ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

Nutritional Challenges Affecting Goat Performance: A Case Study, Terekeka County, South Sudan

Salah T. Bandas Lowaya[1]; Abu-Bakr Omer Ismail[2]

[1]Ph.D. Candidate Department of Animal Production University of Bahr El-Ghazal, College of Agriculture
[2]Professor, Supervisor, Department of Animal Production University of Juba,
School of Natural Resources and Environmental Studies

Publication Date: 2026/11/02

Abstract: This paper describes the traditional method of keeping goats and shows initial steps for future development. The data necessary for this paper have been gained through extensively questioning. questionnaire was used to collect data from 240 farmer-owning goats based on several-visit-interviews. To enrich the primary data, field observations smallholders in Terekeka county, Central equatorial State, South Sudan. Goats are traditionally kept in small herds, there being a high loss of young animals. In addition to natural pastures, the main sources of fodder are the waste products of the traditional way. The range of fodder is particularly poor during the dry period and the farmers depending on Valley water which represent 86%. animal walk longer distance to valleys which may cause risk of dehydration, weight loss and concentration of animals which may lead to diseases and parasites at water points. The animals' health situation and the quality of fodder during the dry season have been identified as the most important restricting factors in improving the keeping of goats. the major contributing factors to low production under traditional farming systems with low input is feeding especially during dry season.

Keywords: *Traditional Farming System, Poor Fodder, Dry Season.*

How to Cite: Salah T. Bandas Lowaya; Abu-Bakr Omer Ismail (2026) Nutritional Challenges Affecting Goat Performance: A Case Study, Terekeka County, South Sudan. *International Journal of Innovative Science and Research Technology*, 11(10), 2519-2527. https://doi.org/10.38124/ijisrt/26oct965

I. INTRODUCTION

Globally, goat farming has been performed in less-favored regions as this livestock type can easily adapt to different environments and transform feed into high-quality protein found in milk and meat (Miller and Lu, 2019).

Goats can thrive in harsh conditions and be reared in varied agro-climatic environments. Goats are prolific breeders with high feed conversion efficiency, which are preferred traits for economic viability. In most developing countries goats have been favored over cattle. This could be due to their small size, fast growth rate and adaptability on the seasonal changes as the result of their browsing behavior. Most importantly their products such as meat are not subjected to the religious taboos unlike pork and beef to Muslims and Hindus respectively (Chenyambuga *et al.*, 2014). Their milk is said to be better compare to other milk such as cows for people suffering from lactose intolerance which is common among adults (Heinlein, 2004). Besides goats' milk containing almost the same amount of lactose as cow's milk (Silanikove *et al.*, 2015).

Goats need plenty of high-quality forage for efficient growth – between 1.5% and 2% of a goat's body weight.

Raising goats can be a valuable part of a sustainable farm. Goats often fit well into the biological and economic niches on a farm that otherwise go untapped. Goats can be incorporated into existing grazing operations with sheep and cattle, and they can also be used to control weeds and brush to help make use of a pasture's diversity. Abet, T. 2021.

In South Sudan agro-pastoralism is the main livelihood system in rural areas. Although agro-pastoralism involves both livestock rearing and crop production, a household's financial capital is held in the form of livestock. Livestock also supply milk and other foods, are sold to purchase cereals for food and meet other domestic needs. Poorer households aim to build their herds; this is the key and economically logical strategy for building their financial capital. Due to the seasonality of food production, milk is a critical food at specific times of year, when other foods e.g. cereals, are not readily available. Livestock is also important in South Sudan's pastoralist and agrarian areas. In addition to the role of livestock as financial capital and food, traditional social

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

support systems in South Sudan are based on livestock transactions.

In particular, the use of livestock as bride-wealth creates social networks, with reciprocal assistance in times of hardship. This critical role of livestock in South Sudan is difficult to quantify, but has huge significance in communities facing crises such as protracted conflict and market failures. Report Livestock and conflict in South Sudan (Idris, 2018).

Goats make an important contribution to the subsistence sub-sector of the economy of many countries in Africa, Asia and in the Middle East. The vast majority of them are raised on rangelands. Ensminger, M. E. (2002).

