northern Cape (Hantam Karoo), South Africa

Zenda, M.[1] and Malan, P.J.[2]

Corresponding author: M. Zenda. Correspondence Email: mashyit@yahoo.co.uk

ABSTRACT

The study aimed to evaluate the challenges facing small-scale sheep farming systems and their production practices in the Hantam Karoo. The challenges facing small-scale sheep farming systems have been under scrutiny due to crises related to environmental, productivity and social issues. A better understanding of these unique responses could guide the development of improved strategies to increase small-scale sheep production in South Africa. Structured and unstructured questionnaires were used to collect data from 32 small-scale sheep farmers. The questionnaire includes both closed-ended questions and open-ended questions. The descriptive analysis was done by using the statistical package for the social sciences (SPSS version 22). The results revealed the following challenges faced by small-scale sheep farmers: overgrazing (54%), shortage of grazing land (85%), poor grazing veld (85%), poor condition of sheep (40%), predation (94%) and infrastructure issues (59%). Furthermore, sheep diseases, gender imbalance, lack of youth interest in agriculture, and lack of knowledge of the selection of specific traits were some of the challenges. In 2017, there was drought, which was responsible for poor grazing and poor conditions of sheep. Finally, the results revealed that agricultural extensionists need to address the shortage of grazing land, predation, infrastructure, livestock diseases, gender imbalances and selection of sheep for breeding to achieve sustainable development goals. Future studies should consider multi-criteria analysis when assessing the challenges of small-scale sheep farming systems in South Africa.

[1] Department of Sustainable food systems and development, Faculty of Natural and Agricultural sciences, University of the Free State, Republic of South Africa, mashyit@yahoo.co.uk

[2] Department of Animal, Wildlife and Grassland Sciences, Faculty of Natural and Agricultural sciences, University of the Free State, Republic of South Africa, +27(0)51 401 2685/2221, malanpj@ufs.ac.za

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1. INTRODUCTION

South African small-scale sheep farming systems face several challenges that affect their productivity. Some challenges facing small-scale sheep farmers under South African conditions include poor infrastructure and public support (Kongolo & Dlamini, 2012; Lee & Gambiza, 2022). Farm infrastructure is crucial in ensuring agricultural inputs are delivered to the market (Ntuli & Fourie, 2021). The quality and reliability of the infrastructure can have a significant impact on the success of the farm. Without adequate infrastructure, the farm may not operate efficiently and effectively. Samuels, Allsop and Hoffman (2013) and Samuels, Allsop and Hoffman (2021) reported that poor infrastructure of water points on land reform farms, especially in terms of access to clean water, influenced small-scale sheep farmers' decisions to return to their old commons, where they had access to reliable water sources. The new farms established under the land reform programme in South Africa are currently used by only a few wealthier farmers rather than the small-scale farmers they were intended for. In other locations, the presence of parasites and diseases limits their productivity and competitiveness (Nyam, Bahta, Oduniyi & Matthews, 2022).

Other challenges facing small-scale sheep farming systems include continuous grazing, poor veld conditions, frequent drought conditions, and insecure tenure rights (Zenda & Malan, 2021). These challenges undermine the economic, social and environmental aspects of sustainability as they affect the lambing of sheep and the productivity of the sheep farming system. These challenges may also expose small-scale sheep farmers to poverty since there will be no production on the farm due to drought.

Many agriculture institutions in most parts of the rangelands of South Africa believe that communal livestock farmers lack appropriate skills (Kirstein & Van Zyl, 1998; Sebei, Maccridle, & Webb, 2004), and this belief is supported by the "tragedy of the commons" argument, which states that individuals acting in their self-interest will ultimately deplete shared resources. (Sebei, Maccrindle & Webb, 2004; Allsopp, Laurent, Debeaudin & Samuels, 2007). The term "commons" refers to a shared resource available to a community. It is assumed that communal livestock farmers prioritise short-term profit over long-term sustainability, leading to the mismanagement

of natural resources. Different management practices in communal and commercial rangelands have led to differences in the management of livestock and their impact on the vegetation. As a result of these assumptions, communal livestock farmers are often blamed for degrading natural resources.

These challenges decrease the overall performance of sheep farming systems, which undermines their productivity. Coping with these challenges requires moving toward consensus on issues that matter most to the communities. Therefore, a study needs to be conducted on the constraints facing small-scale sheep farmers and management practices in the Hantam Karoo. The challenges faced by smallholder farmers are complex and multifactorial, and a comprehensive assessment of these challenges is lacking. It's important to have a holistic approach to sheep production, considering factors such as livestock breeding, health and disease management, environmental impact and farmers' perceptions. Because all of these factors are interconnected and can significantly impact the overall performance of the farming systems, a holistic approach to sheep farming is needed.

