

Feeding Management Skills and Farmers' Sustainability in Commercial Production of Goats (*Carpra hircus*) in Akwa Ibom State, Nigeria

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Abstract

The study sought to determine feeding management skills and farmers sustainability for commercial production of goats in Akwa Ibom State. Descriptive survey research design was adopted for the study. Three specific objectives, three research questions and three null hypotheses were formulated to guide the study. The population of the study was 196 respondents comprising 180 goat farmers and 16 extension agents. Stratified random sampling technique was used in selecting a sample size of 160 respondents (148 goat farmers and 12 extension agents). The instrument entitled "Feeding management skills and farmers' sustainability for commercial production of goats questionnaire (GFMSFSCPGQ)" was used to gather data for the study. The instrument was face-validated by two validates. Split – half reliability technique was used in determining the reliability of the Instrument which yielded a coefficient index of 0.77. Mean was used in answering the research questions Independent t –test statistics was used to test the null hypotheses at .05 level of significance and the findings of the study revealed that, there is no significant difference in the mean responses of Extension Agents and Goat Farmers on the selection of indigenous forages, establishment of pastures and formulation of concentrates skills needed for sustainable commercial production of goats in Akwa Ibom State. Based on the findings of the study, it was concluded that poor selection of indigenous forages, establishment of pastures and formulation of concentrates skills acquired by goat farmers in Akwa Ibom State led to inadequate supply of chevon to consumers. It was recommended among others that Extension Agents and Akwa Ibom state Agricultural Development Programme (AKADEP) through the State Ministry of Agriculture should conduct enlightenment campaign, regular seminars and workshops for goat farmers in Akwa Ibom State on the selection of indigenous forages, establishment of pastures and formulation of concentrates skills needed for sustainable commercial production of goats in Akwa Ibom State.

Keywords: Feeding Management, sustainability, skills, forages, pastures and concentrates.

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1. Introduction

The importance of feeding, management and production of farm animals cannot be over-emphasized. Basically, it is

important to feed goats with a balanced ration for healthy growth and good production. Central to the sustainability and profitability of goat farming is the proper optimization of feed intake and subsequent growth performance. At the

core of this optimization is quality fodder, which directly impacts these factors, setting the benchmark for the animals' overall health and productivity (Akakpo et al., 2022). Akwa Ibom State is endowed with indigenous forages including forage-grasses, forage-cover crops, forages-broad leaves and they are under-utilized in the rural areas while the forest-forages (ff) are not efficiently harnessed.

In West Africa, goat rearing is a traditional activity practiced by 60-87% of the local population either as the main activity or secondary activity (Agosson et al., 2017). West African Goats population is approximately 150 million heads, accounting to 14.22% of goats' population in the world (FAO, 2004). Majority of goat population in Nigeria is 48.34% and they are found in the north as Sokoto red (Maradi) and Sahel and a few in the South as West African Dwarf Goats; Mali (12.76%), Niger (9.93%) and Burkina Faso (9.2%) (FAOSTAT, 2017). Goat farming is below subsistence level in Akwa Ibom State due to poor managerial skills, poor attitude to livestock keeping, inadequate incentives and high cost of feed supply. Generally, the available species of West African Dwarf Goats are peculiarly adapted to the southern region of Nigeria but are commonly reared by rural households in Akwa Ibom State.

Goats (*Capra hircus*) are one of the oldest domesticated species and have been used for their milk, meat, hair and skins in all parts of the world (Coffey et al., 2004). Apart from chicken, goat meat (chevon) is the most preferred amongst people due to their varied utilization for food (meat) and during festive seasons. The milk is useful and consumed by many. The goats produce wool, hair, skin which is used in industries and the droppings are used to increase the fertility of the soil. Goat rearing serves as investment and a good source of income. It is prolific, such that the female (doe) can give birth at 18-21 months of age and can give birth to 3 kids at a time, and they would increase in number within a short period of time, given favourable environment (Tunji - Iyiola 2015). Sustainable and profitable livestock production can be achieved through proper production, utilization and management of pastures and forages worldwide (Jokthan, 2018).

