

Full Length Research Paper

# Farmers' perception on *ante-mortem* welfare of sheep and slaughter indicators in Eastern Cape Province, South Africa

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A survey was conducted among 203 sheep farmers to investigate their perceptions on the significance of *ante-mortem* welfare and slaughter indicators for sheep. Descriptive statistics were computed for seasonal indicators, farmers' age groups, gender and their distribution within the Eastern Cape Province (ECP). The  $X^2$ -tests were also computed to determine the associations between the farmers' attributes and their perceptions on *ante-mortem* welfare for sheep breeds. The results revealed that older male farmers (51 to 60 years old) had the least (1.6%) orientation about the importance of *ante-mortem* welfare of sheep. Most of the respondents (85.2%) were of the opinion that sheep should be culled during winter season to produce lamb meat. Live weight was perceived to be a highly significant ( $p < 0.001$ ) slaughter indicator for Dorper sheep and age was found having a significant ( $p < 0.05$ ) slaughter index for common sheep breeds in ECP. It was concluded that only two municipalities were well informed about the importance of *ante-mortem* welfare of sheep in the Eastern Cape Province of South Africa. Nevertheless, sheep farmers considered age at slaughter, live weight and season as crucial slaughter indicators for sheep.

**Key words:** Pre-slaughter welfare, pin mapping, sheep farmers, winter slaughter.

## INTRODUCTION

Sheep, like other livestock are sentient creatures that are endowed with the ability to feel pain or distress and experience a sense of wellness. Wellness in this context implies that their welfare is important at every stage of development and requires a major consideration. Man also has the moral obligation to respect and to safeguard those that are intended for slaughter from avoidable suffering (Manteca, 1998; Belk et al., 2002). As previously reported by Dwyer (2009), sheep are among the extensively managed livestock that have received little welfare attention because they are seen to be rustic creatures. This disposition is responsible for the inadequate attention accorded to the pre-slaughter

welfare of various ovine species where they are extensively managed in the grassveld or natural pastures. Concerns recently raised in countries like Chile (Schnettler et al., 2008), France (Deiss et al., 2009), Argentina (Zimmerman et al., 2011), South Africa (Mahlangu, 2009; Ndou et al., 2011) and elsewhere about the pre-slaughter welfare of livestock further show a serious need for studies on *ante-mortem* welfare of this livestock before they are converted to meat.

In South Africa generally, anecdotal evidence has shown that certain biological predators impinge on the welfare of small-stocks including sheep on the farm and within the short periods preceding their slaughter. Small

stock farmers are suffering losses in the main small-stock farming areas of the Northern Cape, the Eastern Cape and the Free State Provinces (de Wet, 2010). In the Northern Cape where highest losses have been recorded 14% of the total production loss is due to predation and stock theft. Report has indicated that about 6 500 sheep and goats are killed every day by jackals and caracals. This record literally implies the possibility of losing 500 g of meat from each animal which invariably results in a great monetary loss by the small-stock industry annually (de Wet, 2011, Smith, 2012). Under an extensive grazing system however, compromises about the welfare of sheep have resulted in a number of neonatal deaths due to harsh weather conditions, starvation, insufficient colostrums intake, or increased litter size in the flocks (Østerås et al., 2007; Holmoya et al., 2012).

The implication therefore is that the combination of factors posing challenges to the welfare of sheep in the velds and before slaughter, also affects the perceptions of the consumers about the sheep meat as well (Goddard et al., 2006; Botreau et al., 2007). In a simple term, the pre-slaughter phase includes the circumstances and practices that apply when the animal are mustered on-farm for slaughter. During this period, meat-producing animals are exposed to a range of avoidable stressors, which trigger their homeostasis and distort their adaptive responses in a bid to restore balance (Grandlin, 2007; Muchenje et al., 2009; Zimmerman et al., 2011). These conditions typically occur because of human cruelty and improper pre-slaughter handling (Daly et al., 2006; Ferguson and Warner, 2008; Fayemi and Muchenje, 2012), inappropriate loading and reprehensible driving of the animals to the lairage (Miranda-de la Lama et al., 2010; Vimiso et al., 2012), unpleasant abattoir environment and inhumane slaughter methods (Schaefer et al., 2001; Terlouw et al., 2008).