Additionally, there are limited studies on small-scale sheep farmers' challenges and production practices to improve their livelihoods in the Hantam Karoo in South Africa. There are studies conducted by Molotsi et al. (2017) and Zenda and Malan (2021) in South Africa; however, they concentrated only on sustainability indicators and limitations to the sustainability of small-scale sheep farming systems. Therefore, this research on challenges and production practices of small-scale sheep farming systems is important to fill the gap in knowledge and offer farmers decisions about production efficiency. The collective impact of the aforementioned aspects determines the success or failure of the sheep farming systems in place. Any alteration of one aspect systematically affects the whole sheep farming system. The aspects above are of greater importance and must be considered when assessing the challenges facing small-scale sheep farming systems. Examining these challenges could help inform agriculture extension programs that support sustainable sheep farming in the region. The sustainable development goals guide this research. Sustainable development goals are based on social equity and protection of the environment. In South Africa, sheep production systems are classified as either small-scale (subsistence) or commercial (intensive) production systems. Subsistence systems are typically found in communal areas, where farmers raise sheep for their consumption and income. Intensive

systems are usually found in commercial areas, where farmers raise livestock for sale or profit. Due to the dynamism and complexity of challenges facing small-scale sheep farmers, strategies towards sustainable development need to improve and evolve with time. This article provides an overview of the challenges facing small-scale sheep farming systems and their production practices.

2. MATERIALS AND METHODS

2.1. Study Sites and Sampling Procedures

A stratified sampling technique was used to select 32 small-scale sheep farmers from the following areas in the Hantam Karoo: Brandvlei, Nieuwoudtville, Loriesfontein and Calvinia. The sample frame was the list of registered sheep farmers in the province, which included individual farmers. Each district municipality was selected based on the number of small-scale sheep farmers and their own sheep. The criteria for including or excluding a district municipality were based on (1) the number of small-scale sheep farmers in the district and (2) the total number of sheep owned by the small-scale farmers in the district. In other words, the districts included in the study had a higher concentration of small-scale sheep farmers and a higher number of sheep owned by these farmers compared to other districts. In each district, a list of households owning sheep was obtained from the Department of Agriculture, Forestry and Fisheries (DAFF), which was used as a sampling frame.

Consequently, a stratified sample was drawn from household heads willing to participate in the study. In stratified sampling, the population is divided into subgroups, or strata, based on specific criteria. Then, a sample is drawn from each subgroup. In this case, the strata were based on the number of small-scale sheep farmers and the number of sheep they owned. Stratified sampling was chosen because the researchers wanted to ensure that each subgroup, or stratum, was represented in the sample. This is especially important when there is a lot of variation between subgroups.

2.2. Data Collection

Within the Hantam Karoo area, trained enumerators interviewed household heads using structured questionnaires in the local language (i.e., Afrikaans). A questionnaire was drafted and pre-tested

before being revised and administered. The questionnaire sought information on challenges facing small-scale sheep farming systems and their production practices in the study area.

3. RESULTS

3.1. Demographic Data of Farmers

Small-scale sheep farmers in the Hantam Karoo are dominated by men (78%), while 22% are women (Figure 1). These results indicate that gender imbalance is a huge issue that needs to be addressed since farming systems in the study area favour only men. The issue of gender imbalance is a problem in agriculture. It means less labour in agriculture, which may result in famine and food shortages. Agholor (2019) reported that improving the gender balance may reduce poverty and improve the economies of sub-Saharan African countries. There is a need for agriculture extension support that would benefit women and their families. Reducing the gender balance could help increase food security, agricultural productivity, and poverty (Maziya, Tirivanhu, Kajembo & Gumede, 2020).