Indigenous forages are the natural fresh and succulent plants of different species used mainly for feeding livestock animals like goat, cattle, sheep and many others, they include grasses, legumes and shrubs. Forage crops as defined by Jokthan (2018) are above ground plant material used for feeding livestock, but excluding concentrates and other industrial products. According to Fuglie et al.,(2021), forage grasses and legumes are the principal source of

nutrition for most ruminants. A suitable variety of grasses can be grown for feeding of goats, this depends on the type of soil, availability of rainfall and planting materials. The different grass and legume species grown includes *Cynodon dactylon* (Bahama grass), *Andropogon gayanus* (Northern Gamba grass), *Axonopus compressus*(carpet grass), *Pennisetum purpureum*(elephant grass), *Panicum maximum* (guinea grass); while legumes are, *Calopogonium mucunoides* (calo cover crop), *Centrosema pubescens* (centro cover crops) among others (Ekpo, et, al.2019). The secret of successful feeding is the formulation of cheap and efficient ration. However, there are factors to be considered like the bulk, palatability, availability, price, digestibility, and nutritive quality of the feeds (Siaboc et al., 2024).

According to luginbuhi (2015), a distinction between "poor quality roughage" is necessary in order to make decisions concerning which animal can best utilize a particular forage, trees and shrubs, which often represent poor quality for roughages sources for cattle because of their highly lignified stems and bitter taste, may be adequately high in quality for goats.

Concentrates are feeds given to the animals during dry season or winter (coffey et al., 2004). Some farmers in Akwa Ibom are using concentrates such as growers mash, kitchen wastes such as cassava peels, yam peels, maize husks, boiled cocoyam and cassava, industrial by-products such as spent grain from breweries, palm kernel cake mixed with wheat offals give a very good supplemental feeds which improves goat production. Coffey et al., (2004) also noted that dairy goats need high quality forage and supplemental grains rich in protein to reach their full potential, especially during peak of lactation or growth.

In the light of the above, this study seeks to determine the feeding management skills needed by farmers for sustainable commercial goat production in Akwa Ibom State.

Statement of the Problem

The population of people living in Akwa Ibom State has increased significantly. Therefore the demand for goats and chevon have increased too. Many people need this meat for various purposes; it is the most preferred meat after chicken. The researcher observed that there is a high demand for goats and chevon in recent years especially "isiehu" in hotels and eateries without a corresponding supply, life goats are also needed and presented in ceremonies such as traditional marriages, coronations, burials, during purchase and sharing of landed properties among others. This has

made the price of our native goat to be increased such that people buy goat from the northern part of the country at exorbitant price.

However, this low goat production by farmers in Akwa Ibom State is attributed to dearth of skills among local farmers, unfavourable ecological conditions among other factors. Farmers tend to lack skills on the ; selection of indigenous forages, establishment of pastures, formulation of concentrates. This unfortunate situation motivated the researcher to determine feeding management skills and farmers' sustainability in commercial production of goats in Akwa Ibom State.

Purpose of the Study

The main objective of the study was to examine feeding management skills and farmers sustainability in commercial goats production in Akwa Ibom State. Specifically the study sought to:

- i. determine feeding management skills influence in the selection of indigenous forages by goat farmers in sustainable commercial production in Akwa Ibom State.
- ii. examine feeding management skills influence in the establishment of pastures by goat farmers in sustainable commercial production in Akwa Ibom State.
- iii. access feeding management skills influence in the formulation of concentrates by goat farmers in sustainable commercial production in Akwa Ibom State.

Research Questions

The following research questions were raised to be answered in the study.

- i. To what extent does feeding management skills influence the selection of indigenous forages by goat farmers in sustainable commercial production in Akwa Ibom State?
- ii. To what extent does feeding management skills influence the establishment of pastures by goat farmers in sustainable commercial production in Akwa Ibom State?
- iii. To what extent does feeding management skills influence the formulation of concentrates by goat farmers in sustainable commercial production in Akwa Ibom State?

