



# Prevailing management practices and perceived causes of mortality in pregnant does under free ranging farming systems in the Central Eastern Cape Province of South Africa

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## 1 SUMMARY

The aim of the study was to assess the prevailing management practices for pregnant does in some selected villages well known for goat farming in the Central Eastern Cape Province of South Africa. A structured questionnaire was used to collect data from 153 farmers using the snowball sampling technique. Collected data were analysed using PROC FREQ and Chi Square tests of the SAS (version 1.9 of 2003) software packages. The result showed that 98.7% of the interviewed farmers depended solely on natural graze land for their pregnant does to feed on. The majority of the farmers (59.9%) did not vaccinate their does against diseases before using them for breeding purposes. An average of 77.8% farmers allowed their does to mate freely on the veld. The majority of the farmers (75.2%) kept their pregnant goats together with other flocks in kraals fenced with branches and with no roof. About 66.7% farmers perceived that quality diet is a factor that would boost the performance of pregnant goats. The present results showed that pregnant goats are raised under deprived conditions with poor management facilities such as uncondusive housing environment, lack of vaccination programme and poor supplementary feeding scheme. Factors such as poor quality feed and disease among others were indicated by farmers to cause mortality of pregnant does.

## 2 INTRODUCTION

The impact of goat farming is crucial in the livelihoods of many people because it forms an essential economic and ecological vocation for them (Devendra, 2001). In most cases, goats are raised by rural people with limited resources in developing countries (Escareno *et al.*, 2013). Generally, due to financial constraint, local farmers in the Eastern Cape are unable to provide good housing for their goats thereby exposing them to unfavourable weather conditions, which negatively affects their productivity (Rumosa-Gwaze *et al.*, 2009). The absence of adequate infrastructure (such as

paddock) and poor breeding programme (random mating) employed by communal farmers usually give room for inbreeding (Saico and Abul, 2007). Consequently, goats (such as Boer, Swiss alpine, Angora, Saanen, Nguni breed) raised under extensive system of farming in South Africa are customarily poor in terms of their body condition because of the lack of proper care and this affects the reproductive performance of pregnant does (Snyman, 2010). Death may also occur during parturition for does raised under poor condition (Snyman, 2010). Managing goats during pregnancy is a



key aspect for sustaining continual production of these livestock. This is because pregnant goats are exposed to high metabolic risk because of the foetus that they carry (Mahmoud and Azab, 2014). Besides, when pregnant does are not properly managed during pregnancy, it may lead to abortions, which could cause wastage of foetuses that are supposed to serve as replacement stock (Slayi *et al.*, 2014). The mortality rate of goats in communal areas has been reported to be as high as 40.6% of which

can be improved significantly through effective management practices (Webb and Mamabolo, 2004). There is limited information regarding the prevailing management practices adopted by rural farmers for pregnant does raised in communal areas in the Eastern Cape Province. This study was aimed at revealing some prevalent management practices implemented by goat keepers and their perceived causes of mortality of pregnant goats reared in a rural community setting.

### 3 MATERIALS AND METHOD

**3.1 Study site:** The study was conducted in three different rangelands where goat farming is a major practice by rural dwellers of the Eastern Cape Province of South Africa. Seventeen different villages including Nchaba, Zibi, Xesi, Khayamnandi, Xolani, Ngewazi, Pewuleni, Mqayisa (sweet veld area), Mbizana, Ntselamanzi, Lower Gqumashe, Upper Gqumashe, Gxwederha (mixed veld area) and Makhuzeni, Hala, Gomaro, Kwezana (sour veld area) participated in the study. The study area lies at an altitude of 522 m above sea level with GPS coordinates of 32°47'S26°50'E. It receives a mean annual rainfall of 500 mm and the highest mean temperature is recorded in January (22°C) and lowest in July (9°C). The vegetation of the area is composed of pastures, trees and shrubs that can successfully support livestock farming.

**3.2 Data Collection:** The snowball sampling technique was used to collect data from goat farmers in seventeen different villages that participated in the study. The villages represented three veld types where

several livestock husbandry, including goat farming is practised. A total of one hundred and fifty three goat farmers were interviewed. Farmers were asked questions that focused on demographic characteristics of the household, level of education, knowledge in goat farming, flock size, reasons for keeping goats, diseases and management practices for pregnant goats. Furthermore, questions on the perceived causes of mortality and farming areas that needed improvement for pregnant goats were asked from the respondents. Trained personnel that were well informed in both the local (IsiXhosa) and English language were hired to administer the questionnaires to the goat farmers. All the respondents were Xhosa speaking farmers residing in the Eastern Cape Province of South Africa.