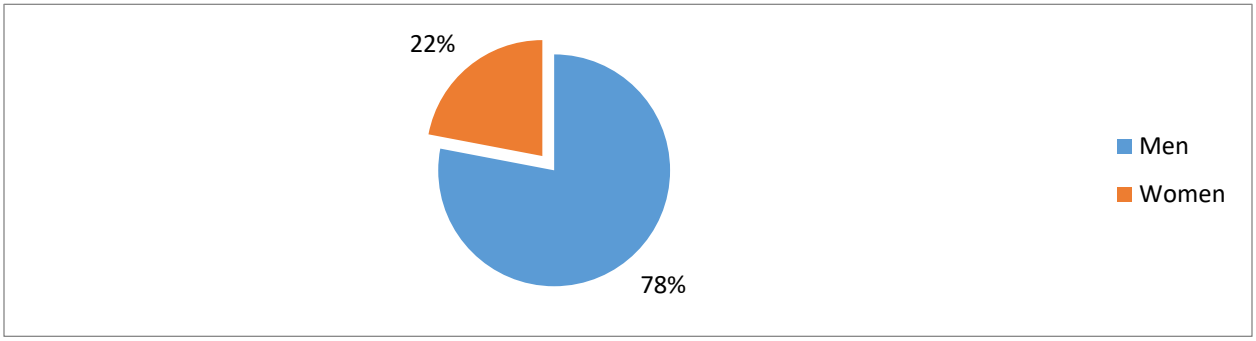

FIGURE 1: Gender Relationship Distribution Percentage of Respondents

Figure 2 illustrates the descriptive analysis of the characteristics of the youth in the study area. The study also shows that 6% of the respondents were younger than 35, while the majority were 61. These results indicate that the youth are not interested in agriculture, which could compromise the sheep farming systems. Chipfupa and Tagwi (2021) found similar results: KwaZulu-Natal, South Africa youth were not interested in agriculture. The issue of youth not being involved in agriculture is also a challenge that needs to be addressed in the study area. Due to stunted economic growth and unemployment, there is a need for solutions that benefit the youth via opportunities in

agriculture. Solutions that provide the youth with opportunities in agriculture are viable options to improve the livelihoods of rural youth.

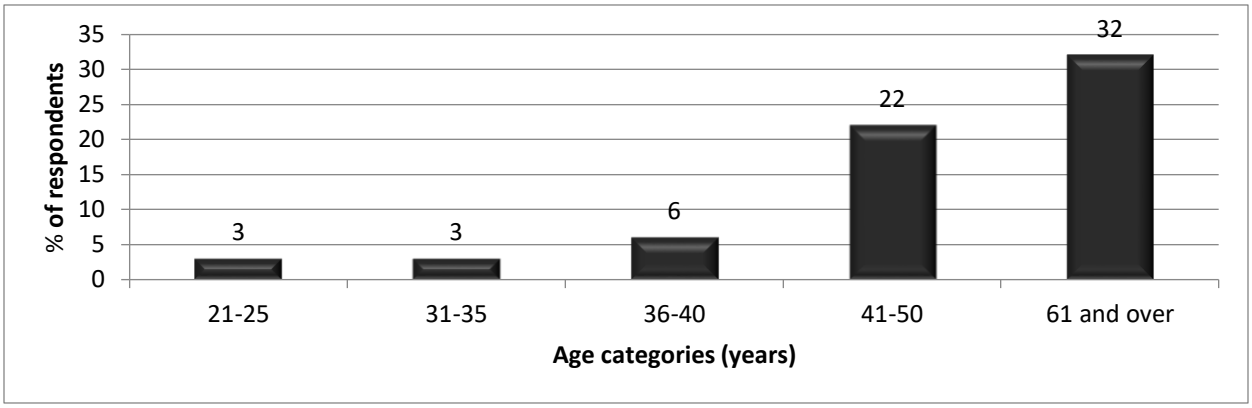

FIGURE 2: Age Relationship Distribution Percentage of the Respondents

3.2. Level of Education

There was a lot of variation between respondents regarding their level of education (Figure 3). It was found that 13% of the respondents have never been to school, while 50% went from grade R to grade 8, and about 19% went from grade 9 to grade 12 (Figure 3). Lastly, about 6% of the respondents matriculated, while about 13% had tertiary qualifications. However, the level of numeracy among respondents is reasonable. These results indicate that small-scale farmers' education level is sufficient to interpret and understand their challenges and production practices.

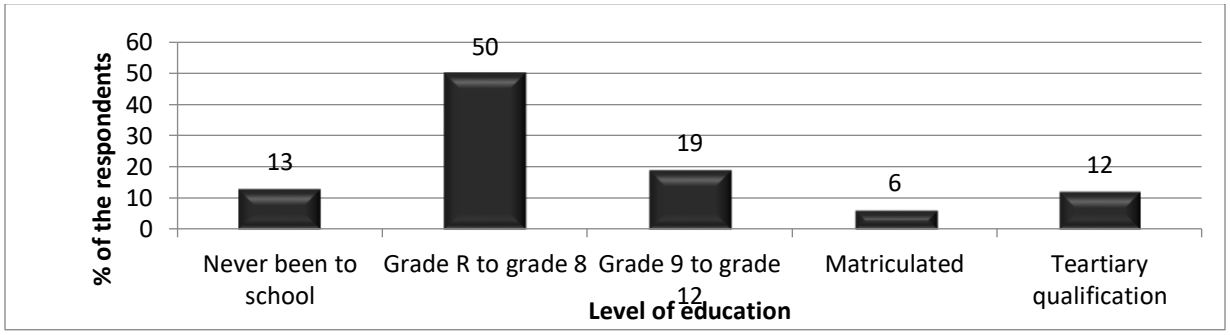

FIGURE 3: Level of Education of the Respondents

3.3. Challenges Facing Small-Scale Sheep Farmers

This section is based on the challenges facing small-scale sheep farming systems and their production practices in the study area.