Consequently, the relationships among these pre-slaughter conditions usually alter the biophysical status of the muscle (Grandlin, 2007; Muchenje et al., 2008). There are instances where the basic slaughter indicators such as age of the animal (Cifuni et al., 2000; Okeudo and Moss, 2007); its health condition, body conformation (Green et al., 1995; Yardimej et al., 2008); slaughter season (Panella et al., 1995; Sanudo et al., 1996) and live weight (Ermias et al., 2006; Strydom et al., 2009) are not given due consideration before presenting them for slaughter. These compromises result in the production of meat with inconsistent quality such as colour aberration, poor carcass grade, low market value and low keeping quality or reduced shelf life (Grandlin, 2007). Since farmers play key roles in meat production chains, the rationale for the current study was to determine their perceptions about the importance of *ante-mortem* welfare of sheep and the indicators for their slaughter. Thus, the objective of this study was to investigate the perceptions of the farmers on the significance of *ante-mortem* welfare and slaughter indicators for sheep.

## MATERIALS AND METHODS

### Study site

This study was conducted in the Eastern Cape Province (ECP) of South Africa. The province, as a frontier of diversity that encompasses all seven of South Africa's biomes, offer unrivalled range of climates and landscapes which support livestock husbandry. The provincial land mass of 16958 km<sup>2</sup> (which forms 14% of South African's land area) accommodates 28% of the country's sheep; 21% of its cattle and 40% of its goats (Eastern Cape Development Corporation, 2011). Breeds such as fine-woolled Merino, the South African mutton Merino, Dohne Merino, Dorper, Dorper and the Karakul are reared in various parts of the country and particularly in ECP (Cloete, and Olivier, 2010; National Department of Agriculture, 2010; Eastern Cape Development Corporation, 2011).

### Data collection and statistical analysis

A total of 203 sheep farmers (both commercial and smallholder producers that were either full-timers or part-timers in sheep farming) participated in this study during the winter period of 2010. The survey questionnaires were administered to all of them through personal contacts in their respective farms. Questions asked were focused on their demographic characteristics (such as age group, gender and farm location or municipality); their perceptions on the importance of pre-slaughter welfare and slaughter indicators of sheep. In order to achieve the objectives of the study, a group of experienced field-workers that could effectively communicate to these farmers in both vernacular (IsiXhosa) and English Languages were used to administer the questionnaires. Having been screened for suitability as interviewers, they were also trained in order to minimise problems that might affect the reliability of the results. Each trainee was afterwards instructed to administer the questionnaire to each respondent and the expected responses were generated by guiding the respondents on how to objectively answer to all the questions raised. The collected data was analysed using the PROC FREQ and PROC CHISQ procedures of the Statistical Analysis System (SAS, version 1.9.3 of 2007).