Research Hypotheses

The following null hypotheses were raised to guide the study and would be tested at .05 level of significance.

HO1: There is no significant difference in the mean responses of extension agents and goat farmers on the extent of feeding management skills needed in the selection of indigenous forages in sustainable commercial production in Akwa Ibom State.

HO2: There is no significant difference in the mean responses of extension agents and goat farmers on the extent of feeding management skills needed in the establishment of pastures in sustainable commercial production in Akwa Ibom State.

HO3: There is no significant difference in the mean responses of extension agents and goat farmers on the extent of feeding management skills needed in the formulation of concentrates in sustainable commercial production in Akwa Ibom State.

Research Methods

Descriptive survey research design was adopted for the study, this allows the researcher to study the group of people, collecting and analyzing data from a few people representing the entire group. The design was considered appropriate for the study since it was soliciting information from goat farmers and extension agents through the use of questionnaire. Three specific objectives, three research questions and three null hypotheses guided the study.

Area of the study

The study was conducted in the six Agricultural Zones of Akwa Ibom state Agricultural development programme (AKADEP).

Population of the study

The population of the study was 196 respondents comprising 180 goat farmers and 16 extension agents, drawn from the six AKADEP Zones in Akwa Ibom State.

Sample and sampling technique:

Stratified random sampling technique based on the six zones was used in selecting a sample size of 160 respondents (148 goat farmers and 12 extension agents), for the study.

Table 1: population and sample distribution of goat farmers

S/N	SIX ZONES OF AKADEP	SAMPLED GOAT	
		GOAT FARMERS	FARMERS
1.	Abak	58	37
2.	Etinan	60	48
3.	Uyo	16	12
4.	Eket	20	25
5.	Ikot Ekpene	30	25
6.	Oron	12	10
	Total	196	148

Instrumentation

The researcher developed instrument entitled “Feeding Management Skills and Farmers’ Sustainability for commercial production of goats Questionnaire (GFMSFSCPGQ)” which was used to gather data for the study. The values attached to the Acquired skills response scale options were: Very Highly Acquired, Highly Acquired, Moderately Acquired and lowly Acquired. While the needed skills options included Very Highly Needed, Highly Needed, Moderately Needed and Lowly Needed with corresponding 4,3,2,1 for the Acquired and Needed options respectively.

Validation of Instrument

The instrument (GFMSFSCPGQ) was face validated by two research experts from the Department of Agricultural Education, Akwa Ibom College of Education Afaha Nsit.

Reliability of the instrument

The suitability of the instrument was further strengthened when (GDMSFSCPGQ), was administered once on a group of 30 farmers who are not participants but were equivalent to the research subject in all respect. The internal consistency reliability of the instrument obtained using split-half method and Cronbach Alpha statistics was 0.77.

Administration of instrument

One hundred and forty-eight copies of questionnaire was administered to goat farmers while twelve copies of questionnaire was administer to the agricultural extension agents. Complete copies were retrieved.

Data analyses

The research questions were answered using mean and independence t-test statistics to test the null hypotheses at 0.05 level of significance.

Decision Rule

For answering the research questions, a cutoff point of 2.50 was set such that a mean response of 2.50 and above was considered as needed while those below this value were regarded as Acquired. In testing the null hypotheses, where the calculated t-value was greater than the critical t-value at p .05, the null hypotheses was retained.

Results

Research Question I

To what extent does feeding management skills influence the selection of indigenous forages by goat farmer in sustainable commercial production in Akwa Ibom State?

Table 2: Mean responses of respondents on the selection of indigenous forages by goat farmers in sustainable commercial production in Akwa Ibom State.