Sheep production systems are often low-input, extensive systems that use natural resources to produce fibre and meat, particularly in harsh environments where other forms of agriculture are not possible (Mclaren, Lambe & Conington, 2023). In sheep production systems, the condition of sheep affects the success of sheep farming systems. Sheep farmers should know whether their sheep are in good condition (just right, too fat or too thin), as this enables farmers to make feed management decisions. The condition of sheep offers opportunities for poor resource sheep farmers to improve their sheep production systems when there is a need for improvements. Ewes require a level of resilience to deal with short-term challenges and a degree of robustness to allow them to be productive and survive in the medium to long term (Mclaren et al., 2023). Both robustness and resilience are important for the sustainability of sheep farming systems. The results indicate that 60% of the respondents are satisfied with the condition of their sheep, while 40% are not (Table 1). This suggests that the condition of the sheep is an issue that has to be addressed. In an extension approach, the condition of sheep can be improved through supplement feeding with silage, hay or grain during drought seasons and during winter conditions when the veld condition is poor. In addition, providing adequate shelter, regular hoof trimming and deworming can help improve the sheep's condition.

TABLE 1: Degree of Respondents' Satisfaction with the Condition of the Sheep

Are you satisfied with the condition of your sheep?		**Frequency**	**Percentage (%)**
	Yes	19	60
	No	13	40
	Total	32	100

For the respondents who were unsatisfied with the condition of their sheep, about 54% indicated that this was due to overgrazing of veld, 69% claimed there was a shortage of grazing land, and 85% said that the grazing veld was poor (Table 2). This is a clear indication that the condition of sheep may be affected by a combination of overgrazing of veld, shortage of grazing veld and poor grazing veld. Todd et al. (2009), Molotsi et al. (2017), and Zenda and Malan (2021) found similar results that overgrazing and a decline in plant biodiversity are common in small-scale sheep farming systems in South Africa. Overgrazing has significant consequences on the livelihoods and

vulnerability of small-scale sheep farmers, exposing them to various risks. In many communal grazing areas of South Africa, rangeland deterioration has negatively affected sheep production due to overgrazing (Mudau et al., 2022). Overgrazing causes a decline in palatable grass species and an increase in less nutritious plants, such as shrubs and bushes. This reduces the rangeland's carrying capacity, affecting sheep's productivity. Therefore, there is a need for veld monitoring to determine whether grazing management techniques prevent overgrazing to meet sustainable resource utilisation goals. Furthermore, Allsopp et al. (2007) found similar results: there is a shortage of grazing land in the communal areas of Liliefontein in Northern Cape Province. Shortage of grazing land has a significant effect on the stocking rates of livestock. This means that if there is a shortage of grazing veld, farmers will be forced to reduce their stocking rates to meet sheep's feed requirements. This may result in the farmers producing sheep of low market value and unproductive livestock. Solutions could include improving veld management practices such as rotational grazing to address the challenge of poor grazing veld. This allows the veld to rest and regrow between grazing periods, which helps to prevent overgrazing and maintain the productivity of the veld. These results indicate that the issues of overgrazing of veld, shortage of grazing veld, and poor veld must be addressed.

TABLE 2: Percentage of the Respondents Not Satisfied with the Condition of Sheep

If not satisfied with the condition of sheep, for what reasons are you not satisfied?	Frequency	Percentage (%)
(i) There is overgrazing of veld	17	54
(ii) There is shortage of grazing veld	22	69
(iii) The grazing veld is poor	27	85

The other challenge small-scale sheep farmers face in the Hantam Karoo is sheep disease. Such diseases may affect the productivity of farming systems. Small-scale farmers keep small herds of livestock; thus, each loss means a source loss of livelihood (Zantsi & Nkunjana, 2021). This study found that 34% of the respondents indicated that yellow fever diseases are affecting their sheep, while pulpy kidney (25%), blue tongue (25%), botulism (9%) and sheep bloat (25%) were also concerned (Table 3). This means that the issues of yellow fever, pulpy kidney, shrinkage disease,

botulism and sheep bloat must be addressed. The high prevalence of diseases is a serious problem for small-scale sheep farmers' production, particularly in drier karoo areas. High occurrence of diseases may cause high mortality rates among lambs, which may result in low reproductive performance in sheep production systems. The high prevalence of diseases may be due to the high costs of vaccines and drugs and the visibility of livestock extension officers. The most vulnerable (pregnant and lactating ewes and lambs) should be vaccinated against yellow fever, pulpy kidney, blue tongue and botulism.