- *Importance of Goat Production and its Role in Household*

In South Sudan, goats are a vital part of the economy and livelihood, providing milk, meat, and income, and are particularly important for food security and resilience, especially for vulnerable communities. Goats play an important role in the livelihood of small scale farmers as a major component of livestock mixed farming systems, which produce meat, milk, skin, fiber, and manure to large number of low income earners (Acharya *et al.,* 2011).

Goats, being adapted to different agro-ecologies, reared by various ethnic communities and found in all production systems (Solomon *et al.,* 2010). Rural life and livelihoods in South Sudan are primarily dependent on smallholder agriculture, fishing and forestry, complemented by the collection of wild foods, hunting and trading. Smallholder agriculture is largely arable-based in South Sudan's Greenbelt, Ironstone, and Nile and Sobat river livelihood zones and more livestock-based in the East and West Floodplains, Hills and Mountains and Semi-Arid livelihood zones. Goats are predominantly sold live for cultural and religious ceremonies and traditionally goats have served as a means of ready cash and a reserve against economic and agricultural production hardship. Zewdie B and Welday K, 2015.

Smallholder farmers still have no access to export goats and its products because of various production and marketing constraints they face. Producing for the formal market requires production resources such as land, water, on farm and off-farm infrastructure, labour force, capital, and good management skills. Khapayi, M. And Pelliers, P. R. (2016).

- *Goat Production Contributions and Challenges to Food Security*

Goats produce meat, milk, fiber, skin and manure. Goat meat has both a large export market and local market. Fiber from goats (mohair and cash mere) is considered to be one of the most luxurious fibers in the world. Goat skin also has high export value due to its role in value-added products. The largest goat population is in Asia, followed by Africa. The biophysical environment of a particular area determines the types of crops that can be grown and feed resources available for maintaining livestock (Devendra, 2007a).

The European goat production system is quite different from developing countries. The livestock production system in developing countries is mainly a pastoralist, range-based, mixed crop-based and landless system, and is therefore a sustainable process. These types of production systems are found in Asia, North Africa, Central Asia, West Asia, Latin America and the Caribbean regions. Agro pastoralist systems are very specific to Africa and Asia. This production system is characterized as extensive grazing where households are nomadic. A similar system is also observed in India in different agro-climatic regions. A range-based system is essentially an extensive system characterized by rainfall of less than 150 mm/year, chronic drought and minimal feed resources. The range-based system is mainly observed in nomads and migratory farmers. Four categories of goat production system have been identified in the existing livestock systems (Devendra, 2007b):

The integrated system involving grazing and tree lopping is observed in areas where grazing land is scarce. It is essential to know the production environment of goat production as it will identify the constraints limiting goat production and enable farmers to address issues and formulate strategies to resolve problems. The diverse constraints in different production systems need to be analyzed and a system approach should be adopted to provide an important pathway for increasing ruminant productivity. primary from development countries they are the one suffering. Climate change and the growing human population have placed immense pressure on natural resources, making it increasingly difficult to provide adequate nutrition to impoverished households (Albahri *et al.,* 2023).

Goats contribute to income, food, and nutritional security through their ability to convert and store nutrients from low-value forage (graze and browse), fodder, industrial by-products, and biomass waste streams, which would otherwise be inaccessible to humans, into meat and milk rich in micronutrients. Therefore the financial benefits of rearing goats fall into two main categories, cash and insurance (Gwiriri *et al.,* 2023; Kaumbata *et al.,* 2020). The selling of meat, milk and live goats can be an important form of household income. Goat ownership can also provide resilience through the ability to sell or slaughter an animal in times of hardships. Nsoso *et al.,* 2004.

Across Sub-Saharan Africa (SSA), goats play vital nutritional, socio-economic, and cultural roles, underpinning food security for millions of people. This is especially true in rural communities where most of households own or rear goats in some capacity (Manirakiza *et al.,* 2020).

II. MATERIALS AND METHODS

- *Study Area Description*

This study was conducted in Terekeka County, one of the central Equatorial Counties is an administrative division of Central Equatorial state. has 9 payams (sub-counties) and 46 bomas (village administrative units). The payams are: Terekeka, Tali, Tindilo, Muni, Nyori, Reggo, Rijiong, Tombek, and Gemeiza. Bomas are the further subdivisions

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

within each payam. It lies on both the east and west bank of the White Nile north of Juba .