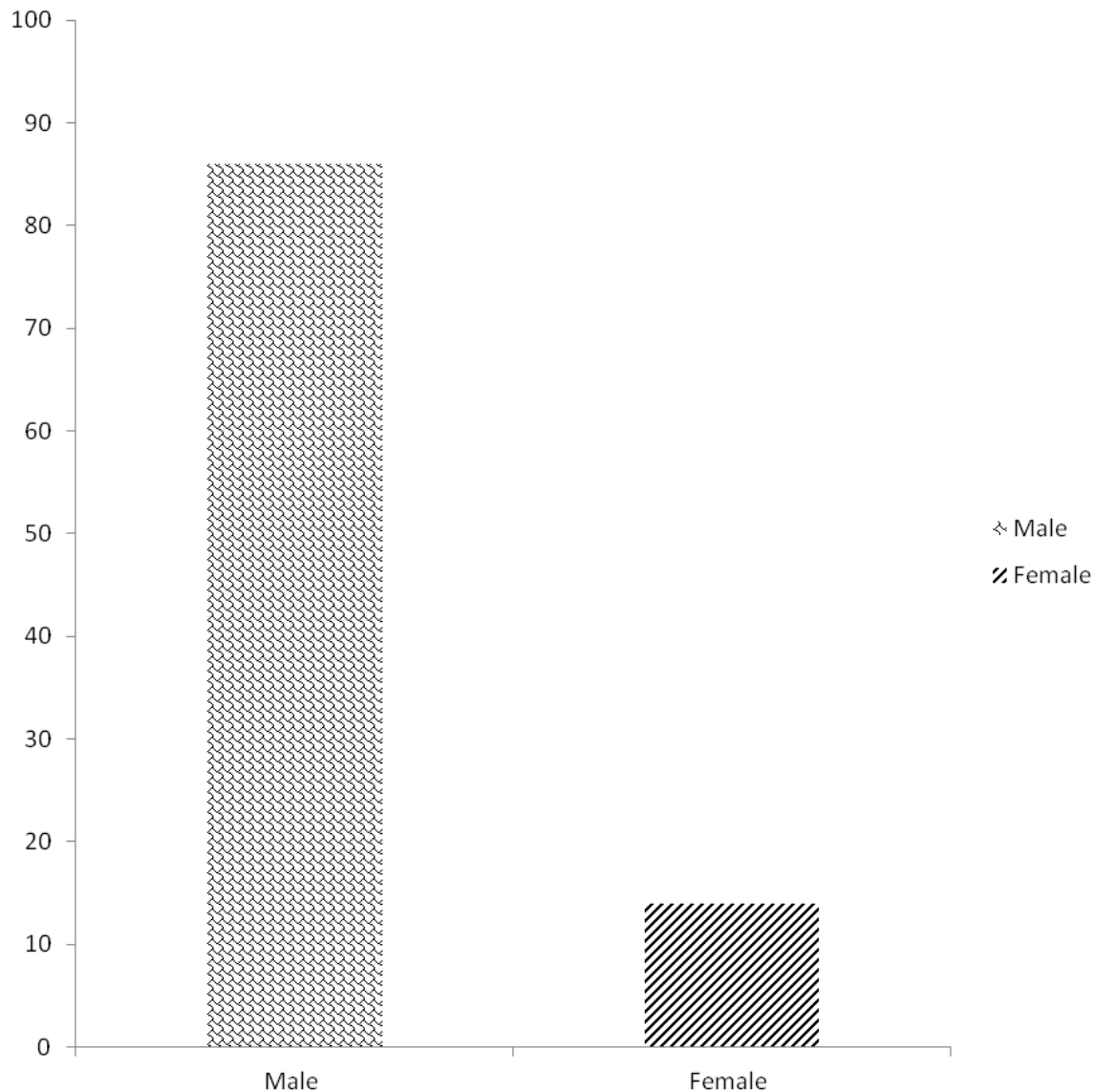
### Pin Mapping for the pre-slaughter welfare of sheep in Eastern Cape Province

A database pinmap was generated from the survey using the Geospatial data and TNT product (TNTmips® and TNTview®) concepts (Skrdla, 2010). This database made it possible to visualise and represent farmers' perceptions on pre-slaughter welfare of sheep on spatial coordinates within the study area.

## RESULTS

### Sheep farmers' demography from the Eastern Cape Province

Result from the current study has shown that sheep husbandry in the ECP consists of approximately 86% male farmers (Figure 1). A glaring inequality was observed between female and male farmers with the male sheep farmers making up a population of proportion six-times more than that of their female counterparts in all the municipalities. Farmers within 41 and 60 years of age