N=160				
S/N	FORAGE SKILLS NEEDED	\bar{X}	SD	REMARKS
1.	Skills in selection of succulent and nutritious fodders	2.65	0.82	SN
2.	Skills in supplying balanced fodders	2.84	0.77	SN
3.	Skills in establishing pastures	2.97	1.03	SN
4.	Skills in preparation of hay and silage	2.61	0.73	SN
5.	Forage maintenace skills	2.67	0.81	SN

Note: SN= Skills Needed, SNN= Skills not needed

The result presented in Table 2 reveals that the mean rating on the extent of forage needed skills were all above the cut off points of 2.50. The result shows that the respondents needed all the skills, therefore, the goat farmers require retraining in all the identified forage skills in sustainable commercial production.

Research Question 2

To what extent does feeding management skills influence the formulation of concentrates by goat farmers in sustainable commercial production in Akwa Ibom State?

Table 3: Mean responses of respondents on the formulation of concentrates by goat farmers in sustainable commercial production in Akwa Ibom State.

The result presented in table 3 indicates that the mean rating on the extent of choice of concentrates needed skills were all above the cut off points of 2.50. The result indicates that the respondents needed all the skills. Therefore, the goat farmers require training in all the identified concentrate skills in sustainable commercial production.

Test of null hypotheses

The following null hypotheses were tested in the study at .05 level of significant

HO₁: There is no significant difference in the mean responses of extension agents and goat farmers on the selection of indigenous forages in sustainable commercial production.

Table 4: t-test analysis of the difference in the mean responses between extension agents and goat farmers on the selection of indigenous forages in sustainable commercial production.

N=160					
Forage Skills Needed	N	X	t-cal	t-crit	Decision
Extension agents	12	25.75	0.79	1.976	upheld
Goat farmers	148	25.15			

Not significant at $p < .05$ alpha level , n=160, df=158

The result presented in table 4 shows that the calculated t- value of 0.79 was obtained which is less than the critical t-

value of 1.976 with the degree of freedom of 158 at .05 level of significance. The null hypothesis was upheld, thus, there is no significance difference in the mean responses between extension agents and goat farmers on the extent of feeding management skills in the selection of indigenous forages in sustainable commercial production. Therefore, since the extension agents and goat farmers do not differ significantly, in their mean responses, it implies that, the

choice of forage skills are needed by goat farmers in sustainable production.

HO₂: There is no significant difference in the mean responses of extension agents and goat farmers on the extent of feeding management skills needed in the formulation of concentrates in sustainable commercial production.

Table 5: t-test analysis of the difference in the mean responses between extension agents and goat farmers on the formulation of concentrates in sustainable commercial production.

N=160					
Concentrate Skills Needed	N	X	t-cal	t-crit	Decision
Extension agents	12	29.17	0.55	1.97	upheld
Goat farmers	148	28.68			

Not significant at $p < .05$ alpha level, $n=160$, $df=158$

The results presented in table 5 shows that the calculated t-value of 0.55 was obtained which is less than the critical t-value of 1.97 with the degree of freedom of 158 at .05 level of significance. The null hypothesis was upheld, thus, there is no significance difference in the mean responses between extension agents and goat farmers on the extent of feeding management skills needed in the formulation of concentrates in sustainable commercial production. Therefore, since the extension agents and goat farmers do not differ significantly in their mean responses, it implies that, the formulation of concentrate skills are needed by goat farmers in sustainable production in Akwa Ibom State.

Findings of the study; The results of data analyzed revealed the following findings based on the responses of the research questions and null hypotheses tested.

- i. Selection of indigenous forage feeding management skills are needed by goat farmers in sustainable commercial production in Akwa Ibom State.
- ii. Establishment of pasture feeding management skills are needed by goat farmers in sustainable commercial production in Akwa Ibom State.
- iii. Formulation of concentrates feeding management skills are needed by goat farmers in sustainable commercial production in Akwa Ibom State.
- iv. There was no significant difference in the mean responses of extension agents and goat farmers on the

extent of feeding management skills needed in the selection of indigenous forages in sustainable commercial production.

- v. There was no significant difference in the mean responses of extension agents and goat farmers on the extent of feeding management skills needed in the formulation of concentrates in sustainable commercial production.