Terekeka County is located at the northern edge of Central Equatoria State, it borders Juba County to the south, Western Equatorial State to the west, Lakes State and Jonglei State to the north, and Eastern Equatorial State to the east. The county contains both low lying swamps and hills in the southern portion of the county. The Nile River runs down the eastern bank of Terekeka Town and Lake Madi is located in the county's west. It borders south with juba county, west with western Equatoria state, north lake state and Jonglei state east eastern equatorial state the region is dominated by the Mundari tribe the native land. Livelihoods in this zone are chiefly based on subsistence rain-fed agriculture and supplemented by forest products and seasonal fishing nets The natural resources available in Terekeka County allow residents to engage in a variety of livelihoods, including agriculture, cattle-keeping and fishing.



Fig 1 Study Area Description

➢ *Terekeka Climate*

The hottest month of the year in Terekeka is March, with an average high of 102°F and low of 79°F. The cool season lasts for 3.0 months, from June 12 to September 11, with an average daily high temperature below 89°F. The coldest month of the year in Terekeka is August, with an average low of 71°F and high of 87°F.

III. METHODOLOGY

➢ *Data Collection:*

Both primary and secondary sources of data were used for the study. Primary data were collected using participatory approach where structured questionnaires were administered to 240 small ruminant farmers' respondents from the respective Payams, The data included age at first mating (AFM), age at first kidding (AFK), kidding interval (KI), pregnancy length (PL), fertility, fecundity, abortion, mortality and prolificacy rates, The chapter is organized into sections covering the questionnaires, demographic characteristics of respondents. the following techniques has been applied.

➢ *Primary Data:*

Primary data was collected using a participatory approach. Both the quantitative and qualitative data will be directly obtained from various respondents such as farmers, Community Animal Health Workers (CAHWs), local leaders and Veterinary expert, about purpose of keeping small ruminants, population of goats and sheep, management practices, constraints of small ruminant production including health issues/common diseases, nutrition management at difference seasons.

➢ *Secondary Data:*

Secondary data were collected from peer-reviewed journals, records from the ministry of Animal Resources and Fishers. Quantitative data obtained from closed-ended questions were analyzed using frequencies and percentages and presented in tables while qualitative data from open-ended questions were analyzed thematically and integrated into the discussion.

➢ *Small Ruminant Questionnaires:*

A comprehensive small ruminant questionnaire was designed to cover all information that relevant to the husbandry of small ruminants, include socio economic characteristics of the small ruminants farming/rearing households, growth performance parameters of small ruminants, natural pasture, nutrition, feeding management and environmental factors, breeding and management practices and health management. The questionnaire was written in very simple English for easy understanding by the respondents and easily translated to local dialogue as well as Arabic during the course of data collection. Also relevant sources of information for identifying pertinent issues that are to be considered by the County Agriculture Department, State, and national ministry of Livestock, Animal Resources and Fisheries, of the County.

➢ *Personal Observation:*

Directly watching and the behaviors has been recorded in real time using senses and judgment. There were no device or tool used for dedicating the data mediating the data collection – the researcher was the instrument. and immediate grazing environment to identify constraints of nutrition. Some information during this study was captured by personal direct observation and experience in the area, this includes:

- Breed/type of small ruminants in the area.
- Managerial and feeding methods utilized in the area.
- Incidence of animal diseases, vectors, internal and external parasites and other causes of ill health.
- Herd and flock structure in the house and in the grazing area.
- Present of wattles, beards and ruff on the both side of the neck up to the back.
- Grazing and water supplies distribution in the area.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

➢ *Field Survey at the Study Area:*

Breeders were questioned individually in their farm. Problems facing their animal's data were collected from farmers. The survey was conducted using structured questionnaires. data that was designed and administered to 240 ruminant farmers in Terekeka county, from May to October 2026 Data was collected on biodata of the farmers, animal kept and number, duration of involvement in ruminant farming and purpose, system of management, flock composition and feeding regime of the animals. All Data obtained from the structured questionnaires were analyzed for descriptive statistics in all the parameters using Statistical descriptive SSPS and Microsoft excel 2016.

➢ *Measurement Techniques*

Data collected using measurement methods in animal production involves using tools and techniques to gather quantitative data on various aspects of animal health, growth, and productivity. These measurements were used to track animal performance like body condition score (BSC) testing using hand palpation and assigning the score (1-5 scale), and linear morphometric measurements, particularly heart girth (HG) or chest girth (CG) and body length (BL) for estimation of live weight using a flexible measuring tape (in cm).