At present, there is no vaccination program to control the diseases above. Sheep in this category need more treatments as this can reduce unnecessary treatment of other groups of sheep that can carry parasites. Sheep bloat can be classified as a metabolic disorder (Strauss, Avenant & De Waal, 2021). Sheep bloat can be prevented through proper nutrition for feeding livestock. By comparison, the losses due to botulism diseases were lower. Bluetongue virus is a single-stranded RNA virus that belongs to the genus Orbivirus, which is part of the family Reoviridae (Abera et al., 2018). Bluetongue virus is spread mainly by the bite of infected Culicoides midges, also known as "biting midges" or "no-see-ums". These small flies serve as the vector for the virus, meaning they can carry and transmit the virus to susceptible sheep. Several strategies can be used to prevent bluetongue virus infection in sheep. The most important strategy is to prevent biting midges from coming into contact with sheep. This can be done by keeping sheep indoors when midges are active and using fly screens and insecticides to control midge populations. Another strategy is to vaccinate sheep against the bluetongue virus. This is especially important for sheep at high risk of exposure, such as those in areas where the virus is endemic. In addition, good husbandry practices such as proper drainage and sanitation can help reduce the risk of midge breeding sites.

Pulpy kidney is a disease caused by the toxins secreted by Clostridium perfringens type D organism and obligate anaerobic rod bacterium (Dadhich et al., 2021). This bacterium is normally found in the gut of healthy animals but can become pathogenic under certain conditions. When the bacteria multiply rapidly, they produce toxins that can damage the intestines and cause severe diarrhoea, abdominal pain and shock. In some cases, the toxins can spread to the bloodstream and cause multiple organ failure and death of sheep. can be used to prevent pulpy kidney disease. It is

important to keep sheep in good health; as stressed as ill, sheep are more susceptible to infection. Additionally, vaccination against the disease can help to prevent outbreaks.

Botulism is a fatal disease that can affect sheep. It is caused by the bacteria Clostridium botulinum (Otter & Uzal, 2020). Symptoms of botulism in sheep include muscle weakness, paralysis and difficulty in breathing. The disease can be fatal if not treated. Still, it can be prevented by vaccination, maintaining good sanitation on the farm and feeding sheep hay that has been adequately cured to avoid the growth of Clostridium botulinum.

The results indicated that most of the respondents encountered yellow fever (34%), followed by pulpy kidney (25%), blue tongue (25%) and sheep bloat (25%). It is also important to note that the local South African communities need good record-keeping to monitor and control these diseases. To achieve this, there is a need for holistic support from the Department of Agriculture, Forestry and Fisheries (DAFF).

TABLE 3: Percentage of the Respondents to Sheep Diseases Encountered on the Farms

Sheep diseases encountered on the farm	Frequency	Percentage (%)
(i) Yellow fever	11	34
(ii) Pulpy kidney	8	25
(iii) Bluetongue	8	25
(iv) Botulism	3	9
(v) Sheep bloat	8	25

Diseases are a major cause of economic losses in sheep production systems because they can lead to the death of sheep. Disease control and management are important to maintain the health and productivity of small-scale sheep farming systems. A critical aspect of disease control management in small-scale sheep farming systems is creating and maintaining a flock health plan. The study revealed that 3% of the respondents use private veterinary services, 31% use government veterinary services, 16% use veterinary chemists, 38% use other methods, and 6% use extension services (Figure 4). Lastly, 3% of the respondents use government veterinary and extension services. The results indicate that government veterinary and other services are used most, while

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private veterinary and a combination of government veterinary and extension services are being used least. Private veterinary services may not be used primarily due to the high costs involved. It can be concluded that even small-scale sheep farmers in the study area may improve their livestock through veterinary services, as farmers may lack the resources and knowledge to control diseases on their own.