Discussion of findings

The results of answering research question one, reveals that goat farmers needed skills in the selection of indigenous forages in sustainable commercial production. Therefore, to acquire the skills, goat farmers needed training in selection of indigenous forage skills such as skills in selection of succulent and nutritious fodders, skills in supplying balanced fodders, skills in establishing pastures, skills in preparation of hay and silage and skills in forage maintenance. The corresponding t-test analysis in table 3 indicates that, there was no significant difference in the mean responses of goat farmers and extension agents on feeding management skills needed in the selection of indigenous forages in sustainable commercial goat production. The findings of this study is in line with that of Fuglie et al (2021) and sabioc et al., (2024) who supported that forage grasses and legumes are the principal source of nutrition for most ruminants, and they further stated that

raising yields of forage crops can increase the availability and affordability of livestock products. Also, the result agrees with the findings of Ekpo et al., (2019) and Mana et al., 2023 that common nutritional forages of goat in Akwa Ibom State include the leaves of *Dacryodes edulis* (African pear), *Acioa bateri* (“Akpab”), *Persea americana* (Avocado pear), *Elaeis guinensis* (oil palm), *Magnifera indica* (Mango tree), *Leucaena leucocephala* (*Leucaena*), *Aspilia africana* (Bush marigold), *Costus afer* (Bush cane), *Ageratum conyzoides* (Goat weed), *Alternanthera bettzickiana* (Red leaved weed), some of these leaves are good sources of carbohydrates, protein and vitamins to the animals. With the training of goat farmers by the extension agents, the farmers will be able to care for and manage goat feed efficiently, hence sustainable production would be achieved.

The result of research question 2 reveals that goat farmers, needed skills in the formulation of concentrates in sustainable commercial production. Therefore, to acquire the skills, goat farmers needed training in the formulation of concentrates. For instance skills in the use of growers mash, use of wheat offals skills, use of palm kernel cake skills and skills in the use of spent grain and water. The corresponding t-test in table 4 indicates that, there was no significant difference in the mean responses of goat farmers and extension agents on the feeding management skills needed in the choice of concentrates in sustainable commercial goats production. The findings of this study is in line with that of Coffey et al (2004) who reported that concentrates are feeds given to goats during dry season which includes mostly grains such as in the form of roughages, concentrates, cereals grains e.g corn, barley, oats and wheat which are high in energy contents. Inability of the goat farmers to acquire the needed skills in the formulation of concentrates would significantly affect sustainable commercial goats production. Inadequate inclusion of concentrates in goat diet has been a serious problem among goat farmers as reported by Sahebrao, et al., (2023).

Therefore, the farmers should be trained by the extension agents on the importance of formulation of concentrate feeds for use especially in the dry season when forages have dried up. The researchers wish to observe that some goat farmers in Akwa Ibom state do not use concentrates to feed their goats due to lack of knowledge and increased prices of such feeds.

Conclusions

Based on the findings of the study on feeding management skills and farmers sustainability for commercial production of goats in Akwa Ibom State, poor selection of indigenous

forages, establishment of pastures and formulation concentrates skills acquired by goat farmers in Akwa Ibom state have led to inadequate production of goats and supply of chevon to the consumers. This implies that Akwa Ibomites will have no option than demand for goats from Northern Nigeria at exorbitant rate.

Recommendations

Based on the findings of this study, the following recommendations are made;

- i. Extension Agents in collaboration with AKADEP and the Ministry of Agriculture should conduct regular seminar and workshops for goat farmers on selection of indigenous forages, establishment of pasture and formulation of concentrates skills, to enable goat farmers acquire the needed skills in sustainable commercial production.
- ii. Extension Agents and AKADEP staff should organize a consistent training and retraining programmes for goat farmers in Akwa Ibom state to acquire requisite skills in sustainable commercial production.
- iii. AKADEP staff and Ministry of Agriculture should mount enlightenment campaigns geared towards sensitizing goat farmers in Akwa Ibom state on the need to adopt selection of indigenous forages, establishment of pasture and formulation of concentrates skills to ensure stable supply of chevon to consumers in the States.

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