Fig 2 Measurement Techniques

➢ *Data Analysis and Management:*

- *Descriptive Statistics:*

Descriptive statistics is used in a variety of ways, such as describing sample characteristics. Descriptive statistics is used to describe the characteristics of a sample, such as the mean, median, and standard deviation of a variable (Alabi, 2023). Descriptive statistics are essential for summarizing, organizing, and interpreting raw data to understand the factors affecting the reproductive performance of small ruminants grazing on natural pastures. Under extensive or semi-intensive pastoral conditions, these statistics allow researchers to identify key constraints, such as poor nutrition, seasonal breeding, or disease, by transforming survey and monitoring data into actionable insights.

- *Multiple Regression:*

Multiple regression is the statistical procedure to predict the values of a response (dependent) variable from a collection of predictors (independent) variable values (Sinharay, 2010). Multiple regression is a powerful statistical tool in animal science used to analyze the joint effect of

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

several independent factors (like, pasture quality, age, supplementation) on a single continuous dependent variable representing reproductive performance (like, litter size, age at first kidding/lambing, or kidding/lambing interval) in small ruminants. In the context of natural pastures. Multiple regression models this by calculating the effect of each predictor variable while holding others constant.

- *SPSS:*

Statistical Package for the Social Sciences (SPSS) is a comprehensive software program used for the interactive or batched statistical analysis of data. While originating in the social sciences, it is widely used in agricultural research such as studies on small ruminant reproductive performance, for managing, analyzing, and visualizing complex datasets. SPSS/IBM version 20 provides a user friendly interface that allows researchers to perform advanced statistics, including descriptive analysis and regression, without extensive programming. The information from the surveys will be organized, summarized, and analyzed using Statistical Package for Social Sciences (SPSS version 20)

IV. RESULTS AND DISCUSSION

Research respondents of this study gave most of their answers in form of writing. The researcher also got the chance to write down those answers given by the key informants and less educated respondents by use of interviews. The questionnaires for the educated respondents were administered only in simple English. Also Data measurement method was used to track animal performance like body condition score (BSC) hand palpation and linear morphometric measurements, particularly heart girth (HG) or chest girth (CG) and body length (BL) for estimation of live weight using a flexible measuring tape (in cm). to gather quantitative data on various aspects of animal health, growth, and productivity. This section began only after data is tabulated and organized, till it becomes ready for presentation, analysis, and interpretations. This process is done in accordance with the objectives of the study. Therefore, the collected data is hereby organized and arranged into tables, graphs, pie-charts, and histograms for easier interpretations and analyses.

Table 1 Socio –Demographic Characteristics of the Respondents

Variables	Frequency	Percent
Age (years)		
Below 30	045	19%
31 - 40	147	61%
41 - 50	028	12%
Above 50	020	08%
Marital status		
Married	190	79%
Not Married	032	13%
Divorced	008	03%
Widow	010	04%
Family size		
1 - 3	040	17%
4 – 6	050	21%
7 – 10	125	52%
Above 9	025	10%
Years of experience		
1 – 10	025	10%
11 -20	035	15%
21 -30	140	58%
31 -40	040	17%
Education		
Primary School	175	73%
Secondary School	60	25%
Diploma	05	02%
Bachelor	00	00%
Master	00	00%
PhD	00	00%
Occupation		
Farming	160	67%
Trading	050	21%
civil service	020	08%
NGOs	005	02%
Student	005	02%
Herd size		
1 – 15	020	08%
16 – 30	055	23%
31 – 40	155	65%
Above 40	010	04%

Source Field Survey 2026

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

Table (1) above illustrated the different aspects of respondents who participated in information of collected data.

➢ *Age of Respondents:*

Table (1) shows majority of the respondents are from the age category of 31-40 which comprises shows that majority of the respondents with the percentage of 61% that most of the owner keepers of small ruminant are medium age this go in line with The Ajala *et al.,* (2008) revealed that majority (51%) of small ruminant keepers were within the age range of 18- 31years and elder people of category 41 -50 represent young people who also participate in rearing and herding small ruminant with the percenter 12% they are following adult group 31-30 which is the most active group in community due to the fact that they are the heads of family (household members), which represent 79% most of them are married people.