**3.3 Data analysis:** Data collected from the study were analysed using PROC FREQ and Chi Square test ( $P < 0.05$ ) of the SAS (version 1.9 of 2003) software packages.

### 4 RESULTS

**4.1 Goat farmers' demography:** The results showed that more men practised goat keeping than women. Many of the respondents involved in goat farming were above the age of 60 years. Most goat-keepers did not have any

school education while a few of them had tertiary education. The summary of goat farmers' demographic information is presented in Table 1.



**Table 1:** Demographic information of goat farmers' from selected villages in Central Eastern Cape Province of South Africa

<b>Farmers' demographic information</b>	<b>Proportion (%)</b>
<b>Gender</b>	
Male	59.5
Female	40.5
<b>Age group (years)</b>	
< 30	9.2
31-40	7.2
41-50	14.4
51-60	29.4
> 60	39.9
<b>Level of education</b>	
Did not go to school	43.8
Below grade 12	31.4
Grade 12	17.0
Beyond grade 12	4.6
Tertiary education	3.3
<b>Training in goat keeping</b>	
Yes	24.2
No	75.8

The average flock size of goats was 16 (range from 2-170). Farmers kept goats for various reasons which included ceremonies (38.6%), income generation (26.8%), income + ceremonies (19%), income + meat + milk + ceremonies (9.2%), meat (3.3%), income + meat + ceremonies (1.3%), income + meat (1.3%).

**4.2 Mating system used by goat farmers:** There was a relationship ( $P < 0.05$ ) between farmers' education, agricultural

training and knowledge about different mating systems for goats (Table 2). Most goat farmers (77.8%) allowed their female goats to mate freely with bucks in the veld. Other respondents (19.0%) used positive assortive type of mating system (i.e. using the best buck in their flock to mate female goats). Few farmers (3.3%) were unsure of the type of mating system that they were using for their dams.

**Table 2:** Relationship between demographic factors and farmers' perceive knowledge in management practices for improving pregnant does' performance.

<b>Demographic aspect</b>	<b>Mating system</b>	<b>Supplementary feeding</b>	<b>Type of housing</b>	<b>Size of pen</b>	<b>Vaccination</b>
<b>Gender</b>	NS	NS	NS	*	NS
<b>Age</b>	NS	*	NS	*	NS
<b>Education</b>	*	*	*	NS	*
<b>Agricultural training</b>	*	*	*	NS	*

Significant at  $*P < 0.05$ , but NS not significant at  $P > 0.05$



**4.3 Breeding season for goats:** The breeding season perceived to be most appropriate for goats by farmers was spring (Table 4). The buck to doe ratio as observed in this study was 1:17. Ordinarily, the

recommended breeding ratio (buck to doe) ranges between 1: 30 or 1:35 for mature male goat. An estimate of 43.1% farmers did not have their own bucks and so, used bucks from other farmers to mate their dams.

**Table 3:** Relationship between demographic factors and farmers perception on the effect of supplementary diet on pregnant dams' performance

Demographic aspect	Death of pregnant dams	Low milk production of dam	Survivability index for pregnant dam
<b>Gender</b>	NS	NS	NS
<b>Age</b>	NS	NS	*
<b>Education</b>	*	*	*
<b>Agricultural Training</b>	*	*	NS

Significant at \*P <0.05, but NS not significant at P> 0.05

**Table 4:** Management practices adopted for pregnant dams by communal farmers from selected villages in Central Eastern Cape Province, South Africa

Number of respondents =153	
Farmers' response on management aspect for pregnant does	Proportions (%)
<b>Housing</b>	
Kraal	75.2
Stall/shed	21.5
Yard	0.7
Kraal and shed	2.6
<b>Health</b>	
Vaccination of female goats before birth	
Yes	40.5
No	59.5
Vaccination of buck	
Yes	30.1
No	68.9
<b>Vaccination program for goats against specific disease by farmers</b>	
Heart water	11.1
Miscarriage	2.6
Gall sickness	2.6
Foot rot	7.8
Bile	3.9
Red water	0.7
<b>Breeding season</b>	
Winter	19.0
Summer	15.0
Autumn	14.4
Spring	49.0
Not sure	2.0
Any time	0.7

<b>Number of does per pen from 1<sup>st</sup>-5<sup>th</sup> month of pregnancy</b>	
1	3.9
2-3	8.5
4-5	18.3
5	28.8
Kept all flock together (including pregnant, non-pregnant, buck, kids)	42.5
<b>Source of drinking water for dam</b>	
Dam/pond	35.9
River	50.3
Spring water	0.7
Tap water	11.1
Dam and tap water	2.0

