

THE PERCEPTIONS OF AND WILLINGNESS TO PAY FOR GOAT'S MILK AND ITS PRODUCTS IN LEPELLE-NKUMPI LOCAL MUNICIPALITY, SOUTH AFRICA

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Abstract. This study assessed the perceptions and willingness to pay for goat's milk and its products, and also both identified and described the challenges that communal farmers face in producing and selling goat's milk and its products. The study was conducted in four villages at Lepelle-Nkumpi Local Municipality, Limpopo province, South Africa. Descriptive statistics and binary logistic regression techniques were used for data analysis. The regression estimates discovered a negative relationship between goat's milk consumption by farmers and the perceptions of communal farmers at a 10% significance level. The binary logistic regression estimates established a negative relationship between consumption status and willingness to pay for goat's milk at the standard minimum price of R24.99 per litre. The study concludes that fewer farmers consume goat's milk and its by-products. Farmers also understand the nutritional health benefits of these products in Lepelle-Nkumpi Local Municipality, Limpopo province, South Africa.

Keywords: by-products, goat's milk, Lepelle-Nkumpi Local Municipality, perceptions, by-products

INTRODUCTION

Generally, goat's milk is considered a niche product which is well-defined as a product targeting a specific

section of a more significant industry and market. High quality products are usually more expensive when compared to generic products (DAFF, 2016). From the production perspective, goat's milk is mainly produced on four continents – Asia, Europe, Africa, and America (DAFF, 2016). Asia is the biggest producer of goat's milk, accounting for approximately 57.8% of global production, followed by Africa at 25.2%. Europe produces around 13.7%, and the remaining 3.2% is produced in America (DAFF, 2016). That could constitute the reason for higher production from these continents; goats adapt, resist various conditions, and can be easily milked manually or mechanically. According to the DAFF (2014), in South Africa, goats are found throughout the country, with the Eastern Cape, Limpopo and KwaZulu-Natal provinces reported to be the largest producers, accounting for approximately 72% of the total live goats. However, the statistics reported seem not to be specific on which of these three provinces is acknowledged to be the largest goat's milk producer; the statistics are only precise on the percentage of the goat population for farming purposes within the three provinces. In addition, the National Agricultural Marketing Council [NAMC] (2005) further emphasize that goats in South Africa are mainly kept for religious or traditional purposes and on an informal basis (backyard slaughter).

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Similarly, the DAFF (2016) notes that at the national level, goat's milk production is predominant in rural areas where farmers commonly produce for subsistence consumption and religious or traditional purposes. However, goat's milk for commercial purposes in South Africa could yield optimal results if supported. With the significant increase in goat's cheese imports in the country, there is a need to contemplate the importance of farming goats and the products they produce, such as cheese, milk, and other products (DAFF, 2016).

Idamokoro et al. (2019) recently discovered that most farmers in rural settings do not consume goat's milk and its products for several reasons, which include a lack of knowledge about the nutritional benefits associated with goat's milk, the taste of this milk, cultural beliefs, and its pungent smell. Regarding the willingness to pay for goat's milk and its products, Idamokoro et al. (2019) further argue that many farmers consuming (subsistence) goat's milk could be willing to pay for this milk and milk products only if the farmers were informed of the nutritional benefits. This information shows that farmers share different perceptions towards goat's milk and its products. The same applies to the willingness to pay for goat's milk and its products. To this end, there is limited information about farmers' perceptions of such milk and its products and willingness to pay for them in South Africa. The available data mainly focuses on selling, production trends, and production and sales constraints faced by goat farmers in South Africa, especially in the Eastern Cape and Limpopo provinces. Therefore, a need arises to assess Lepelle-Nkumpi Local Municipality communal farmers' perceptions of and willingness to pay for goat's milk and its products. These are the two aims of this study.