Farmers were start their farming at the adult age that help them to managed their animals in better way old people above 50 years represent 8% having some activity with keeping small ruminant means that majority of old people are not small ruminants' keeper they are just supervising the adult people in management and rearing practice according to their experience.

➢ *Marital Status Responders:*

Majority of respondents are married as appeared in table (1) 190 (n=240) of respondents who filled the questionnaire are married people which represent 79% from the total number of 240 individuals, followed by not married people which represent 13%.

➢ *Family Size of Respondents:*

Family size of respondent in the study area fall between range 7-10 average (8.5) family members which represent 52% out of the total number 240 of respondent in the study area followed by family size range between 4-6 (Average 5) represent 21%. most of the larger families they extended families comprising of simple families together as one family.

➢ *Experience Years of Respondents:*

Frequency 140 individuals with 58% which range between 21- 30 of the respondents have experience and well understanding on how to keep sheep and goats due to the long term of managing sheep and other livestock animals but in traditional aspect of management depending only on natural pasture in term of nutrition. However, majority of the respondents reported that they work experience is range between 21 -30. they are keeping both sheep and goats were benefit from keeping sheep and goats by getting milk, meat production and commercial are mainly reasons for keeping both sheep and goats in Terekeka county.

➢ *Education of Respondents:*

Table (1) shows the category of primary school carried the majority of respondents with frequency numbering 175 which is 73% from the total sample size of individuals of the respondents most of them are school dropout due to lack of school fees and misunderstood educational value by the parent thinking that better for young people to help their parent by keeping/ livestock/sheep and goats than to go to school The second category in ranging is Secondary school numbering frequency of 60 which is 25%. But both categories of bachelor and diploma some of them are undergraduates in the universities and some are working in both public and private sectors

➢ *Occupation of Respondents:*

In table (1) farmers are the majority of the respondents with frequency of 160, which is 67% of the respondents because the questionnaires were given to farmers to filled in order to test whether most of them farmers since or before. Another category of trading with the frequency of 50, which is also 21% of the respondents have occupied the second position. Whereas the last one category of students and NGOs with the frequency of 5, which is also 2%. For both.

➢ *Herd Size:*

The higher herd size in the study area was found between 31 – 40 average (36.5) of 155 respondents from total respondents of 240 which represent 65%**.** The study also revealed that 23% of the small ruminant's owners from the study area had 16-30 average (23) herd size of small ruminants

Table 2 Gender of Respondents

Gender	Frequency	Percentages
Male	080	33%
Females	160	67%
Total	240	100%

Source: Field Survey, (2026)

Table (2) above shows that 160 of the respondents with the percentage of 67% are females due to the fact that most of the females are not based on home taking care for keeping sheep and goats around near home grasses and males they go very far large livestock grazing i.e. in table (2) shows that 80 of the respondents with percentage of 33% are male which is less than females because men are mainly keeping cattle and those sheep and goats to females. The data presented in the table above indicated that out of the total number of farmers interviewed 33% were male and 67% were female respectively. These results portrayed that more females are engaged in small ruminant management in Terekeka county. Sheep and goat keeping in the study area is a female dominated activity and majority are married. In contrary with Aruwayo *et al.,* (2015) that ruminant production is male dominated in Katsina state.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

Table 3 Water Sources and Drinking Interval for Sheep and Goats' in Different Season

Particular	Frequency	Percentage
Water source (dry season)		
- Well water	010	7%
- stream	010	7%
- valley	120	86%
Water sources (wet season)		
- well water	40	29 %
- stream	70	50%
- valley	30	21%

➢ *Dry Season:*

In the table 3 illustrates that Valley water is dominant which represent 86% and this study goes in line with study carries out in Ethiopia ponds/valleys found that 60-80% source of water during dry season which agreed relatively with Coppock 70% D.L 1994 as well as FAO 2012 indicates that drinking water comes from valleys. valleys hold rain water longer, become the main ponds and water holes when stream dry up. Wells may be too far or have low yield. Wells and streams are minor which 10% as mention by Sahel, Nigeria 2008 that 45% water source comes from wells and stream. Each wells may be deep, require labor to fetch water. Streams often dry up completely animal walk longer distance to valleys. Risk of dehydration, weight loss and concentration of animals which may lead to diseases and parasites at water points.