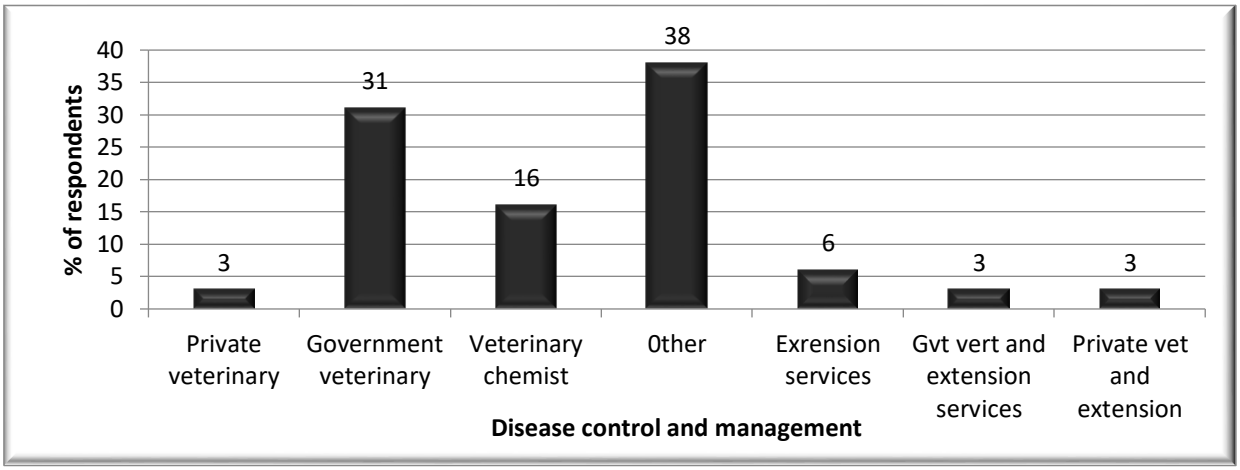

FIGURE 4: The Percentage of the Respondents for Disease Control and Management

Methods to control farm parasites during wet and dry seasons are important. During the wet and dry season, parasite control measures can include spray, traditional methods and government extension services. The results show that 19% of the respondents use traditional methods to control parasites during the wet and dry seasons, 78% use spray, and 3% use government and extension services (Table 4). This shows that small-scale farmers in the area are more aware of using sprays to control parasites than of traditional methods. Using spray to control parasites during wet and dry seasons is more effective and expensive. Under these circumstances, small-scale sheep farmers may be forced to develop their traditional remedies to control parasites, which are sometimes ineffective. Using spray effectively controls external parasites and may help increase and improve the performance of the sheep kept. There is also a need for caution when using natural remedies to control parasites to avoid the wrong dosage, as this may damage sheep's skin.

TABLE 4: Respondents' Methods Used to Control Parasites During Wet and Dry Seasons

How do you control parasites during the wet and dry seasons?		Percentage (%)
	Traditional	19
	Spray	78
	Both	3
	Total	100

Predation can cause direct economic losses through the loss of sheep, and it can also cause indirect losses through increased stress and reduced productivity. The results from the study indicate that predators are one of the biggest challenges for small-scale sheep farmers in the area, with 94% of the respondents indicating that they face problems with predators and 6% indicating that they do not (Table 5). Predation is common in many rural communities of small-scale sheep farmers. It directly influences the economic and social well-being of farming since many sheep farming systems are largely farmer-dependent. Allsopp et al. (2007), Meissner et al. (2013), and Strauss, Avenant and De Waal (2021) reported a similar problem of predation as the major concern in small-scale farming systems in South Africa. Predation is a bigger threat to sheep welfare (Montossi et al., 2013; Strauss et al., 2021; Maluleke, Mpatheni & Nkosi, 2022). This is because sheep cannot defend themselves compared to other livestock. With this kind of response raised by farmers in the study area, there is no doubt that there will be more sheep deaths due to predation. The issue of predation may reduce the sheep numbers in the study area. This indicates that the predator problem needs to be addressed as soon as possible. Predation can be controlled by regularly maintaining fences on the farm. Sheep may crawl under poorly erected fences, resulting in attacks by jackals; therefore, the farms need proper fences. Several strategies can be used to prevent predation, including livestock guarding dogs, predator-proof fencing, and deterrents such as lights and noise-makers.

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TABLE 5: Percentage of Respondents with a Problem of Predators in the Farming Systems

Do you have problems with predators?		Frequency	Percentage (%)
	No	30	6
	Yes	2	94
	Total	32	100