METHODOLOGY

Study area

The study was conducted in Lepelle-Nkumpi Local Municipality. According to Municipalities South Africa (2018), this is a municipality within the Capricorn District in the Limpopo Province of South Africa. It is the smallest of four municipalities in the district, making up 16% of its geographical area, and the municipality is predominantly rural. The agricultural sector in Lepelle-Nkumpi is dominated by private land, where the focus is on producing fruit, for example, oranges and grapes, rather than livestock farming. Therefore, to expand farming

enterprises within the municipality, land is required. This means that the Local Economic Development (LED) for Lepelle-Nkumpi Local Municipality needs to advocate for increased availability of land so that the municipality's residents can consider expanding their farming to livestock. Hence, the municipality was selected for this study to analyze better how communal farmers perceive goat's milk, willingness to pay for it and its by-production.

Data collection

The data to address the study objectives were collected from Lepelle-Nkumpi Local Municipality, and the municipality comprises eleven (11) villages. For this study, a purposive sampling procedure was used to select communal farmers participating in goat production. Therefore, four (4) villages were selected, which the local Department of Agriculture supports through extension personnel to help the farmers improve goat production. These villages included Morotse, Sepitsi, Malekapane and Semiloane. After that, a proportional random sampling procedure was used to select farmers to participate in the study, and a total of 183 communal farmers (65 farmers at Morotse, 51 farmers at Sepitsi, 36 farmers at Malekapane and 31 farmers at Semiloane) were sampled. Primary data was subsequently collected through face-to-face interviews using a questionnaire. The implicit goal of employing a proportional random sampling procedure was that the village with the highest number of goat farmers should have a larger sample size, just as a village with the lowest number should have a smaller sample size.

Analytical techniques

Descriptive statistics and binary logistic regression model were used to analyse data. Descriptive statistics are used to describe the basic features of the data in a study. According to Krishnan (2010), descriptive statistics provide simple summaries of the study sample using simple graphical analysis and descriptive statistics form the basis of almost every quantitative data analysis. For this study, frequencies, percentages, mean, maximum and minimum were used to provide summaries of the demographics of communal farmers, as well as the challenges faced by communal goat farmers.

A Likert scale survey and binary logistic regression model were used to analyse factors influencing perceptions of and willingness to pay for goat's milk and its products. A Likert scale is a rating scale used to measure

Table 1. Description of explanatory variables in Binary Logistic Regression model

Variables	Description	Units of measure
Willingness to pay and perception (dependent variables)	1 – positive perception/willingness to pay 0 – negative perception/not willing to pay	Dummy dependent variables
Gender of a farmer	1 – male 2 – female	Dummy
Marital status	1 – single 2 – married 3 – widow 4 – divorced	Categorical
Age of a farmer	1 – below 50 years 2 – 50–69 years 3 – 70–89 years 4 – above 89 years	Years
Household size of a farmer	1 – less than 7 2 – 7–12 3 – 13–18 4 – above 18	Number of people living in a household
Level of education	1 – no formal education 2 – primary education 3 – secondary education 4 – tertiary education	Categorical
Years of farming	1 – below 21 years 2 – 21–40 years 3 – 41–60 years 4 – above 60 years	Number of years in farming goats Years
Selling of goats	1 – yes 2 – no	Dummy
Goat production as source of income	1 – yes 2 – no	Dummy
Type of income	1 – pension fund 2 – none 3 – others	Categorical
Household monthly income	0 – none 1 – R1000 2 – above R1000	South African Rand (ZAR)
Religion	1 – christian 2 – african tradition 3 – others	Categorical
Occupation	1 – pensioner 2 – other 3 – none	Categorical
Goat meat consumption	1 – yes 2 – no	Dummy variable

the attitudes or opinions of the respondents. With this scale, respondents were asked to rate items on a level of agreement. For example: Strongly agree, Agree, Neutral, Disagree, and Strongly disagree (Statistics Handbook, 2018). For this study, two outcomes were extracted from the Likert scale survey to make a dummy dependent variable for perceptions and willingness to pay. Each dependent variable was regressed separately against hypothesized explanatory variables. For instance, a respondent indicating strongly agree, agree and neutral that goat's milk does not have health and nutrition benefits was categorized as a negative perception, just as when the response of a respondent indicating disagree and strongly disagree that goat's milk does not have health and nutrition benefits was categorized as a positive perception. Likewise, a respondent who strongly agreed to pay for goat's milk and its products was categorized as willing to pay, while a respondent indicating neutral, disagree and strongly disagree was categorized as not willing to pay for goat milk and its products. The general binary logistic regression model is illustrated in the equation below (Gujarati, 1992).