#### 4.5 Feeding practices for pregnant does:

The majority of the farmers (98.7%) allowed their pregnant does to graze freely on the veld, which was composed of grasses, shrubs and trees while very few farmers used tethering (0.7%) and herding system (0.7%). Some farmers (46.4%) indicated that they gave supplementary feeds to pregnant goats while others (27.5%) did not give any supplementary feeding to pregnant goats. Some farmers indicated that they gave roughage in dried forms (17.0%), minerals and vitamins (5.2%), formulated feed (2%) and maize (2%) as supplementary feed to pregnant dams. The specific feed resource given to pregnant does

included pastures (55%), *Acacia karroo* (fig. 1) and Lucerne (21%), mixture of tree and pastures (21%), tree alone (2%) and others (1%). There was a relationship ( $P < 0.05$ ) between farmers' education, training in agriculture and the knowledge of supplementary feeding of does as a factor that improved goat performance during pregnancy. Table 3. The source of water available to pregnant goats for drinking while grazing on the veld is usually from the dams/ponds and most of the farmers (80.4%) reported that they do not change their source of water.



**Figure 1:** Picture showing *A. karroo* leaves

#### 4.6 Housing system for pregnant does:

Most farmers kept their pregnant goats in the kraals (fig. 2). This is a floor type of goat

housing locally built for goats. The material used for making the kraals by a number of the farmers (64.7%) was untreated trees and

shrubs. Judging from a visual appraisal, one could note that most farmers use dried *Acacia karroo* plant to make their kraals. Other farmers reported using iron sheets (22.9%), treated wood (7.8%), a combination of untreated mud iron sheets (2.6%), wire gauge (1.3%) and mud

(0.7%) to house their pregnant does at night when they return from the veld. A descriptive summary of the management practices adopted by communal goat farmers for pregnant does in the study area is further presented in Table 4.



**Figure 2:** A goat kraal made with branches from *A. karroo* plant

**4.7 Mortality indicators and improvement indexes for pregnant goats as perceived by farmers:** The majority of farmers (66.7%) were of the view that quality feed is an essential aspect of goat husbandry that will significantly boost the productivity and performance of pregnant does with respect to kidding and milk production. This was followed by drugs for goats (7.8%), quality feed + expertise (2.6%) and expertise (0.7%). The perception of farmers regarding the factors that cause mortality of pregnant goats before and after kidding showed that poor feed (32%) accounts for death in pregnant goats. The other factors that caused death as perceived by farmers were disease (24%), predators (15%) and old age (7.2%). There was a relationship between farmers' education, training in agriculture and perceived causes of mortality in pregnant dams. Personal communication with farmers revealed that goat keepers usually experience more droughts during the winter season than any other season of the year. Conversely, some farmers (40.5%) were of the opinion that low milk production by newly

kidded goats in most cases was due to poor or lack of forage during drought (including winter) season. Most goat-keepers (83.0%) were of the view that winter season plays a role in kid mortality compared to other seasons of the year. Shortage of quality feed (76.15%) and cold weather (12.05%) were the specific factors that were indicated to be possible reasons for kid mortality during the winter season. The other causes of kid mortality as perceived by farmers were poor mothering ability (58.2%) and predation by jackals (25.5%). A large proportion of farmers (64.7%) reported that their goats produced enough milk to feed their kids after birth. The daily milk yield per goat in the study area ranges between 0.125-2 l (Masika and Mafu, 2004). Other farmers (35.3%) reported that their goats did not produce sufficient milk for their kids. Foster mothers (66.7%) were used to feed newly born kids when does did not produce sufficient milk for their offsprings. Farmers with large flocks reported that they bought colostrum milk (powder form) from shops (17.6%) to feed newly born kids (100g of dry powder milk



mixed in 1 litre of water) while others (11.8%) did not feed their kids with anything when their dams do not produce sufficient milk. On housing for newly kidded does, most goat keepers (54.9%) did not provide a separate pen for dams and their newly born kids. Newly kidded dams were kept together with their offsprings and the rest of the flock in the same kraal. Some farmers (24%) separate newly born kids from their dams into a separate kraal. Either the kids were left to be with their

mothers in the same kraal or they were sometimes kept in special kid boxes (24%) made from wood to provide warmth for them. At three weeks of age, some farmers (38.6%) indicated that they release kids to graze with their dams in the veld. Some farmers (37.3%) reported that they release kids to graze with their mothers in the veld as soon as the kids were strong enough, judging from their physical appearance.

