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Entrepreneurial Skills Required by Agricultural Education Students in Tertiary Institutions in Kano State for Optimal Success in Sheep Husbandry Practices

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Abstract

Sheep are among the first animals to have been domesticated by humans. Their history goes back to between 11,000 and 9,000 BCE. Sheep are raised both in villages and towns and by pastoralists in Kano State and other States of Nigeria. This study was designed to identify the entrepreneurial skills required by agricultural education students in tertiary institutions in Kano State for optimal success in sheep husbandry practices. The study used survey research design. Three research questions and three null hypotheses guided the study. The population for the study was 172, comprising 24 Animal Science Technologists and 148 Agricultural Science Lecturers in public tertiary institutions in the State. All the 24 Animal Science Technologists were involved in this study, while 108 Agricultural Science Lecturers were selected as sample size for the study. A questionnaire was used as instrument for data collection, validated by three experts. Pilot study was conducted to determine the reliability of the instrument, a coefficient of 0. 73 was obtained. Mean scores were used to answer the research questions while t-test statistic was used to test the null hypotheses at 0.05 level of significance. The findings of the study revealed that all 34 items identified for feeding, health and production management practices were required as entrepreneurial skills for optimal success in sheep husbandry practices (mean scores > 2.50). Based on the findings, it was recommended that Lecturers in tertiary institution in Kano State should focus on essential skills for sheep husbandry practices in training Agricultural Education students.

Keywords: Entrepreneurship, entrepreneurial skill, agricultural, sheep husbandry

91. Introduction

Agriculture is the oldest industry known to mankind. It is the basic source of food and raw materials for many industries. Agriculture plays an important role in the development of many developing nations; It remains the basic source of livelihood for more than half of the world's population. Hence there is the need to focus on sustainability and increased agricultural productivity (Baridoma & Nlebem, 2022). Despite the benefits derive from agriculture, unemployment is one of the major issues affecting Nigeria's National development. To solve the problems of unemployment, teaching and learning of

entrepreneurship skills become paramount interest to all stakeholders. Entrepreneurship skills are set of specific knowledge, abilities, skills, traits, motives, attitudes and values required for the personal development and successful participation of each person in an organization (Khamis & Alhassan, 2020). The inclusion of entrepreneurship skill acquisition in the tertiary institutions' curriculum would bring about sustainable development in vocational agriculture. Agriculture is the science, art and business of cultivating soil, producing crops and rearing livestock for human use. The demand for livestock products is increasing as a result of increased human population and relative growth and income (Azimi *et al.*2022). Sheep are among the major economically important livestock in Nigerian agriculture. Sheep are principally bred as source of income, meat for home consumption, manure, cultural and ceremonial purposes (Azimi *et al.*2022).

According to the opinions developed by Richard (2023) sheep producers ought to have skills and knowledge about sheep so as to improve their sheep management skills, increase their chances of a profitable sheep enterprise or gain employment. The government in her bid to reduce unemployment introduced entrepreneurship in the schools' curriculum. The inclusion of entrepreneurship education in tertiary institutions in Nigeria shows its importance in jobs creation. However, every year thousands of students are turned out into the society searching for jobs where there are no jobs (Aneke & Nwobi, 2024). Therefore, the unemployment rate keeps on increasing each year into the society. It is based on this background that this study was conducted to determine the entrepreneurial skills required by agricultural education students in tertiary institutions in Kano State in sheep husbandry practices for self-employment and self-reliance. The study is guided by the following research questions:

i. What are the entrepreneurial skills required for feeding management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State?
ii. What are the entrepreneurial skills required for health management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State?
iii. What are the entrepreneurial skills required for reproduction management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State?

The study is further guided by the following specific objectives, the achievement of which led to the achievement of the aim of the study.

i. determine the entrepreneurial skills required for feeding management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State,
ii. determine the entrepreneurial skills required for health management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State,

iii. determine the entrepreneurial skills required for reproduction management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Sheep Fattening: Sheep fattening is described as the feeding of nutrient-rich feed to stimulate rapid growth and fat deposition for targeted carcass growth and quality. Sheep easily adapt to a high intensity production system in feedlots. A sheep fattening program aims to achieve the highest growth rate and carcass yield in the shortest possible time (75-90 days) and to increase production per unit of resource. Sheep fattening has proven to be profitable as it has relatively lower investment costs compared to that of larger ruminants, generate faster economic returns, had reduced associated risks and allows the business to expand rapidly. In sheep fattening, the selection of rams is important to achieve high performance, productivity and profit. The following are knowledge and skills on the criteria to be used when selecting the ram for fatting programme (Wamatu *et al.* 2021).

2.1.1.1. *Health status:* When buying a ram, one should examine the animal carefully, without disturbing it, to observe its behavior. These include restlessness, alertness, aggressiveness, tremors, breathing condition (normal or stressed), and normal movement. A closer examination of the nose (to check for discharge), mouth (to check for bad breath, abnormal salivation, ulcers around the lips, gums, tongue), and eyes (to check for discharge). The skin should be examined for spots or swelling. Only vigilant rams without one of the above-mentioned indications should be purchased for fattening.

2.1.1.2 *Body condition:* Weighing the sheep can reflect the condition of the sheep, but sometimes the body weight does not reflect the condition of the animal, i.e. an animal with a large physique may have a higher body weight with low body reserves than another animal with a small physique but plenty of reserves. Very thin/emaciated and fat/larger rams should be avoided. Rams with average body condition (neither emaciated nor greasy) are preferable, as they respond faster to feeding and achieve better yields within a short time than fat rams, which are already at well fed. Assessing the condition of a sheep can be done simply visually or by touching the body parts in the lumbar area, rib cage and sternum. Very thin and emaciated animals often take a long time to recover.

