

# Consumers' Perceptions Towards Goat's Milk: Exploring the Attitude Amongst Consumers and Its Implication for a Dairy Goat Breeding Programme in Siaya County, Kenya

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## Abstract

Although most of the milk consumed in Kenya comes from cows, goat's milk is becoming increasingly popular despite the often negative public perception as evidenced in the literature. Studies on consumer willingness to pay for goat's milk have revealed that consumers were more willing to pay a premium price to obtain the milk. However, there is inadequate information on consumers' attitudes towards consumption of goat's milk, factors associated with this attitude and their implication on a dairy goat breeding programme. By assessing consumer perception, the current study examined consumers' attitude towards goat's milk in Siaya County of Kenya, the factors that influenced the decision, and their implications for a dairy goat breeding programme. A snowballing sampling technique was used to select a sample of 84 survey respondents in the County. Primary data was collected using interviews with the help of sets of structured and semi-structured questionnaires. A 5-point Likert continuum scale was used to analyze and rank perceptions of consumers, with one (1) as strongly disagreed and five (5) as strongly agreed. The results showed that consumers' perception towards goat's milk was positive. There was a relationship between perception towards goat's milk and socio-economic factors like age and education. From the findings, it was also evident that the price of goat's milk and its relative scarcity were barriers to its consumption. This implies that dairy goat multiplication and breeding programmes are likely to be successful in the study area and in areas with similar production circumstances. Policy interventions are, therefore, recommended to educate consumers on quality attributes of goat's milk and provision of high value genotypes of dairy goats to farmers in the County to increase the volume of milk supply from the goats and, due to economies of scale, subsequently lower the cost of production and stabilize the market price of goat's milk.

**Keywords:** Attitude, Consumer perception, Goat's milk, Breeding programme, Kenya

## 1. Introduction

The dairy goat population in Kenya has steadily been increasing over the last decade (Ogola et al., 2010a). Key to this increase has been various development programmes that have been introduced in different parts of the country (Ahuya, 2005; Ogola et al., 2010a). Other factors that have contributed to the use of dairy goats are the rapid human population growth, climate change, urbanization and land fragmentation (Dubeuf et al., 2004; Kosgey 2004; Ahuya, 2005; Ogola et al., 2010a; Mbuku & Kosgey, 2013). Dairy goats often thrive well across agro-ecological zones, occupy small space, have low feed requirements and reproduce rapidly (Devendra & Burns, 1983). Most importantly is the ability of goats to play a role in generating employment and income, capital accumulation, and improving household food security and nutrition (Pannin & Mahabile, 1997).

The progressive introduction of dairy goats into Kenya has placed an emphasis on consumer driven market development of its products. One of the products that can influence the success of the goat enterprise is goat's milk. Goat milk consumption accounts for a small but growing percentage of the Kenyan dairy market. According to FAO (2011), over 70% of the milk that is sold in Kenya originates from dairy cows and only

0.02% from goats. The evolution of the dairy goat milk markets can, in many ways, dictate the success or failure of dairy goat breeding programmes and the dairy goat enterprise in general. A study by Jerop et al. (2013) in Siaya County found that many consumers were willing to pay a premium to obtain goat's milk. Studies on taste done in western Kenya indicated no difference in acceptability of goat and cow milk products. A study by Kagunyu et al. (2006) revealed that milk from exotic dairy goat genotypes had less fat, was less sweet and had more odour than from indigenous goats. Various studies have documented certain exceptional chemical compositions of goat's milk that contributed to its beneficial effect on human health (e.g., Businco & Bellanti, 1993; Park, 1994 & 2005; Alfe íez et al., 2003; Haenlein, 2004; Park & Haenlein, 2006; Ochepe & Momoh, 2010). According to Park (2005), the most important quality standard for goat's milk is an acceptable, attractive odour and taste. Other studies have reported that the strong odour and taste of goat's milk prevent people from consuming the milk (e.g., Mowlem, 2005; Park, 2005).