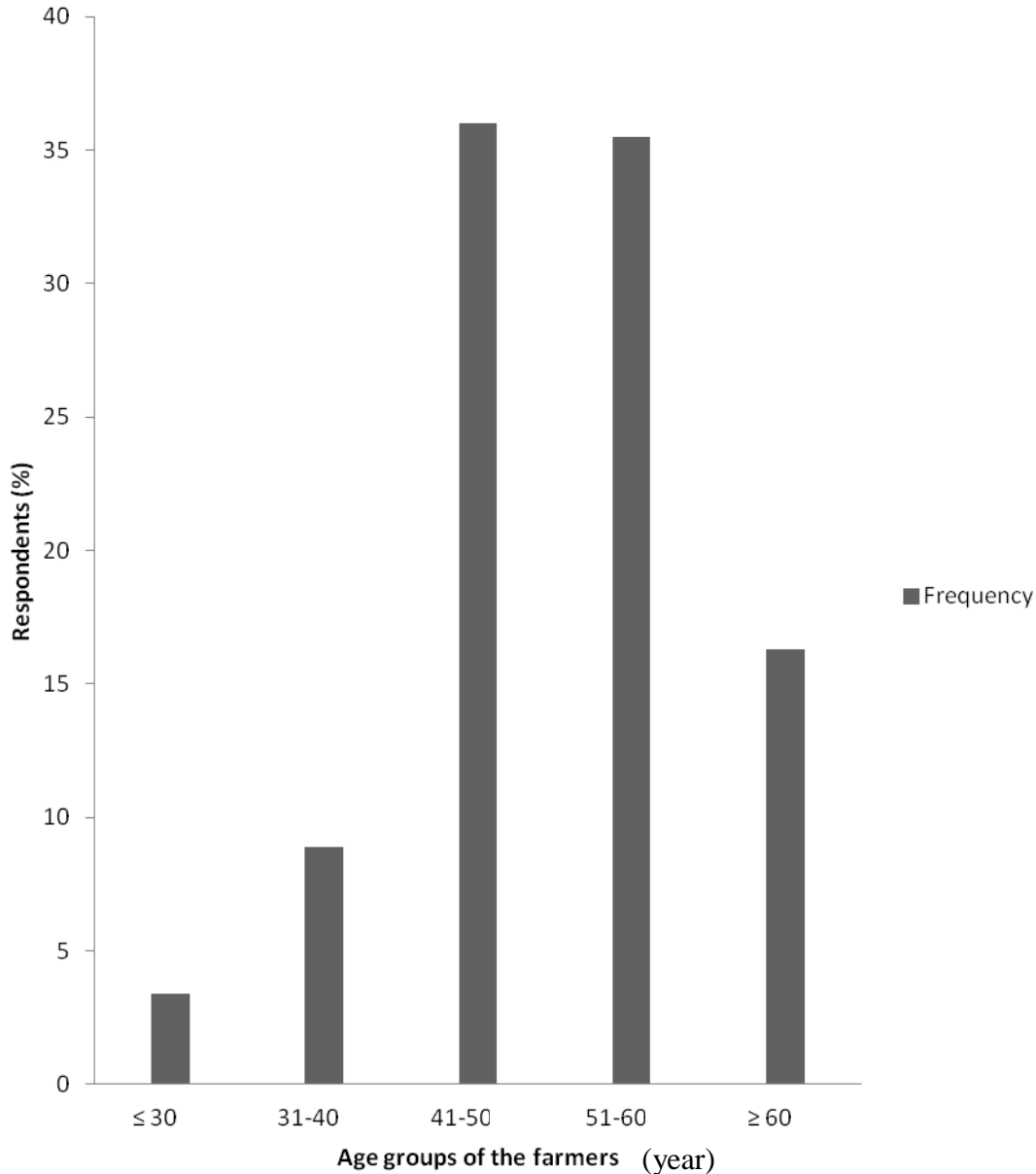
**Figure 1.** The gender of farmers involved in sheep husbandry in Eastern Cape Province.

are more than other age groups in the ECP (Figure 2). Results further showed that sheep farmers are not distributed evenly in the ECP but highest concentrations were found in Mzimvubu, Mhlontlo and Elundini and, the least from Mbashe and O.R. Tambo municipalities (Figure 3). While most of the male farmers were within 41 to 50 years of age in the study areas, the youngest ones ( $\leq 30$  years) were the least in population. It was observed that farmers belonging to different age categories were found at Mzimvubu where majority of farmers were situated. As presented (Figure 3), the youngest sheep farmers ( $\leq 30$  years) were only available at the GreatKei, Mhlontlo and Mzimvubu municipalities. The Mbashe, OR Tambo and Sakhisizwe municipalities however, are the only municipalities with the unique feature of having only

the oldest cadre of farmers on their sheep farms.

#### **Farmers' perceptions on pre-slaughter welfare of sheep in Eastern Cape Province**

Results on perceptions about *ante-mortem* welfare showed that female respondents (within 31 to 40 years old) from Mzimvubu were the most enlightened farmers on the importance of pre-slaughter welfare of sheep (Figure 4). On the contrary, older farmers from Mbashe, Mquna, OR Tambo and Sakhisizwe municipalities did not have much knowledge about the significance of *ante-mortem* welfare. As shown in the map below, data collection from the brown shaded portion that covers 34%