➢ *Wet Season:*

Table 4 indicate that Stream water is 50% agreed with McCade, J. T2004 Young, H. et al 2009 studied carried out in Darfur livelihoods which states that 55-66% of drinking water comes from streams. Rain refills streams and they flow easy access, less labor, wells increase to 29% compared to 10% in dry season because shallow wells recharge and water is easier to fetch. While Valleys about 22% compared to 86% in dry season because valleys flood or water becomes dirty/ stagnant. Herders prefer running water.

➢ *Drinking Interval*

From the illustrated table 4 above the source tells us dry season longer intervals in extreme cases because animals must trek to valleys. High heat, poor forage which cause higher water need but lower access. Wet season it has shorter interval in common because streams/ wells are near grazing areas. Cooler temperature green forage also reduces water demand in table 4 is describing that high intake and body weight gain ii wet months June – September and start to decline in dry month in October and this study is in line with Kassahun 2009 found that two higher intake and body weight gain in wet months' vs dry months. In this study as illustrated in table 4 that the food conversional efficiency is very low starting in dry month dry month October to poor which 0.06 as a result in general poor efficiency mean 0.11 FCR and this agreed with Tulu et. al, 2021 reported FCR drops to 0.05-0.07 in October due to the poor forage quality.

Table 4 Means of Daily Intake (Kg Dm/Animal) and Daily Body Weight Gain Kg

Month	Daily intake	Daily weight gain	FCE
May	0.35	0.04	0.11
June	0.60	0.07	0.12
August	0.80	0.075	0.09
September	0.71	0.124	0.17
October	0.55	0.035	0.06
Mean	0.60	0.07	0.11

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

V. CONCLUSION AND RECOMMENDATION

➢ *Conclusion:*

Goats have been economically, nutritionally and socio-culturally very important to mankind, in common with other ruminants, because they can convert low quality fibrous feeds to high quality products. Judging from the analysis, the overall goats' performance problems are causes by Inadequate management and nutritional deficiencies cause poor production. All these performance problems should be resolved by positive improvements in nutritional, photoperiod & infectious causes. Goats performed comparatively better than sheep in terms of age at first kidding, kidding and lambing rate and gestation period under natural pasture.

The study found out majority of the farmers in the study area are practicing free-range farming system of small ruminants about 70% (n=98) of the respondents practiced free-ranging system of small ruminants' production. Therefore, Small ruminant's production was perceived to be disadvantaged in terms of nutrition, access to extension services and new technology. So efforts must be put to support sustainable intensification will vary by production systems and the specific factors driving changes. Growing demand for small ruminant products, particularly from local, domestic, and local markets will continue to be the main driver of small ruminants' system intensification in developing countries. Smallholders can play an important role in the needed sustainable intensification if investments are targeted and implemented in areas of most probable positive returns, policies and investments are pro-poor and emphasis is given to empowerment and developing the capacities of the poor to participate more fully. Goats farming was facing several constraints, for example, related to animal feeding and health, in the study area. Also diseases contribute to high death rate as shown in the result of this study 70% (n=98) of low kid/lamb survival was due to diseases especially PPP Majority of the small ruminants' farmers practice uncontrolled/mixed flocks. However, the culling age was higher in the traditional system which could be explained by the lack of follow-up and assistance of goat herd. Based on these findings, goat farmers have a lack of knowledge on livestock management particularly on reproduction and even in health and feed.

In general, the results reveal several constraints that need to be taken into consideration when designing and implementing goats' production program, by better feeding practices, greater attention to basic healthcare and better selection of breeding.

➢ *Recommendation*

- There is a need of genetic improvement programs of goals, within indigenous goats' populations rearing under traditional management system.
- Disease control through improved prevention of diseases, vaccination, and through genetic resistance.
- Supplementation for specific classes of animals such as lactating, Pregnancy and Kidd animals
- Training of farmers on breeding, health management, record keeping, and access to veterinary services.
- improvement in feed quality through urea treatment of feeds, and through increased efforts in plant breeding to correct the grain varieties and raise nutrient quality of the crop residues;
- More researches to be conducted on the impact of diseases and nutrition.

REFERENCES

[1]. Silanikove, N., Leitner, G. and Merin U. 2015. The interrelationships between lactose intolerance and the modern dairy industry 7: 7312-7331

[2]. Solomon G, Azage T, Berhanu G and Dirk H, 2010. Sheep and goat production and marketing systems in Ethiopia: Characteristics and strategies for improvement. Livestock Research Institute (ILRI), Addis Ababa, Ethiopia.