$$[(py = 1x)][1 - py = 1x] = \alpha + \beta_1 X_1 + \dots + \beta_n X_n + U$$

where:

P – predicted probability of a positive perception/willingness to pay.

$1 - P$ – predicted probability of a negative perception/not willing to pay.

α – the constant of the equation.

β – the coefficient of the independent variables.

X – independent variables.

U – disturbance/error term.

RESULTS AND DISCUSSION

This section presents the descriptive statistics and econometric results observed in the study.

Demographics of farmers

This section profiles the demographics of the farmers based on the observed descriptive statistics results.

Descriptive statistics (Table 2) established that of the farmers sampled, approximately 57.9% were males, whereas about 42.1% were females. These results explain the male dominance among the farmers in the study area. Merlino et al. (2020) obtained different results where women dominate as goat farmers, for instance in

north-west Italy and Kamarubahrin (2019) in Malaysia. Descriptive results indicate that in terms of the farmers' education level, approximately 4.9% of farmers had never gone to school, while about 95.1% of farmers had obtained a secondary education. These results confirm that most farmers from the study area have a secondary education. Table 2 also shows that 29% of the farmers in the study area were between the age of 20 and 49 years, whereas about 45.4% of the farmers were between 50 and 69 years old. On the other hand, approximately 25.7% of the farmers were between the age of 70 and 81 years old. These results show that the dominant age group of the farmers in the study areas was between 50 and 69 years. When it comes to the marital status of the farmers, about 3.8% of the farmers were classified as single. In comparison, about 94.5% of the farmers were classified as married, and approximately 1.6% of these farmers were classified as widows. The results suggest that most farmers were married in the study areas.

As shown in Table 2, descriptive statistics revealed that about 84.2% of farmers had a household size ranging from one to six household members. In addition, about 3.8% of the farmers had a household size ranging from seven to twelve household members. Again, approximately 12% of the farmers had household sizes ranging from 13 to 18 household members. These results confirm that most farmers from the study area had a family size of fewer than seven people. Idamokoro et al. (2019) found similar results in the central Eastern Cape province of South Africa, stating that most farming households rely on family labour, which tends to be limited due to the smaller number of people living within a household.

About years of farming goats, descriptive statistics established that about 40.4% of the farmers had less than 21 years of experience. On the other hand, approximately 35.5% of the farmers had 21 to 40 years' experience of farming goats. Additionally, descriptive statistics revealed that about 24% of the farmers had between 41 and 60 years' experience in goat farming. These results reveal that the largest group of communal farmers from the study areas had goat farming experience of 1 to 20 years.

In terms of selling goats, approximately 85.8% of farmers reported that they sell their goats at the local level, while 14.2% of the farmers reported not to sell their goats. Instead, such farmers are perhaps farming