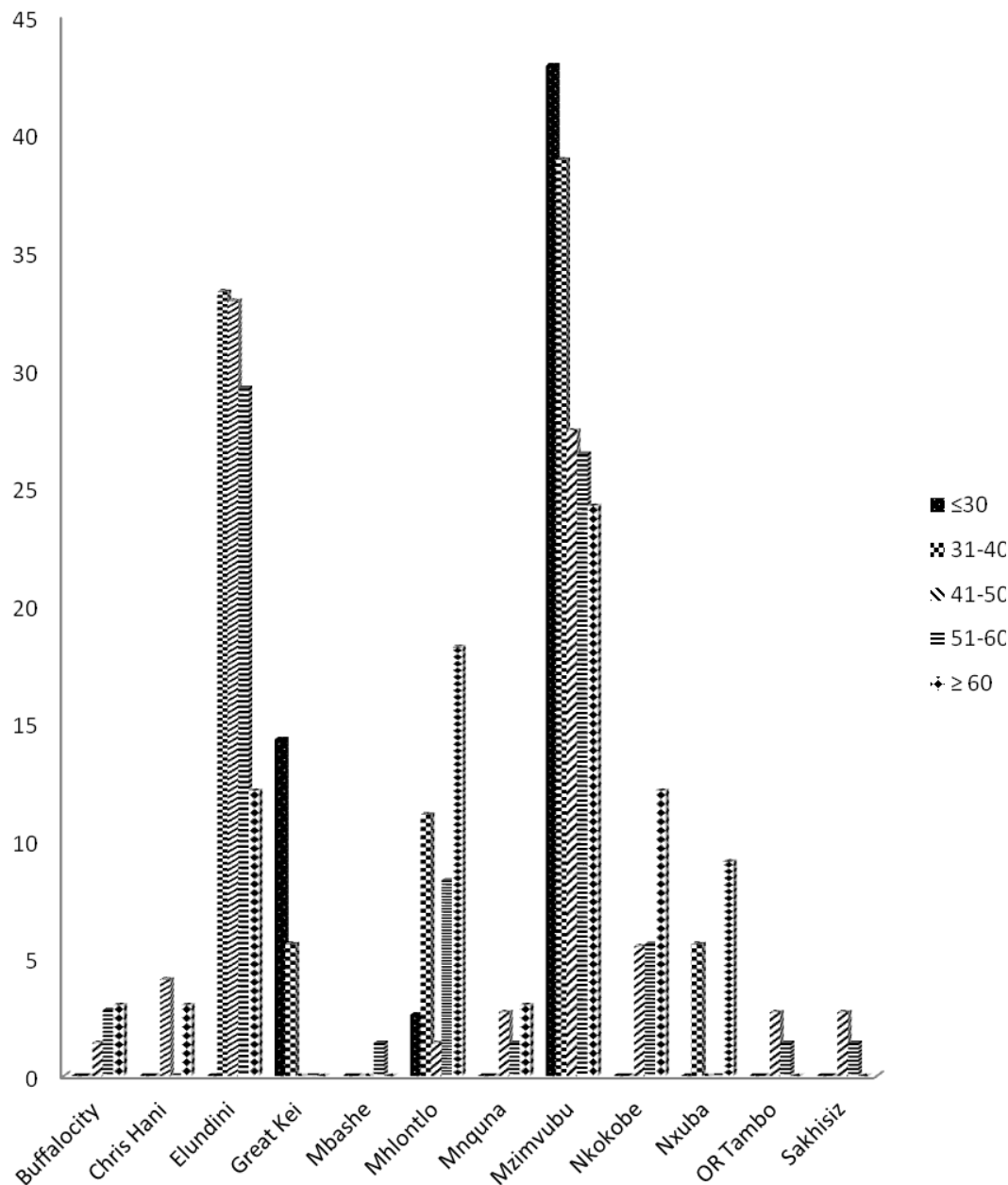
**Figure 2.** Age groups of farmers involved in sheep husbandry in Eastern Cape Province

of the geographical footprint of ECP was not possible for bureaucratic constraints. This implies that the local municipalities within the Cacadu District were not captured and this includes Baviaans, Blue Crane, Camdeboo, Ikwezi, Kouga, Kou-Kamma, Makana, Ndlambe and Sundays River Valley respectively.

#### **Perceptions on slaughter indicators for sheep breeds in Eastern Cape Province**

Findings in this study further showed that all the respondents recognised season as a crucial slaughter

indicator in ECP (Figure 5). Most of them (85.2%) were of the opinion that sheep should be consigned for slaughter during winter season. Spring was on the other hand, considered as a season when sheep culling should not be done. Divergent views were however recorded in respect of perceptions on live weight and age as slaughter indicators for sheep. As shown in Table 1, the opinions of most sheep farmers about live weight being a slaughter indicator were only different ( $p \leq 0.05$ ) for Dorper but similar ( $p \geq 0.05$ ) for Dohne Merino, South African mutton Merino, Dorper and other breeds. Differences in opinions could be attributed to phenotypic variations, which farmers might have noticed among the