Farm infrastructure plays a critical role in the health and productivity of small-scale sheep farming systems. Good infrastructure may reduce the risk of diseases, improve production efficiency and increase sheep productivity. The study's results demonstrated that infrastructure is also a challenge small-scale sheep farmers face. The results show that 59% of the respondents face infrastructure problems, while 41% do not (Table 6). This agrees with the findings of Van der Merwe, Van Rooyen and Van Rooyen (2008), who reported that in the Hantam Karoo, there is a lack of infrastructure due to low income in the farms and unfavourable conditions. Benseler (2003) further reported that in the Hantam Karoo, there is a problem with poor infrastructure conditions and a lack of responsibility to maintain the infrastructure. Inadequate infrastructure in terms of fencing has a higher incidence of predator movement along the fence line and hole utilisation by medium and small predators. Good infrastructure in terms of fences significantly reduces predator movement from different farms. In addition, adequate infrastructure facilitates agricultural inputs and outputs to the market (Ntulie & Fourie, 2021). Poor infrastructure in the Hantam Karoo may be attributed to the municipalities' lack of management and maintenance of commonage land. This indicates that this challenge needs to be addressed as soon as possible. To address the challenges of poor infrastructure on a farm, it's important to identify specific areas that need improvement. Once the specific challenges have been identified, the next step is to develop a plan to address them. This may involve improving existing infrastructure, such as repairing fences or investing in new infrastructure.

TABLE 6: Percentage of the Respondents Facing a Challenge of Infrastructure

Are you facing a challenge of infrastructure?		Frequency	Percentage (%)
	No	13	41
	Yes	19	59
	Total	32	100

It is also important to consider that breeding is vital for the productivity of small-scale sheep farming systems. Animal breeding practices can be used to improve the productivity of small-scale sheep farming systems, but they must be targeted to the constraints and opportunities of those farming systems (Molotsi et al., 2017). The results show that 94% of the respondents indicated keeping male sheep for breeding, while 6% indicated keeping male animals for other purposes (Table 7). This shows that small-scale farmers in the area are aware of keeping male animals for breeding practices to achieve sustainable sheep production.

TABLE 7: Percentage of Respondents Keeping Male Sheep for Breeding Purposes

Reasons for keeping male sheep		Frequency	Percentage (%)
	Breeding	30	94
	Other	2	6
	Total	32	100

It is also important to consider selection processes for the breeding of animals to enhance the reproductive performance of sheep farming systems. Through genetic selection, small-scale sheep farmers can improve their sheep's breed. The results indicate that 69% of the respondents selected males according to the size of the animals (Table 8). Furthermore, 22% of the respondents indicated choosing males according to colour, 41% temperament and 3% performance (Table 8). These results suggest that small-scale sheep farmers do not consider performance when selecting male animals. Performance is of paramount importance for the breeding of sheep, as it enables one to have a better sheep flock. These results indicate that small-scale sheep farmers are unaware of breeding practices. However, these results are similar to those of Kongolo and Dlamini (2012) and

Molotsi et al. (2017), who reported that small-scale sheep farmers use breeds without good knowledge of the selection of specific traits.

TABLE 8: Reasons for Selecting Male Animals (Percentage)

How do you choose males?	Frequency	Percentage (%)
(i) Size	22	69
(ii Shape	26	81
(iii) Colour	25	78
(iv) Temperament	13	41
(v) Performance	1	3
(vi) Hardiness	16	50

Furthermore, this study found that 81% of the respondents selected the male sheep according to the shape of the animal, while 19% did not (Table 8). This indicates that small-scale sheep farmers are very concerned with maintaining the shape of their animals.

The study found that 50% of the respondents indicated that they select male animals according to hardiness, while 50% indicated that they do not (Table 8). This shows that small-scale sheep farmers are not very concerned about the hardiness of their sheep farming systems. Therefore, the issue of breeding to enhance hardiness has to be addressed since the Hantam Karoo region is a harsh climatic region for sheep production.

Lastly, in the present study, 82% of the respondents use natural methods for mating the livestock, 9% use insemination, and 9% use a combination of natural methods and group paring (Figure 5). The results indicate that the small-scale sheep farmers in the study area may not be practising insemination and a combination of natural and group paring due to the high costs involved.

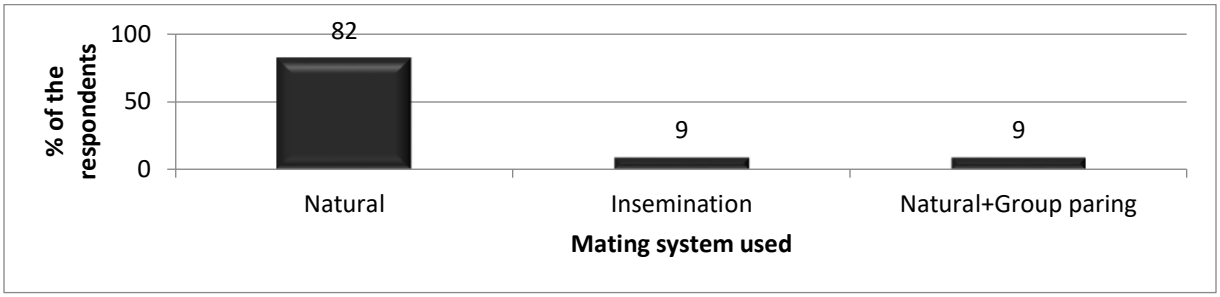

FIGURE 5: Mating System Used (Percentage)