Various studies have identified that a number of factors can influence consumers' buying behaviour in relation to food (e.g., Davis et al., 1989; Thompson & Thompson, 1996; Shepherds, 2001). Choice of food by consumers is shaped not only by their cognitive appraisals but also by many interrelated factors (Shepherds, 2001). The demographic and socio-economic characteristics of the buyer can affect the buying behaviour. Among the crucial influential socio-economic characteristics of the consumers are gender, age, household income, education and household size (Jerop et al., 2013). The presence of children in a household has been regarded as a significant factor that positively influences consumers' organic food attitudes as well as buying behaviour (Essoussi & Zahaf, 2008). Children have also been shown to change the buying decisions of the parents when they are shopping in a supermarket. Additionally, education has been reported as a significant factor affecting consumers' attitudes towards organic food products. People with higher education were more likely to express positive attitudes towards organic products (Gracia & de Magistris, 2007). Higher income households were also more likely to form positive attitudes and to purchase more organic food (Aryal et al., 2009).

The controversies raised by fundamental questions on peoples' attitudes towards acceptance of goat's milk, and its implications for a dairy goat breeding programme call for additional studies. No information exists about the specific factors that drive attitude towards goat's milk in Kenya and its implications for a dairy goat breeding programme. The current study aimed to fill this void by undertaking a study to assess peoples' attitudes towards consumption of goat's milk in Siaya County where exotic dairy goats have been introduced, factors associated with these attitudes, and its implication for a dairy goat breeding programme. The County is located in the south-western part of Kenya bordering Busia County to the north and Kisumu County to the south-east. The County has a total area of approximately 2,530.5 km<sup>2</sup>. It lies between latitude 0° 26' to 0° 18' north and longitude 33° 58' east and 34° 33' west, with an annual rainfall between 1,170 and 1,450 mm, and a temperature range of 15 to 30° C. Largely, people in this region are faced with many challenges because the area is relatively dry, has small land sizes, i.e., the County is densely populated (≈333 people per km<sup>2</sup>) and is milk deficient (KCFS, 2011). Consequently, dairy goats present an opportunity for people in the area to increase their incomes through sale of goat's milk, and to improve their food security and nutrition through milk consumption. With more information about the demand side of the market, dairy goat farmers and the business community in Siaya County can make better informed business decisions. The information derived from the current study will also be important for the expansion of dairy goat multiplication and breeding programmes in Kenya.

## 2. Theoretical Framework

It was assumed that a consumer's attitude towards goat's milk was embedded in consumer behaviour. The behaviour of a consumer directly results from intentions that are generally favourable towards the purchase of a commodity as indicated in the theory of planned behaviour (TPB), which is a revision of the earlier theory of reasoned action (TRA), with the addition of perceived and actual control as factors in both behavioural intention and behaviour (Ajzen, 1985). Within the framework of TRA, behavioural intention is a function of attitude towards the behaviour and normative social beliefs held by the consumer (Davis et al., 1989). That is, besides measuring people's attitudes towards the behaviour, there is also need to measure people's subjective norms. Attitudes towards behaviour measure the extent to which an individual has a favourable or unfavorable evaluation of the behaviour in question (Thompson & Thompson, 1996) while the subjective norm refers to the perception of what other people and the environment think the person should do with respect to the behaviour in question, and what the response to this pressure will be in predicting his/ her behaviour (Madden et al., 1992). Additionally, according to the TRA, a person's attitude towards behaviour is influenced by his/ her behavioral beliefs and evaluations. Behavioural belief is one's belief in performing a specific behaviour that will lead to a specific consequence, and evaluation of the outcome is one's assessment of the specific consequence (Lam & Hsu, 2006). Therefore, the TRA assumes that attitude to the behaviour ( $A_{act}$ ) is determined by the sum of a person's behavioural belief strength ( $B_i$ ) and about the consequences of performing the behaviour multiplied by