Table 2. Descriptive statistics of demographics from communal farmers

Index	Outcome	Frequency	Percentage (%)
N		183	183
Gender of a farmer	Male	106	57.9
	Female	77	42.1
Level of education for a farmer	No formal education	09	4.9
	Primary school	0	0.0
	Secondary school	174	95.1
	Tertiary education	0	0.0
Age of a farmer	20–49 years	53	29.0
	50–69 years	83	45.4
	70–81 years	47	25.6
	Above 81 years	0	0.0
Marital status of a farmer	Single	7	3.8
	Married	173	94.5
	Widow	3	1.6
	Divorced	0	0.0
Household size of a farmer	Less than seven people	154	84.2
	7–12 people	7	3.8
	13–18 people	22	12.0
	More than 18 people	0	0.0
Years in farming goat	Less than 21 years	74	40.4
	21–40 years	65	35.5
	41–60 years	44	24.0
	More than 60 years	0	0.0
Selling goats	Yes	157	85.8
	No	26	14.2
Selling goats is the primary source of income	Yes	143	78.1
	No	40	21.9
Type of income	Pension fund	114	62.3
	None	66	36.1
	Other	3	1.6
Household monthly income of a farmer	No income	66	36.1
	R1000	52	28.4
	Above R1000	65	35.5
Religion	Christian	139	76.0
	African tradition	0	0.0
	Others	44	24.0
Occupation	Pension	99	54.1
	Other	3	1.6
	None	81	44.3
Goat meat consumption	Yes	149	81.4
	No	34	18.6

goats for subsistence purposes. These results confirm that most farmers from the study area keep/farm goats for sale. This is in contradiction with the findings of Idamokoro et al. (2019), who argue that farmers commonly keep goats for subsistence purposes, especially in rural farming households. Furthermore, descriptive statistics found that about 78.1% of the farmers acknowledged goat sales to be their primary income source. Approximately 21.9% of the farmers indicated that selling goats is not their primary source of income.

Farmers have various income types, for instance, descriptive statistics revealed that about 62.3% of the farmers benefit from pension funds, whereas about 1.6% of the farmers benefit from salaries, wages, social grants etc. On the other hand, about 36.1% of the farmers had no sources of income. In this respect, the results state that most of the farmers from the study area were beneficiaries of pension funds. Idamokoro et al. (2019) also found that most communal farmers (80.13%) were beneficiaries of pension funds. In terms of monthly household income, about 36.1% of farmers had no monthly income, while about 28.4% of the farmers had an income of R1000, and about 35.5% of the farmers had an income above R1000 per month. These results suggest that the largest group of the farmers from the study area had no monthly payments.

Concerning the religion of farmers, 76% of the farmers described themselves as Christians, while 24% indicated other religious groups. The results agree with those of Merlino et al. (2020) from north-west Italy. As indicated in Table 2, approximately 54.1% of the farmers were categorized as pensioners, while 1.6% of the farmers were categorised as having other occupations. Moreover, about 44.3% of farmers had no occupation. These results inform that most farmers from the study areas were pensioners.

Regarding the consumption of goat's meat, about 81.4% of the farmers reported that they consume goat's meat, while about 18.6% of the farmers reported that they do not. These results establish that most goat farmers from the study area not only farm or keep goats but also consume goat's meat.

Factors influencing perceptions of goat's milk and goat's milk by-products

This section presents the factors that influence perceptions toward goat's milk and its by-products, and the regression results are presented in Table 3. A Likert survey

was used to determine a point where a farmer was distinguished to have a positive or negative perception of goat's milk and its by-products.

From the variables hypothesised to influence farmers' perceptions, a binary logistic regression using a stepwise regression method was employed. The information for some of the hypothesized variables was not sufficient for analysis purposes, hence the stepwise regression. The model summary of the study, as shown in Table 3, shows that a Nagelkerke R^2 of 0.682 was attained; this denotes that the model explained more of the variation (at 68%) from the explanatory variables with an overall prediction percentage of 87.4%. The (-2) Log-likelihood, there is no absolute way to judge the likelihood value, but the better (positive) log-likelihood value, the better the model fit. The explanatory variables observed to be significant, and their direction of influence on the dependent variable (perceptions) are discussed below.

Goat's milk consumption

For this variable, respondents were asked if they consume goat's milk or not. The regression estimates discovered a negative relationship between goat's milk consumption and perceptions of farmers at a 10% significance level. These results could explain that the fewer farmers consume goat's milk and its by-products, the higher the probability of negative perceptions towards it and these by-products. Similar comparable findings were also observed by Idamokoro et al. (2019) by stating that taste, cultural bias, and natural dislike of the milk promote the reason why farmers do not consume goat's milk. Guney and Ocak (2013) also observed that personal dislike, taste and strong smell were part of the reasons why farmers do not consume goat's milk in Turkey.

