

Original Research Paper

Evaluation of Socio-economic Status and Breeding Practices for Goat Farmers in Madiga Village of Capricorn District, Limpopo Province, South Africa

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Article history: Received: January 3rd 2022; Revised: April 28th 2022 ; Accepted: June 26th 2022

Abstract

The study was conducted to investigate the socio-economic status and breeding practices used by goat farmers in Madiga village, Limpopo Province, South Africa. A total of 26 goat farmers out of 54 were randomly selected and given well-structured questionnaires. The Chi-square test was used for data analysis. The results showed that age was highly significantly affected ($P < 0.01$) by gender, with a high number of males less than 30 years and 30-50. The results also showed that the purpose of keeping the goats was significantly affected ($P < 0.05$) by gender. The results indicated that there is no significant ($P > 0.05$) variation between selection criteria (growth rate, coat color, conformation, and others) amongst the male and female farmers and the selection criteria values: 2 (15.4%), 5 (38.5%), 4 (30.8%), 2 (15.4%) and 3 (23.1%), 5 (38.5%), 1 (7.7%), 4 (30.8%), respectively. The present study suggests the importance of growth rate, skin color, conformation, and others in the selection of goat breeding in Madiga village. However, the selection of traits for breeding was not different amongst the male and female farmers. Developing a community-based breeding program will benefit both male and female farmers.

Keywords: Chi-square test; Coat color; Conformation; Growth rate.

المخلص

تم إجراء هذه التجربة لدراسة الحالة الاجتماعية-الاقتصادية وممارسات التربية التي تستخدم من مربي الماعز بقرية مديجا، إقليم لومبوبي، بجنوب أفريقيا. تم الاختيار العشوائي لعدد 26 مربي من أصل 54 وتم تقييمهم من خلال استمارات الاستبيان التي تم إعدادها بشكل جيد. وتم استخدام مربع كاي لتحليل البيانات. وأظهرت النتائج أن العمر قد تأثر معنوياً بالجنس (درجة ثقة أقل من 0.01)، حيث وجد زيادة عدد الذكور في فئة العمر أقل من 30 سنة وفئة 30-50 سنة. كما أظهرت النتائج أن الغرض من الإبقاء على الماعز كان قد تأثر بشكل معنوي بالجنس. وأشارت النتائج إلى عدم وجود تغيرات معنوية بين مواصفات الانتخاب (مثل معدل النمو، لون الغطاء، تكوين الجسم، وصفات أخرى) بين المربين من الجنسين (الرجال والسيدات). وكانت قيم الانتخاب لتلك المواصفات 2 (15.4%)، 5 (38.5%)، 4 (30.8%)، 2 (15.4%) و 3 (23.1%)، 5 (38.5%)، 1 (7.7%)، 4 (30.8%)، على التوالي. الدراسة الحالية تقترح أهمية معدل النمو ولون الغطاء، ودرجة تكوين الجسم. في اختيار تربية الماعز بقرية مديجا. بينما انتقاء خصائص للتربية لم يختلف بين الرجال والنساء المربين. إذ أن تنمية برامج التربية على أساس مجتمعي يمكن أن يفيد الرجال والنساء المربين.

الكلمات المفتاحية: اختبار مربع كاي، لون الغطاء، درجة التكوين، معدل النمو.

Introduction

Goats have been characterized as the poor man's cow and play a huge role in the socio-economic statuses of low-income generating communities (Soodan *et al.* 2020). Onzima *et al.* (2017) identify goats to be amongst the most important livestock species that fulfill multiple roles such as meat, milk, and manure and thus show high breed diversity due to their ability to adapt to their different environmental conditions. Farmers in communal areas experience a lack of knowledge in appropriate breeding practices, which leads to low breeding yields of goats (Berhanu *et al.*, 2012). It is therefore a necessity to improve the breeding practices to increase and sustain communal goat breeds, to meet the demands of the human population (Semakula *et al.*, 2010). South Africa is one of the countries with a lot of communal areas with untapped diversity in the production of goats (Mohlalole *et al.* 2015), which has the potential to improve the communal