the person's evaluation ( $E_i$ ) of those consequences (Ajzen, 1985). This can be written formally as shown in equation 1 below:

$$A_{act} = \sum_{i=1}^m B_i E_i \quad (1)$$

The subjective norm, ( $SN$ ), is determined by the sum of the person's normative beliefs, ( $NB$ ), i.e., beliefs concerning the particular behaviour multiplied by the person's motivation to comply with the wishes of the people perceiving him/ her ( $MC$ ) (Ajzen, 1985). The TRA expresses this relationship as presented in equation 2 below:

$$SN = \sum_{j=1}^n NB_j MC_j \quad (2)$$

In both the TRA and TPB, attitude towards the target behaviours and subjective norms about engaging in the behaviours are thought to influence intention, but TPB adds perceived behavioural control over engaging in the behaviours as an additional factor influencing intention (Ajzen, 1985). Perceived behavioural control has a direct effect on behavioural intention too. Perceived behavioural control is a construct unique to TPB, and it refers to an individual's perception of the presence or absence of the requisite resources or opportunities necessary for performing the behaviour (Chau & Hu, 2001). Perceived behavioural control is caused by control beliefs, or the belief that the required resources and opportunities are available to carry out the behaviour, and perceived facilitation, or the assessment of the importance of those resources to successfully complete the behaviour (Ajzen, 1991).

Control beliefs consist of two components: (i) frequency of occurrence of the facilitators or inhibitors of the behaviour ( $C_i$ ), and (ii) perception of the strength of the facilitators or inhibitors ( $P_i$ ). Statement of these two components were again multiplied and combined to obtain the overall level of control beliefs (Ajzen, 1991) as depicted in equation 3 below:

$$PBC = \sum_{j=1}^n C_i P_i \quad (3)$$

### 3. Conceptual framework

Figure 1 below outlines the conceptualized interrelationships in the study, the key variables involved and how they are interrelated.

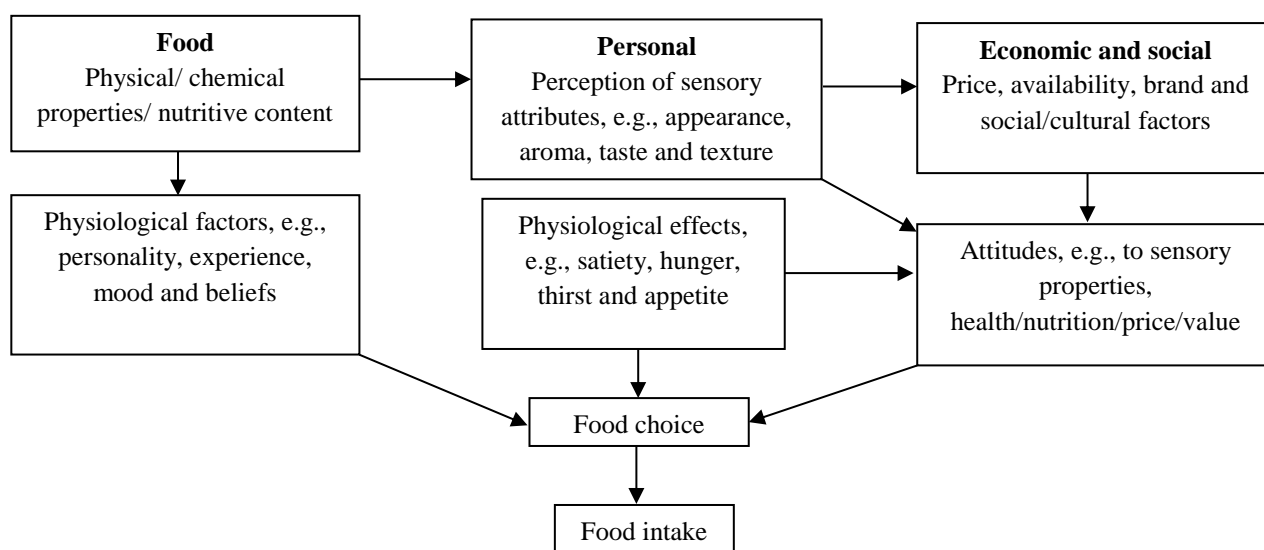


Figure 1. Factors influencing food choice (derived from Shepherds, 2001)