**Figure 3.** Sheep farmers' age-group distribution within Eastern Cape municipalities.

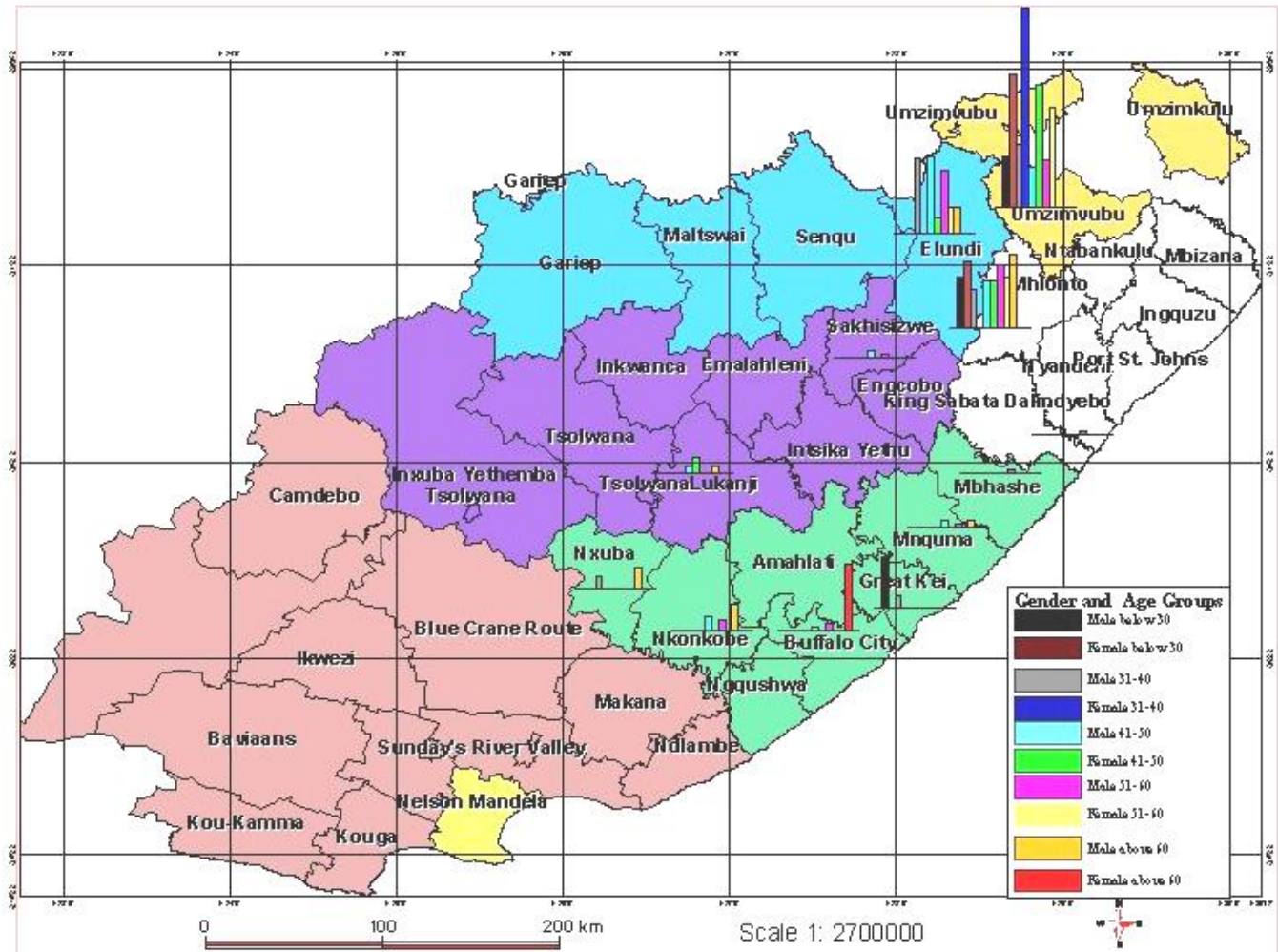
ovine species on their farms. Contrasting opinions obtained in the current study may be due to farmers' knowledge about the impact of inbreeding depression or heterosis on growth performance of sheep.