farmers' socio-economic status while affecting their livelihoods (Semakula *et al.* 2010). Several studies have been conducted to identify the socio-economic status and breeding practices of goat farmers (Debraj et al., 2011; Mahto et al., 2014; Sabapara, 2016; Oumer et al., 2020). However, no study has been conducted to identify the socio-economic status and breeding practices at Madiga village, Limpopo province. Hence, the objectives of this study were to evaluate the socio-economic status and to clearly understand the breeding practices including the selection procedures of Madiga village goat farmers, to be able to develop a clear breeding program that will improve the farmers' production output.

Materials and Methods

Study area

The study research was conducted at a village called Madiga in the Ga-Dikgale area east of Polokwane. Madiga is situated about 12.2 km west of the University of Limpopo. Temperatures in winter range between 5^o C and 28^o C and in summer temperatures range from 10^o C to 36^o C and the mean annual rainfall is less than 400mm (Kutu and Asiwe, 2010).

Sampling techniques and data collection

Madiga village was purposely selected to conduct the goat communal farming evaluation. A total of 26 participants willingly participated in this study, farmers with goats were randomly selected, and formal interviews using questionnaires to clearly understand the social status of Madiga village as well as the skills the farmers have concerning the breeding practices for goats. The questions were designed to focus on the owner of the goats and the people who are dealing with those goats daily. The questionnaires were first tested long before the actual survey and group discussions were done with the older citizens. The data was then captured in excel.

Data analysis

Spreadsheets were used to encode, and record data collected from the questionnaires. Therefore, the Statistical Package for Social Science 26.0 (IBM SPSS, 2019) computer software was used to generate frequencies and percentages to answer the objectives of the study. The Chi-square test was used for data analysis, for comparison between males and females.

Results and Discussion

Socio-economic status of goat farmers in Madiga village

The results of the socio-economic status of goat farmers in Madiga village are presented in Table 1. The results showed that age was highly significantly affected ($P < 0.01$) by gender, with a high number of males less than 30 years and 30-50 years of age with a frequency of 23.08% and 61.54%, respectively, when compared to females. A high number of females were older than 50 years of age (100%) when compared to males (15.38%). The results also revealed that marriage was highly significantly influenced ($P < 0.01$) by gender. More males are into marriage (100%) when compared to females (38.46%) and a high number of females are single (61.54%) compared to males (0%). Education was highly significantly affected ($P < 0.01$) by gender, with a high number of males with no formal education and primary education (23.08%) when compared to females. The results further revealed that a high number of females have secondary education (61.54%) and tertiary education (38.46%) when compared to males with secondary education (23.08%) and tertiary education (0%). The results of the source of income showed that there is no significant difference ($P > 0.05$) in the source of income between the genders. The findings further revealed that the occupation was significantly influenced ($P < 0.05$) by the gender, with a high number of males having public (30.77%) and private (23.08%) occupations when compared to females with no public and private occupations (0%). The findings further revealed that a high number of females are pensioners (61.54%) than males (46.15%) and more females also had private and pensioner occupations (7.69%) and other occupations (30.77%) except for the ones mentioned than males. The results of work by gender showed that work was highly significantly affected ($P < 0.01$) by the gender, with a high number of males working part-time (38.46%), full

time (30.77%) and permanent (23.08%) when compared to females no part-time, full time and permanent work (0%). The outcomes further revealed that more females have full-time and permanent work (84.62%) and other work (15.38%) when compared to males with full-time (7.69%) and other work (0%).