#### 4. Research Materials and Methods

The study was carried out in Siaya County because of the various programmes in the area targeting improvement of people's livelihoods using dairy goats. Data was collected from 84 consumers of goat's milk in the study area using a snowballing sampling technique, because consumption of goat's milk was not widespread. Sets of structured and semi-structured questionnaires, organized into two sections, were used to collect data. The first section was dedicated to obtaining information on socio-economic characteristics of the survey respondents like age, education, income, number of children 18 years and below, household size and gender. The second section was devoted to understanding perceptions and attitudes of the survey respondents towards goat's milk. Variables of interest were sensory attributes of goat's milk, price and availability of goat's milk.

Data was analyzed using SPSS version 17.0 software (SPSS Inc., Chicago, USA). Analysis entailed the use of frequencies, percentages and mean scores for descriptive statistics. Consumers' perceptions (i.e., sensory, health, price and convenience) towards goat's milk were assessed by asking them to react to the respective statements. Responses were recorded on a 5-point Likert-type continuum scale of SA (Strongly Agreed), A (Agreed), U (Undecided), D (Disagreed), SD (Strongly Disagreed), which were, correspondingly, scored 5, 4, 3, 2, and 1. The weighted mean was then calculated as shown in equation 4 below:

$$WM = [(fSA * 5) + (fAG * 4) + (fUN * 3) + (fDA * 2) + (fSD * 1)]/n \quad (4)$$

where WM = weighted mean; f= frequency values; 5, 4, 3, 2, 1 = attached weights; SSSS, AAAA, UUUU, DDDD&SSSS= perceptions of strongly agreed, agreed, undecided/ neutral, disagreed and strongly disagreed. Adopting the procedure of Bagheri et al. (2008) for perception analysis, the means for all indicators were then categorized as follows; 1.00-1.49 = strongly disagreed (SD), 1.50-2.49 = disagreed (DA), 2.50-3.49 = undecided/ neutral (U/N), 3.50-4.49 = agreed (AG) and 4.50-5.00 = strongly agreed (SA).

The study also determined socio-economic factors that predicted a consumer's perception towards goat's milk using ordinary least squares (OLS) regression model. The regression analysis model used is as presented in equation 5 below:

$$Y = \beta X' + \mu_i \quad (5)$$

where  $Y$  = dependent variable;  $X$  = a matrix of independent variables affecting consumers' perceptions towards goat's milk;  $\beta$  = vector of parameter estimates; and  $\mu$  = a random disturbance term. The dependent variable was the respondent's perceptions towards goat's milk, which was defined as the scores obtained from the statements associated with twelve selected indicators. The empirical model is as depicted in equation 6 below:

$$Y_i = \beta_0 + \beta_1 \text{ Education (Years)} + \beta_2 \text{ Age (Years)} + \beta_3 \text{ Gender} + \beta_4 \text{ Household size} + \beta_5 \text{ Household income} + \beta_6 \text{ Child}_{\leq 18} + \mu_i \quad (6)$$

#### 5. Results and Discussions

##### 5.1 Socio-economic Characteristics of Consumers of Goat's Milk

The frequencies and percentages of socio-demographic characteristics of the survey respondents are presented in Table 1 below. The sample comprised 57.1% women. Most (53.6%) of the survey respondents had primary level of education, with the least (9.5%) having tertiary education. Majority (67.9%) of them received a monthly income of less than Kenya Shillings (KES) 5,000, with only 2.4% earning above KES 15,000. The mean age of

the survey respondents was 45 years and household sizes ranged from 1 to 17. The mean number of adults that were 19 to 59 years of age was 3 people while children 18 years of age and below in a household was 4.