These key issues invariably influence the age at which the animal attains slaughter weight and could be responsible for the difference in views. Observations during data gathering revealed that younger farmers ( $\leq 30$  years) were flexible about the live weight appropriate to offer Dorper for slaughter. Older male farmers ( $\geq 60$  years), considered Dohne Merino and South African mutton Merino ripe for slaughter having attained 41 to

50 kg live weight. It was noticed during data collection that female farmers (within 41 to 49 years) chose rather to offer other sheep genotypes for slaughter at  $\leq 60$  kg live weight. Majority of male farmers (66.7 to 100.0%) preferred sheep to be slaughtered for meat when they are  $\leq 1$  year, as lambs but the female farmers indicated interest in slaughtering their sheep when older than, or equals 2 years.

## DISCUSSION

The results on unequal gender participation in sheep



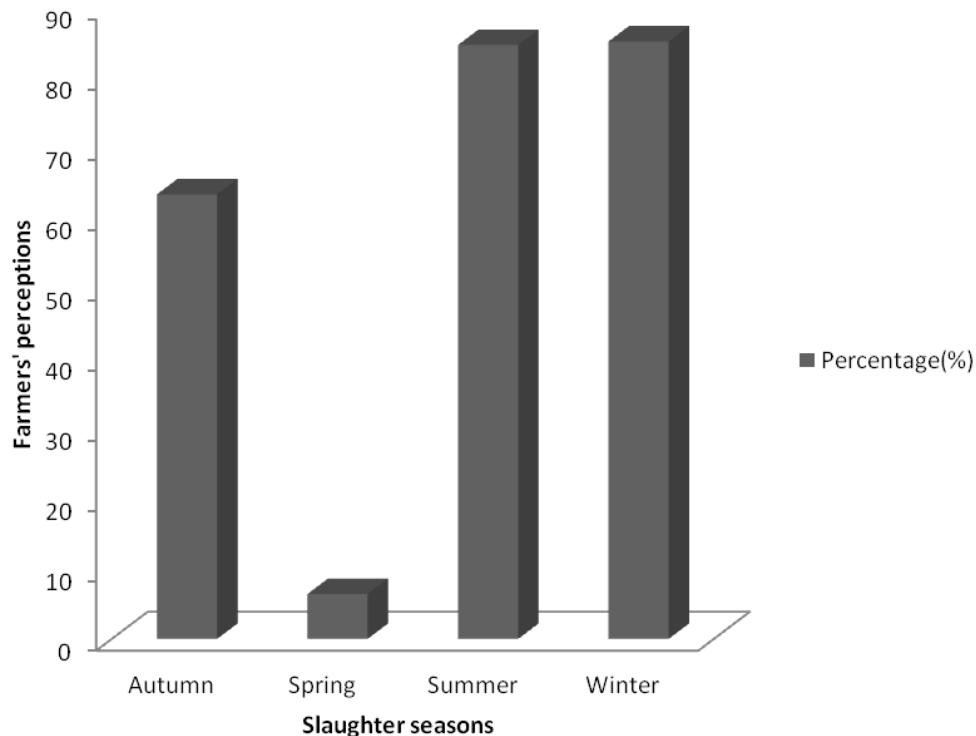
**Figure 4.** Pin-mapping showing the perceptions of farmers on the importance of pre-slaughter welfare of sheep in Eastern Cape municipalities.

husbandry in the present study are consistent with previous findings by Jaim and Rehman (1988) and Banstola et al. (2004). The reports by Paudel et al. (2007) and Mapiliyao et al. (2012) also showed that age at which people of different genders go into sheep farming affect their perception on sheep welfare. Among several factors responsible for this, Yisehak (2008) and Ayoade et al. (2009) found that female pre-occupation with household chores, spouse dominance and inability to access adequate capital plays a crucial role in this regards. Heavy domestic responsibilities on women are therefore responsible for their search for livelihood outside livestock husbandry and the reason for empowering men instead (Alfred Nzo District Municipality IDP, 2010; Statistics South Africa, 2010). Although it is a common practice in South Africa that women own livestock yet, Kleinbooi and Lahiff (2007) reported that the management of the herds is regarded as the sole responsibility of men in many provinces across the

nation.

This norm is connected with the history (colonial-apartheid era) of the country where institutional support is either lacking or failing to implement redistributive land reforms in favour of women in livestock enterprise (Hoffman et al., 2007). Apparently, the initiative by Public-Private-Partnership (PPP) between the Alfred Nzo District and the Goldfields Foundation on Agricultural Development are responsible for higher concentration of sheep farmers around Mzimvubu and Elundini municipalities (Alfred Nzo District Municipality IDP, 2010). The provision of financial aid and technical supports for Small, Medium and Micro Livestock Enterprises (SMMLE'S) for about 2450 farmers in 330 villages around Umzimvubu and Matatiele justifies the result we obtained in the current study on land use for sheep husbandry within the region (Oledele and Monkhei, 2008).