Table 1. Socio-economic status of goat farmers in Madiga village, Capricorn district of Limpopo Province

	Gender		Chi-square	P-value
Characteristics	Female N (%)	Male N (%)		
Categorical variables				
Age				
< 30 years	0 (0.00)	3 (23.08)		
30-50	e	0 (0.00)	8 (61.54)	
Older than 50 years	13 (100.00)	2 (15.38)	19.067	<0.0001**
Marital status				
Single	0 (0.00)	8 (61.54)		
Married	13 (100.00)	5 (38.46)	11.556	0.001**
Education				
None	0 (0.00)	3 (23.08)		
Primary	0 (0.00)	3 (23.08)		
Secondary	8 (61.54)	3 (23.08)		
Tertiary	5 (38.46)	0 (0.00)	17.272	0.001**
Source of income				
Yes	11 (84.62)	13 (10.00)		
No	2 (15.38)	0 (0.00)	2.167	0.141ns
Occupation				
Public	0 (0.00)	4 (30.77)		
Private	0 (0.00)	3 (23.08)		
Pensioner	8 (61.54)	6 (46.15)		
Private + Pensioner	1 (7.69)	0 (0.00)		
Others	4 (30.77)	0 (0.00)	12.286	0.015*
Work				
Part time	0 (0.00)	5 (38.46)		
Full time	0 (0.00)	4 (30.77)		
Permanent	0 (0.00)	3 (23.08)		
Full time + Permanent	11 (84.62)	1 (7.69)		
Other	2 (15.38)	0 (0.00)	22.333	0.000**
Purpose of keeping				
Meat consumption	0 (0.00)	4 (30.77)		
Social status	8 (61.54)	9 (69.23)		
Meat consumption and social status	5 (38.46)	0 (0.00)	9.059	0.011*
Continuous variables				
	Mean	Mean	T-value	P-value
Number of goats kept	26.31±5.57	7.62±0.78	3.32	0.003**

^{ns}= not significant, * = significant at $P < 0.05$, ** = significant at $P < 0.01$, N = Number and % = Percentages.

The results also showed that the purpose of keeping the goats was significantly affected ($P < 0.05$) by gender. The results showed that more males are keeping goats for meat consumption (30.77%) and social status (69.23%), 0% of females keep goats for meat consumption, and 61.54% keep goats for social status. The findings further revealed that a high number of females keep goats for

both meat consumption and social status (38.46%) than males (0%). The results of the number of goats kept by gender displayed that there is a highly significant difference ($P < 0.05$) in the number of goats kept by gender. Females kept a greater number of goats (26.31 ± 5.57) when compared to males (7.62 ± 0.78).

Goat breeds kept by farmers

The results of the breeds kept by gender of farmers are presented in Table 2. The results revealed that the goat breeds were significantly affected ($P < 0.05$) by gender, with more males keeping non-descript indigenous goats (100%) than females (46.15%). The results then showed that more females kept Boer goats (15.38%), non-descript indigenous and Boer goats (23.08%), and mixed breeds (15.38%) and no males kept Boer goats, non-descript indigenous and Boer goats, and mixed goat breeds (0.00%).

Table 2. Common goat breeds kept by Madiga goat farmers

Types of breeds	Gender		Chi-square	P-value
	Female N (%)	Male N (%)		
Non-descript indigenous goats	6 (46.15)	13 (100.00)		
Boer goats	2 (15.38)	0 (0.00)		
Boer and non-descript indigenous goats	3 (23.08)	0 (0.00)		
Mixed breed goats	2 (15.38)	0 (0.00)	9.579	0.023*

* = significant at $P < 0.05$, % = Percentages and N = Number

Selection criteria practiced by goat farmers

Table 3 displayed that male selection criteria: growth rate 2 (15.4%), skin color 5 (38.5%), conformation 4 (30.8%) and others 2 (15.4%) were not significantly different ($P > 0.05$) with the female selection criteria: growth rate 3 (23.1%), skin color 5 (38.5%), conformation 1 (7.7%), and others 4 (30.8%).