Table 1. Socio-economic characteristics of consumers of goat's milk in Siaya County, Kenya

Variable	Aspect	n	%
Gender	Female	48	57.1
	Male	36	42.9
Level of education	No formal education	9	10.7
	Primary	45	53.6
	Secondary	22	26.2
	Tertiary	8	9.5
Income (KES)	< 5,000	57	67.9
	5,001-10,000	17	20.2
	10,001-15,000	8	9.5
	15,001-20,000	2	2.4

KES= Kenya Shillings.

### 5.2 Consumer's Perception Towards Goat's Milk

The survey respondents were asked whether they strongly agreed, agreed, did not know or were neutral, disagreed or strongly disagreed with statements on sensory, health, price and convenience characteristics of goat's milk as presented in Table 2. The results show that the main motive behind consumers' attitude towards goat's milk was health. Traditional consumers of goat's milk in the County believed that goat's milk had therapeutic properties and could cure or prevent some diseases. A longitudinal four year survey by Harden & Hepburn (2011) of milk drinkers revealed that about 66.8% of those consuming goat's milk did so for medical reasons. Santoso et al. (2012) made similar conclusions on a survey among consumers of goat's milk. Another major factor that contributed to the perception on goat's milk was that it looked better. Consumers acknowledged that when boiling raw milk, goat's milk, unlike cow's milk, did not have a yellow thin sheet developing on the surface. The observation may be attributed to the fact that goats converted carotene in their diet to vitamin A more efficiently than cows did, producing whiter milk, cream and butter. Additionally, goat's milk does not contain agglutinin, the compound in cow's milk that enables the fat globules to cluster and rise to the top of the milk. This indicates that for some consumers, certain types of consequences of goat milk products have self-relevance. Table 2 also shows that the average mean value of perception statements on price dimension was 3.8 on a 5-point Likert scale, thereby giving it a rank of 3. According to Jerop et al. (2013), consumers were willing to pay higher prices for goat's milk. This implies that many consumers of goat's milk did not mind the price of the milk, possibly because of the additional health benefits of goat's milk. Sensory appeal attributes of goat's milk was also the driving factor on milk perception. The variable that goat's milk had a good taste ranked fourth, with an average of 3.7. Many of the respondents commented the taste of goat's milk as slightly sweeter than cow's milk. The study also found that majority of the survey respondents (53.6%) were more likely to agree with the statement that 'goat's milk was good for infants'. About 37.0% of the consumers alleged that children that faced problems like abdominal pain, bloating, diarrhea and facial rashes greatly improved after switching to goat's milk. According to Park (2012), goat's milk, in addition to providing basic nutrition and subsistence to goat keepers, had a significant value in human nutrition, especially for children.

In the current study, low consumers of goat's milk were more likely to agree with the statements that 'goat's milk had an odour', 'goat's milk was readily available' and 'goat's had a longer shelf life'. Odour in goat's milk was mostly produced by the presence of a buck, especially at the time the does were being milked, and odour in goat's milk could also be due to poor milking and handling practices (Bihagi & Jalal, 2010). The point that only 14.3% of the survey respondents accepted the statement that 'goat's milk had an odour' could be attributed to the fact that dairy goat farmers in the study area kept bucks separately from the milking does and also confined their goats almost all the time in stalls, with feed and water brought to them, which assisted in clean milk production and good milk practices (Ogola et al., 2010a). Further, most of the survey respondents in the current study felt that goat's milk was not readily available, with only 11.9% of the respondents strongly agreeing that it was readily available (Table 2). Economically, a high price of a commodity is assumed to be associated with its high demand or low availability. This implies that unavailability of goat's milk could be the cause of its relatively high price and, perhaps, a limiting factor to its consumption. According to Ogola et al. (2010b), initiatives on the use of dairy goats in Kenya were still at the formative stages, which may contribute to the overall scenario of unavailability of goat's milk. Majority (53.6%) of the consumers disagreed and strongly disagreed on the statement that 'goat's milk had a longer shelf-life than cow's milk', i.e., goat's milk did not stay for long without going bad.