Health benefits of goat's milk

A positive association between health benefits and the perception of farmers of goat's milk and its by-products was observed to be significant at the 5% level (0.020). This implies that as long farmers believe that there are benefits obtained in consuming goat's milk and its by-products, there is a greater chance of positive perceptions. Similarly, Phoya et al. (2003) argue that despite its recognisable health benefits, the consumption of goat's milk is still not widely accepted in some parts of the world, including South Africa, where consumption would be expected to be higher.

Table 3. Factors influencing perceptions of communal farmers towards goat milk and its by-products

Variables	B	SE	Wald Stat.	Sig.
Gender	0.179	0.837	0.046	0.831
Age	0.513	0.512	1.001	0.317
Marital status	-0.916	1.356	0.456	0.500
Use of goat milk and by-products	0.511	0.621	0.678	0.410
Goat milk consumption	-1.080	0.711	2.305	0.100*
Source of income	-0.370	1.222	0.092	0.762
Health benefits	4.391	1.894	5.377	0.020**
Nutrition benefits	-1.204	0.668	3.244	0.027**
Religion	0.850	0.643	1.747	0.186
Constant	0.050	0.189	0.070	0.791

Model summary:
 -2 Log-likelihood: 118.603
 Nagelkerke R Square: 0.682
 Overall prediction percentage: 87.4%

**5% sig. level, *10% sig. level.

Nutrition benefits from goat's milk

The binary logistic regression approximations revealed a negative association between nutrition benefits and the perception of farmers towards goat's milk and its by-products. These results suggest that the fewer farmers understand the nutrition benefits associated with goat's milk consumption, the greater the probability that farmers could hold negative perceptions of these foodstuffs. Similar findings were obtained by Marius et al. (2021) in Namibia, where goat's milk consumption and the nutritional and health benefits of goat's milk were identified as the factors influencing the perceptions of farmers of goat's milk and its by-products.

Factors influencing willingness to pay for goat's milk

This section presents factors which prompt farmers' willingness to pay for goat's milk, and the regression results are shown in Table 4. A Likert survey was also used to capture reference points where a farmer was distinguished as willing to pay for goat's milk or not.

From the study, a Nagelkerke's R^2 of 0.591 was obtained, indicating that the model explained more of the variation between the dependent and explanatory

variables with an overall prediction percentage of about 81.4%. This implies that the model estimates fit the data at an acceptable level, as shown in the model summary.

The standard price to measure willingness to pay for goat's milk was R24.99. This is the minimum price per litre of goat's milk (NAMC, 2020). Therefore, the variables that the binary logistic regression model discovered to be significant towards willingness to pay for goat's milk are discussed below.

Goat's milk consumption

The binary logistic regression estimates established a negative relationship between consumption status and willingness to pay for goat's milk at the standard minimum price. This variable was significant at the 5% level (0.035). This implies that as long as farmers are not consuming goat's milk, there is a probability that such farmers may not be willing to pay the standard price for goat's milk. There are limited studies that focus on the willingness to pay for goat's milk and its products in the South African context, therefore areas for further research can be explored to understand the factors contributing towards the willingness to pay for goat's milk and its products.

Table 4. Factors influencing willingness to pay for goat milk and its by-products among communal farmers

Variables	B	SE	Wald Stat.	Sig.
Gender	1.105	0.967	1.306	0.253
Age	-0.434	1.015	0.183	0.669
Marital status	-1.809	1.507	1.440	0.230
Use of goat milk and by-products	0.169	0.712	0.056	0.813
Goat milk consumption	-1.027	0.706	2.116	0.035**
Source of income	-0.235	0.872	0.073	0.788
Health Benefits	1.258	0.542	5.394	0.020**
Nutrition benefits	-0.353	0.400	0.776	0.378
Religion	0.572	0.373	2.347	0.091*
Constant	0.804	0.622	1.670	0.196