Table 3. Selection criterion

Selection criteria	Gender		Chi-square	P-value
	Female N (%)	Male N (%)		
Growth rate	3 (23.1)	2 (15.4)		
Skin color	5 (38.5)	5 (38.5)		
Conformation	1 (7.7)	4 (30.8)		
Others	4 (30.8)	2 (15.4)	2.667	0.446 ^{ns}

^{ns} = not significant, % = Percentages and N = Number

Proportion of respondents for breeding practices

Table 4 is showing the findings of the breeding practices of goat farmers at Madiga village. The knowledge was highly significantly affected ($P < 0.01$) by gender. Females did not know breeding practices at all when compared to males, more males knew breeding practices (53.85%) and few did not know (46.15%). The results further showed that the methods of improving non-descript indigenous goats were significantly influenced ($P < 0.05$) by gender. Females did not use any method to improve non-descript indigenous goats, all females had a lack of knowledge. More males knew (53.85%), 30.77% of males kept non-descript indigenous goats, and 15.38% introduce exotic breeds for improvement. The outcomes of control mating by gender showed that mating was not significantly influenced ($P > 0.05$) by gender. Many both males and females do not practice controlled mating. The results also revealed that culling was significantly influenced ($P < 0.05$) by gender. Many males practiced the culling method (100%) when compared to females (46.15%), and more females did not practice the culling method on their animals (53.85%). The

findings further showed that the reason for culling was highly significantly affected ($P < 0.01$) by gender. More males practiced culling because of the older age of the animals (84.62%) than females and a lower number of males cull the animals because of their low production (15.38%) when compared to females (30.77%). The findings also revealed that more females cull their animals due to old age and low production (53.85%), undesired coat color (7.69%), diseases (7.69%), and no males cull their animals for those reasons.

Table 4. The proportion of respondents for breeding practices

	Gender		Chi-square	P-value
	Female N (%)	Male N (%)		
Breeding practices				
Knowledge of breeding practices				
Yes	0 (0.00)	7 (53.85)	9.579	0.002*
No	13 (100.00)	6 (46.15)		
Methods of improving non-descript indigenous goats				
Introducing exotic breeds	0 (0.00)	2 (15.38)	7.800	0.020*
Keeping non-descript indigenous breeds	0 (0.00)	4 (30.77)		
Lack of knowledge	13 (100.00)	7 (53.85)		
Breeding Methods				
Crossbreeding	0 (0.00)	3 (23.08)	3.391	0.066 ^{ns}
Pure-Breed	13 (100.00)	10 (76.92)		
Control mating				
Yes	0 (0.00)	3 (23.08)	3.391	0.066 ^{ns}
No	13 (100.00)	10 (76.92)		
Practice culling				
Yes	6 (46.15)	13 (100.00)	9.579	0.002*
No	7 (53.85)	0 (0.00)		
Reason for culling				
Old age	0 (0.00)	11 (84.62)	20.667	0.000**
Low production	4 (30.77)	2 (15.38)		
Old age and low production	7 (53.85)	0 (0.00)		
Undesired coat colour	1 (7.69)	0 (0.00)		
Diseases	1 (7.69)	0 (0.00)		

^{ns} = not significant, * = significant at $P < 0.05$, ** = significant at $P < 0.01$, % = Percentages and N = Number

A thorough understanding of rearing communal goats is a sure way to improve breeding practices (Kebede et al., 2011). The current study objective was to define and identify breeding objectives and breeding practices utilized while understanding the socio-economic status of goat farmers in Madiga village. The results of the current study indicated that the majority of both males and females were above the age of 50 years, which was different from the results of Slam et al. (2018). This could be a result of different agricultural returns in the form of money in the different areas. Results obtained by Byaruhanga et al. (2015) correspond well with this research as it also found participants to be above the age of 50 years this could mean that both areas have similarities in attractiveness towards farming, where only old age people are interested while the younger are not as they do not see the monetary returns of goat farming. Obtained results showed that education was highly significant when compared by gender with females being more educated than males. This had similarities with the study conducted by Dhara et al. (2019). The current study results showed that more males had no formal education than females. While a study conducted by Shivakumara et al. (2020), showed a greater percentage of goat farmers had no formal education, while 31 – 35 % had primary education which was followed by smaller