Geographically, the higher mountain peaks in Elundini having 800 to 1200 mm rain per annum forms the



**Figure 5.** Season as a slaughter indicator for sheep in Eastern Cape municipalities.

**Table 1.** Farmers' perception on age and live-weight of ovine species as slaughter indicators in Eastern Cape municipalities.

Breed	X <sup>2</sup> -value	<sup>1</sup> Sig.
<b>Live weight of sheep at slaughter</b>		
Dohne Merino	12.479	NS
South African mutton Merino	9.099	NS
Dorper	0.802	NS
Dormer	101.601	***
Others	1.416	NS
<b>Age of sheep at slaughter</b>		
Dohne Merino	26.478	*
South African mutton Merino	38.743	***
Dorper	21.093	*
Dormer	25.840	**
Others	18.723	NS

<sup>1</sup>Significant at \*p ≤ 0.05; \*\*p ≤ 0.01; \*\*\*p ≤ 0.001 but NS not significant at p ≥ 0.05.

catchment for Mzimvubu River where large volumes of water supports communal sheep grazing and livestock watering. The topography of the Elundini terrain (with slopes steeper than 1.8 in the Southern Drakensberg), also creates a scenic environment conducive for biking, hiking and skiing of livestock like sheep. Massive rearing of ruminants is possible in these municipalities due to

availability of 56.40% grassland covering the entire total surface area. Farmers from these two municipalities (Elundini and Mzumvubo) have at their disposal basic resources to meet the welfare needs of the stock in the velds (Draft Integrated Development Plan Review, 2010).

In retrospect, during the winter season of the year 2010 when this study was conducted, most farmers within the study area (ECP) and in South Africa (at large) recorded massive sheep mortalities due to the outbreak of Rift Valley Fever (DREF Operation, 2010; GAR, 2010; Jansen van Vuren et al., 2010; UNNC, 2010). The deteriorating effect of this zoonotic disease could be one of the major reasons why farmers' opinion favours slaughter of sheep in winter. In addition, as implied from the studies conducted by Perry et al. (2002) and Waller et al. (2004) culling sheep during winter is necessary due to recurrent winter pasture contamination that might raise the prevalence or pathogenicity of trichostrongylic gastro-intestinal nematode (GIN) species which could consequently affect the body conditions of sheep in the flock. Few studies have also reported serious economic losses by sheep farmers owing to naso-sinusal myiasis caused by ovine oestrosis should farmers fail to cull sheep during harsh weather conditions such as winter (Cepeda-Palacios, 2001; Alcaide et al., 2003).

As opposed to health issues, Panella et al. (1995) pointed out high seasonal demands for ovine meat during festive seasons (Christmas and Easter) as one of the indicators that annually propel farmers to consign their

lambs or sheep for slaughter during winter. In the Mediterranean countries for instance, mutton or lamb consumers would prefer to slaughter their sheep during winter because of their preference for lambs having pale colour, higher ultimate pH and low juiciness (Sanudo et al., 1996). From the foregoing, it can be deduced that the choice of season and slaughter weight for sheep are motivated by various factors. According to Santos-Silva et al. (2002), Yardimej et al. (2008), and Snowden and Duckett (2011), farmers that are aiming at the possibility of having better wholesale prime cuts, expected carcass backfat, choice quality meat grade and optimal meat yield would target the most suitable season and live weight before culling their animals. As found in the current study, Cifuni et al. (2000) and Gallardo et al. (2011) also reported that male farmers would show preference for lambs within 45 to 90 days old in quest for lamb meat with fatty acid profiles that are suitable for their health and/or taste (Sanudo et al., 1996).

## Conclusion

Findings in this study have clearly shown that not all the sheep farmers in the Eastern Cape Province have adequate knowledge on the importance of *ante-mortem* welfare of sheep. Since the attainment of slaughter weight is not the same for all sheep genotypes, farmers were of the opinion that they could present their sheep for slaughter, as it seems appropriate for them. The slaughter weight of 60 kg was considered the upper limit for culling different sheep genotypes by the middle-aged female farmers. In general, most of the respondents chose winter as the preferred season when sheep should be presented for slaughter. It could be concluded from this study that only two municipalities were knowledgeable about the importance of *ante-mortem* welfare of sheep in ECP.

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