Model summary:
 -2 Log-likelihood: 118.222
 Nagelkerke R Square: 0.591
 Overall prediction percentage: 81.4%

**5% sig. level, *10% sig. level.

Health benefits of goat's milk

The variable health benefits were measured by asking the respondents if they believe that consuming goat's milk has health benefits or not. The variable portrays a positive relationship with the willingness to pay for goat's milk at the 5% significance level. This could mean that as long as farmers believe that there are health benefits associated with the consumption of goat's milk, there is a greater chance that the farmers may pay for the minimum standard price for goat's milk. However, the variable observation cannot be regarded as conclusive, since there could be other possible factors influencing the willingness to pay besides health benefits.

Religious status of a farmer

There is a positive association between the religious status of farmers and their willingness to pay for goat's milk at the 10% significance level. These results suggest that if farmers are classified as Christians, there is a likelihood that they could be willing to pay the minimum standard price for goat's milk. The findings of the current study disagree with the results of Idamokoro et al. (2019), where age, gender, and educational level were the factors that influenced the respondents' willingness to consume and pay for goat's milk in central Eastern Cape province, South Africa.

Challenges faced by communal farmers in selling and producing goat's milk and its associated products

This section presents the challenges farmers face regarding producing and selling goat's milk and its products.

As presented in Table 5, there are five identified challenges which arise from producing goat's milk, as declared by farmers. In selling goat's milk and its products, farmers noted that production volumes determine market participation. This is because farmers experience low production volumes, which therefore activates them to mainly produce goat's milk for subsistence purposes instead of sale. The challenges arising from goat's milk production are ranked. Thus, the highest-ranked represents the challenge faced most often, and the lowest-ranked represents the least experienced challenge. Of the five challenges identified, the one most experienced is that goats require a high feed intake to produce milk, where the feed becomes less available and relatively expensive for farmers. Another major challenge was that goats were subjected to feeding kids with the same milk they produce, consequently lowering production volumes. This therefore limits farmers' ability to sell goat milk and its by-products at a larger scale. Marius et al. (2021) report that lack of feeding leads to the production

Table 5. Challenges faced by communal farmers in the production and marketing of goat milk and its products

Challenges faced	The number of times mentioned	Rank as the most persisting challenge
High feed intake to produce milk	34	1
Less milk is produced because goats have to feed kids	21	2
Few goats for milk production	18	3
Goats do not have enough milk	18	3
Presence of blood clots in the milk	16	4

of less goat's milk, which becomes a challenge for the selling of goat's milk. Also, when farmers keep few goats, this results in a low milk yield. Therefore, selling goat's milk becomes less effective. Ogola and Kosgey (2019) further argue that the market price might also affect the sale of goat milk and its products.

CONCLUSION

The current study concludes that there is male dominance in the production of goats and most farmers hold less than 21 years of experience in farming goats. Also, most farmers are rearing their goats for sale, and at the same time, farmers are also consumers of goat's milk and its by-products. Furthermore, regression estimates discovered that the consumption of goat's milk influences farmers' perceptions of goat's milk and its by-product. Also, few farmers had an understanding of the health and nutrition benefits of consuming goat's milk. On the one hand, willingness to pay for goat's milk is influenced by goat's milk consumption, health benefits and the religious status of farmers. Lastly, one of the significant challenges encountered by farmers is high feed intake that goats need to produce milk, as feed is relatively expensive for farmers.

RECOMMENDATIONS

The study results show male dominance in the production of goats, with most farmers having less than 21 years of experience in rearing goats. To address this, workshops, training, and information sessions are advised to assist farmers in developing skills to improve productivity since they have worked the minimum of years in farming and to bring awareness that goat production should not be limited to a specific gender. This should be practised

by the Department of Agriculture and other stakeholders or departments that support small-scale farmers' development. Most farmers rear goats for sales purposes rather than subsistence consumption. Therefore, the Department of Agriculture should assist farmers in obtaining a fair market price for goat's milk and its by-products.