percentages of high school and tertiary education these were different from this research as it obtained different results. Access to education and the call for people to get an education is a government lead program, the difference in the results could be based on the impact of those programs. The current study noticed that there was no significance by gender when it came to the source of income. No significance by association for the source of income (Tada et al., 2013). Variation in the type of occupation and work status was obtained with a lot of participants with informal type of employment, while a few had a formal type of employment (Nipane et al., 2019). Berhanu et al. (2012) obtained results that showed that goat keeping was mainly for a variety of reasons ranging from social status to own consumption. The same was obtained in this current study where a lot of the farmers kept goats for social status and own consumption. Monau et al. (2020) argue that communal farmers tend to keep a small flock of animals. The findings are in agreement with the obtained results as indeed the greater number of participants kept a few numbers of goats, this could be because of just keeping goats for social status instead of producing to make income. Results that were also obtained in a research conducted in Malawi by Kaumbata et al. (2020) showed that there are significant differences in the mean flock size.

The preference of the type of goats to be kept was mainly focused on the ability of the goat to survive the environmental conditions that existed in the particular area; hence the preference was more focused on local breeds (Chenyabuga and Lekule, 2014). In this study, also the farmers preferred local non-descript indigenous breeds, simply because they required less input cost in terms of medical supply and feed reserves. A study conducted by Nigussie et al. (2013) found that the key selection criteria were based mainly on appearance by its coat color, body conformation, and size. In this study skin, color, and body conformation were highly preferred by the participating farmers. Results obtained by Onzima et al. (2018) differed from this current study as those researchers found out that farmers in their study area preferred adaptation traits over production traits. The reason in this study that adaptation traits are somewhat not a major priority is because the farmers are already farming with goats that are highly adaptive to the area and do not prefer those that are not, as they would give them production problems. Communal farmers tend to subject their animals to open natural, unplanned, and uncontrolled mating systems (Zewdu et al., 2018). This research also obtained similar dynamics towards these goat farmers, because they did not practice breeding. In a study conducted by Mataveia et al. (2018) it was observed that smallholder goat farmers preferred to farm with local breeds. In this research, it was observed that breed preference between male and female farmers differed highly, with females preferring exotic breeds while males preferred local. According to Semakula et al. (2010), high levels of uncontrolled mating systems existed among small goat farmers, which over time may lead to a loss of the genetic material of the indigenous breeds, which may eventually lead to extinction. When one looks at this research's findings it is evident that the use of only a particular type of indigenous breeds, without importing or exporting new genetic sources into the villages will in the future result in a loss in genetic stock. The lack of knowledge in understanding breeding or practicing it will be the result of such a decline.

Conclusion

Goat farmers in the Madiga village mainly keep their goats for social status, more than for production purposes. Hence the results obtained show a lack of understanding of the breeding side of things, animals can do as they please. Apart from the fact that there could be land space challenges, it is evident that there is not much focus on the key aspects of breeding objectives. This challenge can then be looked upon towards the lack of knowledge of such breeding information, and the lack of extension services focused on the delivery of such information. The preferred breed to farm with is the best adapted for the area, however, a lot of animal output can be beneficial to the farmers if more care in the form of designing breeding programs could greatly have an impact on the farmers' production program. It is therefore important that a collaborative effort between the Institutions of higher learning existing in the Province, Municipality sections on agriculture, the department of land reform and agriculture, and all NGOs must come together in an attempt to assist in the development of the farmers' knowledge and assist in preserving the

genetic resource of the non-descript indigenous goat breeds. Also, more research needs to focus on the importance of the breeds that are preferred by farmers, and what more benefits can be reached from them.

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