Table 2. Perceptions of consumers on the likelihood of goat's milk possessing the characteristics listed than cow's milk in Siaya County, Kenya

Variable	Perception								
	Characteristic	Strongly agreed	Agreed	Undecided/Neutral	Disagreed	Strongly disagreed	Mean	SD	Rank
Health	Therapeutic factors	36.9	33.3	14.3	15.5	0	3.9	1.1	1
	Good for infants	23.8	29.8	32.1	14.3	0	3.6	1.0	5
Sensory appeal	Had an odour	1.2	13.1	29.8	38.1	17.9	2.4	1.9	8
	Looked better	48.8	17.9	9.5	19.0	4.8	3.9	1.3	2
	Tasted better	29.8	39.3	11.9	8.3	10.7	3.7	1.3	4
Price	More expensive	31.0	31.0	28.6	8.3	1.2	3.8	0.1	3
Convenience	Readily available	11.9	17.9	19.0	28.6	22.6	2.7	1.3	6
	Longer shelf-life	0.0	10.7	35.7	39.3	14.3	2.5	0.9	7

SD = standard deviation.

### 5.3 Regression Analysis

Table 3 highlights the estimated OLS regression function. It presents perception of goat's milk as the endogenous variable (Y), and socio-economic factors like age of the farmer, gender of the head of the household, income level, education level of the consumer and children under 18 years of age. The outcome of the regression analysis shed light on the extent the exogenous variables (Ft) determined and explained perception on goat's milk. The results showed that 25.4% of the variations in perception were explained by the exogenous variables. The results indicated a significant relationship between perception of goat's milk with age ( $P < 0.041$ ) and education ( $P < 0.001$ ) of the survey respondents. The coefficient of age was negative and significant. This implies that younger consumers had a more favourable perception on goat's milk. This may reflect societal change because focus on dairy cows earlier was more than on dairy goats or small stock (Josserand, 1984).

The level of education of farmers, as measured by the number of years of education, also influenced perception on goat's milk. The relation between level of education and perception was positive and significant. This implies that survey respondents with higher levels of education were more inclined to more favourable perception than those with lower levels of education. This could be attributed to the fact that consumers who were more knowledgeable had a higher ability to perceive, interpret and respond to better quality products (Gracia & de Magistris, 2007). Although not significant, the findings of the present study showed that perception of goat's milk was negatively influenced by gender. The gender variable was a dummy (1 = male and 0 = female). The negative sign on gender implies that females were more likely to perceive goat's milk positively relative to males. It may, therefore, be imperative to include men in the promotion of dairy goat breeding programmes to enhance their adoption. Despite being insignificant, perception of goat's milk was positively influenced by the number of children in a household below the age of 18 years. This finding suggests that an additional child below the age of 18 years from the mean in a household raised the perception of goat's milk. This could be attributed to the fact that families with children focused on health more than those without (Fricke & Alvensleben, 1997).

Table 3. Ordinary least squares estimation of socio-economic factors that affected perception of the survey respondents towards goat's milk in Siaya County, Kenya

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.44	0.19		18.56	0.00
Gender of the respondent	-0.11	0.07	-0.15	-1.46	0.15
Education of the respondent	0.15	0.05	0.36	3.38	0.00**
Presence in a household of children between 18 years and below	0.03	0.03	0.14	1.28	0.21
Household income	-0.06	0.05	-0.13	-1.23	0.22
Age of the respondent	-0.01	0.00	-0.21	-2.08	0.04*

Significance level \*\* $P < 0.05$ , \* $P < 0.1$ ,  $R^2 = 25.4\%$ .