Farmers' perception of goat's milk and its by-products is influenced by goat's milk consumption, health benefits and nutrition benefits. This calls for nutritionists and health professionals, to mention but a few, to advocate awareness of the benefits of consuming goat's milk and its by-products. This will also help accelerate demand for goat's milk and these by-products. The willingness to pay the standard price for goat's milk is conditioned by goat's milk consumption, health benefits and religious status. This means that awareness campaigns informing potential consumers should be advocated to generate improved knowledge and established markets for goat's milk and its products. Lastly, one of the significant challenges faced by farmers is the high feed intake to produce milk, as feed is relatively expensive for farmers. This calls for the Department of Agriculture to support farmers through subsidies or some form of compensation of goat feed to enhance production.

REFERENCES

- DAFF (Department of Agriculture, Forestry and Fisheries) (2014). Republic of South Africa Annual Report 2013/2014. Retrieved Sep 17th 2021 from: <http://www.daff.gov.za/>.
- DAFF (Department of Agriculture, Forestry and Fisheries) (2016). A profile of Goat milk. Retrieved Sep 17th 2021 from: www.nda.agric.za.
- Gujarati, D. (1992). *Essentials of econometrics*. New York: MacGraw-Hill.

- Guney, I., Ocak, S. (2013). Consumer preference for goat milk in Turkey. *Glob. Adv. Res. J. Agric. Sci.*, 2, 181–188. Retrieved from: <http://garj.org/garjas/index.htm>
- Idamokoro, E.M., Gunya, B., Aliber, M. (2019). Farmers' perception and willingness to consume goat milk and goat milk products: A case of study of the central Eastern Cape, South Africa. *Pastoralism: Research. Policy Pract.*, 9(3), 1–8. <https://doi.org/10.1186/s13570-019-0139-7>
- Kamarubahrin, A.F. (2019). Muslim consumer intention toward goat milk purchasing behavior in Malaysia: A preliminary findings. *Int. J. Manag. Account. Econ.*, 6(1), 6279. https://www.ijmae.com/article_114103.html
- Krishnan, V. (2010). Constructing an area-based socioeconomic index: A principal components analysis approach. *EC map.*, 20–22. <https://www.ualberta.ca/community-university-partnership/media-library/community-university-partnership/research/ecmap-reports/seicupwebsite10april13-1.pdf>
- Marius, L.N., Shipandeni, M.N.T., Togarepi, C. (2021). Review on the status of goat production, marketing, challenges and opportunities in Namibia. *Trop. Anim. Health Prod.*, 53, 30. <https://doi.org/10.1007/s11250-020-02468-3>
- Merlino, V.M., Brun, F., Versino, A., Blanc, S. (2020). Milk packaging innovation: Consumer perception and willingness to pay. *Agric. Food.*, 5(2), 307–326. <http://dx.doi.org/10.3934/agrfood.2020.2.307>
- NAMC (National Agricultural Marketing Council) (2005). Report on the investigation into the potential for the South African Goat Industry.
- NAMC (National Agricultural Marketing Council) (2021). Annual report on predetermined objectives 2020/21. Retrieved Oct 17th 2021 from: www.namc.co.za.
- Ogola, T.D.O., Kosgey, I.S. (2019). Factors influencing participation in dairy goat milk marketing in Kenya and its implication for a sustainable breeding program. *Livest. Res. Rural. Dev.*, 31(4). <http://www.lrrd.org/lrrd31/4/isacc31048.html>
- Phoya, R.K.D., Fullu, W.H.K., Banda, J.W. (2003). The effect of milking indigenous Malawi goats on kid growth and mortality rates. *Malawi J. Agric. Sci.*, 2, 42–48. <https://www.cabi.org/gara/mobile/FullTextPDF/2008/20083325275.pdf>
- Statistics Handbook (2018). An overview of statistical methods (p. 18–26). Retrieved Nov 19th 2021 from: <https://unctad.org>