[3]. Miller, B.A. and C.D. Lu. 2019. Current status of global dairy goat production: An overview. Asian-Australasian Journal of Animal Sciences 32(8):12-19

[4]. Devendra, C. (2007b) Perspectives on animal production systems in Asia. Livestock Sciences 106, 1–18

[5]. Devendra, C. (2007a) Goats: Biology, Production and Development in Asia. Academy of Sciences Malaysia, Kuala Lumpur, Malaysia, p. 246.

[6]. Chenyambuga S. W. and Lekule F. P. 2014. Breeding preferences and breeding practices for goats in agro-pastoral communities of semi-arid and sub-humid areas in Tanzania. *Livestock Research for Rural Development* 26(6): 117

[7]. Abet, T. 2021. Uganda: Scientists Turn to Goat Milk to Curb HIV-Related Deaths. The Monitor paper. 17 March 2021

[8]. Acharya, Iwaasa, A.D., McAllister, T.A., Wang, Y. and Thomas, J. (2011). Animal performance and incidence of bloat in mixed Alfalfa/sanifoin grazing; *European Journal of Accounting, Auditing and Finance Research. Vol.4, No.1, pp.1-8,*(4(1):1 -8.

[9]. Haenlein G. F. W. 2004. Goat milk in human nutrition. *Small Ruminants Research* 51: 155 – 163

[10]. Zewdie B, Welday K, 2015. Reproductive Performance and Breeding Strategies for Genetic Improvement of Goat in Ethiopia: A Review. Greener Journal of Agricultural Sciences, 5(1):023-033, http://doi.org/ 10.15580/ GJAS. 2015. 1.080614317.

[11]. Khapayi, M. And Pelliers, P. R. (2016). Factors limiting and preventing emerging farmers to progress to commercial agricultural farming in the king William's town area of the Eastern Cape Province.

[12]. Kaumbata, W., Banda, L., Mészáros, G., Gondwe, T., Woodward-Greene, M. J., Rosen, B. D., et al. (2020). Tangible and intangible benefits of local goats.

[13]. Idris, I. (2018). Livestock and conflict in South Sudan. K4D Helpdesk Report

[14]. Ensminger, M. E. (2002). *Sheep and goat science.* 6th ed. Danville, IL: Interstate Publishers.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26oct965

[15]. Albahri G, Alyamani AA, Badran A, Hijazi A, Nasser M, Maresca M & Baydoun E, 2023. Enhancing essential grains yield for sustainable food security and bio-safe agriculture through latest innovative approaches. Agronomy 13(7): 1709.
[16]. Nsoso, S. J., Monkhei, M., & Tlhwaafalo, B. E. (2004). A survey of traditional small stock farmers in Molelopole North, Kweneng district, Botswana: Demographic parameters, market practices and marketing channels. *Livestock Research for Rural*
[17]. Manirakiza, J., Hatungumukama, G., Besbes, B., & Detilleux, J. (2020). Characteristics of smallholders' goat production systems and effect of Boer crossbreeding on body measurements of goats in Burundi. *10*(2), 1–11.
[18]. Gwiriri, L. C., Machekano, H., Cooke, A. S., Nyamukondiwa, C., Safalaoh, A., Ventura-Cordero, J., et al. (2023). Ecological interventions to enhance goat health and livelihood outcomes in rural Sub-Saharan African communities. *SSRN*.
[19]. O.L. Alabi, 2023 Role of goats in food security, poverty alleviation and prosperity with special reference to sub-Saharan Africa
[20]. Sinharay, S. 2010 nutrient intake and growth performance of goat under different feeding systems in tropical condition 27(3) 245-25.
[21]. Ajala M.K. Adesehinwa, A.O.K, and Mohammed, A.K 2008 Nigerian journal of animal production 35(2), 145-152.
[22]. FAO 2012. Phenotypic characterization of animal genetic resources
[23]. Aruwayo, A,. Ayoade, J.A., and Alawa, J.P. 2015 feed intake, body weight changes and feed conversion ratio of Yankasa sheep. Journal of agriculture science 7(3), 215-221.
[24]. McCade, J.T 2004. Statistical data. In ecology Vol. 85