## 6. Implications for a Breeding Programme

It is evident that dairy goats and goat's milk are increasingly becoming popular in Kenya as reported in various studies (Ahuya, 2005; Ogola et al., 2010a; Jerop et al., 2013). Studies have also shown that consumers were willing to pay premium prices for goat's milk in Siaya County (e.g., Jerop et al., 2013). By assessing consumer perception, consumer's attitude towards goat's milk and factors that influenced them would enable determination of appropriate policies and interventions that would enhance the success of a breeding programme for dairy goats in the study area and in areas with similar production circumstances. In the current study, the five most important factors that influenced perceptions on goat's milk were its therapeutic properties, appearance, price, taste and being good for infants. The belief in the health benefits of goat's milk may be the most critical at the moment in increasing its consumption. The point that goat's milk was pricey, coupled with the fact that it was relatively scarce, reflects the possibility that the market for goat's milk was still a niche market and did not enjoy the cost-cutting practices of mass production techniques. The findings in the current study imply that a breeding programme for dairy goats was likely to be successful in the study area. The positive relationship between perception towards goat's milk and socio-economic factors like age and education suggest the need to link demographic factors to dairy goat breeding programmes to ensure their success.

Policy interventions and education of consumers on quality attributes of goat's milk, and provision of high value dairy goat genotypes to farmers would increase both demand and supply of goat's milk and, subsequently, lower the cost of production and stabilize the market price of the milk. Similar initiatives have been used by various development programmes when introducing dairy goats in different parts of Kenya (Ahuya, 2005; Ogola et al., 2010a&b). Besides, pure exotic or crossbred dairy goats and associated technologies are preferred as a fast means of improving animal production of smallholder farmers and, quickly their economic status and diet quality (Kosgey et al., 2006). According to Ogola et al. (2010a), dairy goat multiplication and breeding programmes targeting poverty alleviation among rural populations should be commensurate with the farmer's capacity to ensure their success and sustainability, i.e., appropriate messages and technologies based on the understanding of the farmer's production objectives, options and constraints. Overall, the success and sustainability of dairy goat multiplication and breeding programmes would depend on the response of the farmers to the rising demand for dairy goats and their products through improved management practices and their constant training on good goat husbandry practices. Monitoring and evaluation of the dairy goat multiplication and breeding programmes are required to guide and entrench the technologies introduced.

## 7. Conclusions and Policy Recommendations

Due to the growing demand for health foods, consumption of goat's milk is increasing in Kenya because of, among other reasons, its therapeutic properties and nutritional value. The present study describes the existing situation regarding perceptions of consumers towards goat's milk in Siaya County of Kenya, the factors influencing this, and their implications for a dairy goat breeding programme. The main factors motivating consumption of goat's milk were; health concerns, goat's milk being good for infants, and goat's milk looking better and having a good taste. Additionally, the scarcity and the high price of goat's milk were revealed as hindrances to the development of the dairy goat sector in the study area. Age and education levels of the survey respondents had an effect on their perceptions towards goat's milk. It is, therefore, recommended that awareness and information be enhanced to the population in the study area on the nutritional and medicinal values, and other important attributes of goat's milk to increase its acceptance. It was also evident from the findings that the price of goat's milk and its low availability were barriers to its consumption. These would favour a breeding programme for the dairy goats. To counteract the price barrier, the government and development organizations should intervene by providing high genetic value dairy goats to farmers in this area to increase the volume of milk supply. This would lower the cost of production due to economies of scale and, consequently, stabilize the market price of goat's milk. Generally, the finding that consumers perceived goat's milk positively implies that multiplication and breeding programmes for dairy goats were likely to be successful in the study area and in areas with similar production circumstances.

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