## 5 DISCUSSION

The results from the current study showed that more males participated than females in goat husbandry and this is in line with the findings of Chah *et al.* (2013). A possible reason for the unbalanced gender interest in goat keeping may be that goat farming sometimes requires energy and time of which women may not be willing to put into farming (Oluwatayo and Oluwatayo, 2012). In addition, according to a report from Ayodele *et al.* (2009), most women are usually involved in several domestic activities that could contribute to their lack of interest in livestock farming. Goats were kept by farmers for various reasons. More importantly, goats were kept largely for ceremonies and for income generation. The current findings were consistent with the report by Rumosa-Gwaze *et al.* (2010). Similarly, goats were kept by rural people as part of their vocation like in other developing countries where they use them for income generation, paying of dowries and for household consumption (Hassen and Tesfaye, 2014). Goat keepers in this study showed that most respondents practice random mating system for their goats. This practice is also common in rural areas in several other countries of the world (Semakula *et al.*, 2010). The resultant effect of this type of mating system could lead to inbreeding (Rumosa-Gwaze *et al.*, 2010). Most farmers in the area were of the view that the best mating time they would prefer for their goats is in autumn. Their reason for this was because when goats conceive in autumn, they give birth in spring and during this time, there would be abundance

of quality forage in the veld. Most farmers allowed their goats including pregnant dams to feed in the pastures during the day and at night; they return them to the kraal. Similar findings were reported by Debele *et al.* (2013). Supplementary feeding of pregnant dams was only practiced by few farmers especially those with large flocks. The reason why most farmers did not supplement their pregnant dams could be that they earn low salaries. Providing goats with good feed and supplements during pregnancy play a very important role in doe performance before and after parturition (Snyman, 2010). Grasses were usually used for feeding pregnant dams. Most farmers reported that their pregnant goats feed on *Acacia karroo* while grazing on the veld. This is because *Acacia karroo* plant is an alternative feed resource that is widely distributed throughout the year in the study area and it is easily accessible by farmers (Mapiye *et al.*, 2011). Several studies have indicated the use of *Acacia* plant species as a potential food resource to improve productivity of ruminant animals (Mapiye *et al.*, 2011). The kraals constructed for goats by most farmers in the study area were made from untreated *Acacia karroo* branches. These kraals in most cases are made in the form of fences without any roof to cover the top. This finding concurred with a study by Rumosa-Gwaze *et al.* (2010) who also reported that goats are kept in poor housing structures in communal areas of that region. The kraals were customarily built near the houses of farmers. This is intended to curb incidences of theft as



reported by farmers (Tsegaye, 2009). Observations of some of the kraals inspected during the study showed that most farmers do not properly maintain their kraals where does were kept. Kraals were littered with animal dung, this could be a breeding ground for pathogens that may pose a problem to pregnant goats (such as foot rot), and the entire flock kept together inside the kraals. Poor housing and unhygienic conditions is likely to contribute to high mortality of pregnant goats. Exposing pregnant goats to poor housing condition could affect the performance of pregnant animals during harsh weather (Van den Burg and Jansen, 2004). The ideal goat pens are usually constructed in an elevated platform with slated wooden floors that would allow for ease of cleaning of the pen house (Tsegaye, 2009) and prevents animals standing in the dung which results in foot rot (Slayi *et al.*, 2014). However, farmers in the study area reported that they do not consider space when stocking their pregnant goats in kraals. This reflects their limited knowledge on the need for proper animal management and welfare for pregnant goats. Heart water, foot rot and gall sickness were the specific diseases that affect pregnant goats as reported by farmers in the area. These diseases are livestock diseases caused by ticks that are common in the study area (Muchenje *et al.*, 2008). Slayi *et al.* (2014) in their study reported that lack of dipping and dosing of goats to control ticks could be responsible for the cause of infection to tick-related diseases in goats within communal areas in the Eastern Cape. The major environmental factor that

may cause death and/or reduce productive performance of dams during pregnancy as perceived by farmers in the study area was feed. Shortage of quality forage is a major challenge of livestock animals in communal farming system (Battini *et al.*, 2014). Feed shortage is usually experienced during winter season as reported by farmers. At this time of the year, heavily pregnant goats may suffer from nutritionally related diseases especially dams bearing twins or triplets. The stress from walking long distances in search of food by pregnant dams may also affect negatively on the body reserves of the animals when they return to their kraals at night. According to Slayi *et al.* (2014), death of dam because of poor forage and lack of available pasture to graze during drought season may also cause death of newly born kids.

## 6 CONCLUSION

Goat husbandry in the Central Eastern Cape Province has a great potential if properly managed since it is a widely practiced vocation in the region with large expanse of land that can successfully support livestock farming. Notwithstanding, the poor conditions such as lack of vaccination programme, poor feeding and housing condition in which pregnant does are raised may affect their performance and increase mortality among them. However, necessary interventions by relevant agencies in providing assistance such as feed, incentives like drugs and expertise to resource-limited farmers may boost goat production in the region.

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