Breeding season is also important for sustainable sheep farming systems. The results show that 59% of the respondents breed in winter, 3% of the respondents breed in autumn, spring, and summer, 13% of the respondents breed in autumn, and 19% breed in winter and summer (Figure 6). This indicates that the respondents know that breeding in winter is important because the feed will be available, and the veld is better in most cases due to the good rains experienced in that season.

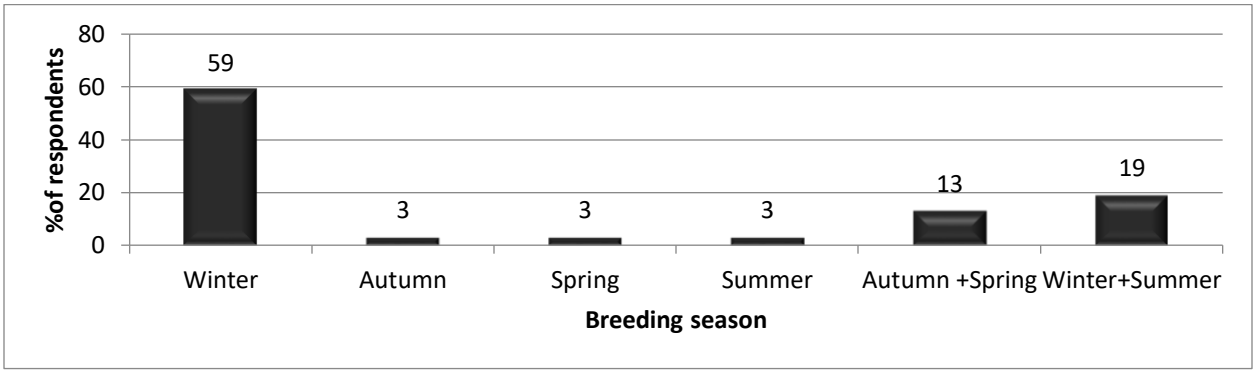

FIGURE 6: Selected Breeding Season (Percentage)

4. CONCLUSION AND RECOMMENDATIONS

This study aimed to evaluate the challenges facing small-scale sheep farmers in the Hantam Karoo, South Africa. In the Hantam Karoo, limited studies have been conducted on the challenges faced by small-scale sheep farmers and their production practices. Additionally, understanding the challenges and production practices of small-scale sheep farmers in the study area could help to inform agriculture extension interventions that can support these farmers and improve their livelihoods.

From the results, it was found that small-scale sheep farmers are facing the following challenges: overgrazing (54%), shortage of grazing land (85%), poor grazing veld (85%), poor condition of sheep (40%), predation (94%) and infrastructure issues (59%). Some potential solutions to overgrazing could include providing farmers with sustainable grazing practices and establishing fodder banks. Solutions could include improving veld management practices such as rotational grazing to address the challenge of poor grazing veld. This allows the veld to rest and regrow between grazing periods, which helps to prevent overgrazing and maintain the productivity of the veld. Predation can be controlled by regularly maintaining fences on the farm. The condition of sheep can be improved through supplement feeding with silage, hay or grain during drought seasons and during winter conditions when the veld condition is poor. The challenge of infrastructure can be addressed through making improvements to existing infrastructure, such as repairing fences or investing in new infrastructure.

In addition, livestock diseases, gender imbalance, lack of youth interest in agriculture and lack of knowledge for selection for specific traits were some of the challenges. To address the issue of diseases, the local South African communities need good record-keeping to monitor and control these diseases. Gender imbalance can be addressed through support from agriculture extension that would benefit women and their families. Reducing gender balance could help to increase food security and agricultural productivity and reduce poverty (Maziya et al., 2020). Youth should also be encouraged to be involved in agriculture.

In 2017, there was a drought, which was responsible for poor grazing of veld and poor conditions of sheep. Finally, the results revealed that agricultural extensionists need to address the shortage of grazing land, predation, infrastructure, livestock diseases, gender imbalances and selection of sheep for breeding to achieve sustainable development goals. Future studies should consider multi-criteria analysis when assessing the challenges of small-scale sheep farming systems in South Africa. Multi-criteria analysis can provide a more comprehensive assessment of the challenges and possible solutions.

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