2.1.1.3 *Breed:* The selection of breed types for fattening is mainly based on the breed available in a particular location. This applies to rural smallholders, small-town, suburban and cooperative sheep fatteners. Many lack knowledge of other breeds of sheep

2.1.1.4 *Age:* There is no uniform age for sheep fattening for small-scale farmers. However, to meet market demand, it is advisable to select sheep for fattening between 6 and 12 months. Very young and older rams are not suitable for fattening, as younger rams use the ingested feed for growth rather than meat accumulation and older bucks have very poor feed efficiency. A sheep's dentition is a good indication of its age.

2.1.1.5 ***Colour:*** Choose white or two-tone coated sheep. Black coat colour is not preferred by consumers, so profit margins may drop.

2.1.1.6 ***Sex:*** Males are mostly used for fattening and are preferred for religious purposes. Females are mostly kept for reproduction.

2.1.2 Housing: Most sheep flocks were housed in traditional sheep sheds constructed from lightweight and cost-effective materials, such as wood, wire mesh, and sheet metal. According to research findings of Meziane et al. (2024), approximately 72% of farmers housed lambs with adult sheep. Additionally, over half (52%) sheltered their sheep alongside other farm animals.

2.1.3 Feeding: Sheep feeding practice primarily relied on straw as the main roughage feed (Meziane et al. 2024). Sheep were fed twice daily, once in the morning and once in the evening. During the winter months, their diet consisted of grass, hay, and cereals, while in summer; it primarily comprised hay, cereals, and occasionally grass silage. Watering was generally provided midday, with an average consumption of 2.5 liters per head daily. The average feed allocation was typically 1 kilogram per head per day, depending on the size of the flock.

2.1.4 Health Monitoring and Diagnostic Services: Subclinical disease can be detected by routine examination of live animals, such as in the regular examination of rams before the breeding season, and by post-mortem examination of animals to determine the cause of death. Regular flock observation, examination of dead animals, and flock health records provide information for effective disease monitoring. Records that indicate increased incidence of disease or failure of previously successful treatment and prevention programs should signal the need for an aggressive approach to diagno sis. Early and accurate diagnosis of disease is one of the most effective tools to inform a producer's approach to disease prevention and management (Woiwode, 2021).

2.1.5 Parasite Control: Parasites are a major health concern for many flocks, and the type of parasite(s) vary with the environment. External and internal parasites rely on optimal conditions in their environment for transmission and proliferation. External parasites include flies, lice, mites, keds, and ticks, and affect production because they feed on body tissue such as blood, skin, and fiber. Wounds caused by external para sites result in discomfort and irritation, and parasites can transmit diseases from sick to healthy animals. External parasites can be managed by use of topical insecticides. Internal parasites are of concern in areas that receive significant rainfall. The life cycle of internal parasites in volves the presence of infectious larvae on the forages sheep graze, and the presence of adult parasites in the host animals. Anthelmintics (dewormers) are most effective when used in combination with pasture management strategies (Woiwode, 2021)

2.1.6 Vaccines: Vaccines are available for a number of infectious diseases of sheep and may constitute a major step in prevention. Vaccines stimulate an animal's resis tance to an infectious agent. They work best in healthy animals with adequate nutrition and require sufficient time for the development of a protective response. Vaccines should be

used according to the manufacturer's guidelines or as directed by a veterinarian (Woiwode, 2021).

2.1.7 Hoof Trimming: Routine hoof trimming is not always necessary (Woiwode, 2021). However, when sheep are maintained for long periods under conditions in which the hoof does not receive sufficient wear, trimming may be required to prevent lameness and to improve animal comfort.

2.1.8 Giving injections: Sheep usually receive injected drugs subcutaneously (under the skin), but some injections may be given intramuscularly (into the muscle). Care should be taken to ensure injections are administered in the correct place, do not harm the animal or the operator, and do not cause adverse reactions or abscesses (Lloyd &Playford, 2022).

2.1.9 Horn trimming: Horn trimming is the removal of the hard tip of rams' horns. If done correctly, this should not cause distress or injury to the ram, as the cut area does not contain nerves or blood vessels. Rams' horns may need to be trimmed to prevent ingrown horns damaging the face and eyes, to prevent injury to other rams and handlers, to help prevent flystrike, to make rams easier to load and transport, and to stop rams catching their horns in fences, yards or trees (Lloyd & Playford, 2022). Horns are best trimmed at hogget age (before 12 months of age

2.1.10 Castrating: Lambs should be castrated at 2–8 weeks of age, when they have smaller testicles and scrotums. This means that the lambs have less sensitive tissue to be removed, resulting in smaller wounds and faster healing. Younger lambs are easier and safer to handle, meaning castration can be done faster and with less stress for lamb and operator. Castrating lambs older than 12 weeks of age is not advisable (Lloyd & Playford, 2022). If the lambs are older than 12 weeks, castration may coincide with the onset of puberty, increasing the risk of complications.

2.2 Theoretical Review

The theoretical framework of this study is based on the 'Production Theory.' The origin of the production theory can be traced back to the eighteenth century. Authors such as Adam Smith, David Ricardo and Thomas Malthus suggested the idea of production in their works (Endurance and Nathan, 2021). Production theory can be used to demonstrate how an economy or sectors of an economy can combine inputs or factors to produce outputs. Production theory explains the relationship between factors of production and output. It emphasizes that when factors of production are combined and put in some transformation process, the result will be output. The theory of production examines the connection between inputs and outputs in the production process. It investigates how businesses combine resources like labour, capital, and technology to effectively generate goods and services. The conversion of inputs into outputs is referred to as production in economics. The raw materials or other productive resources utilised to create output, or finished goods, are referred to as inputs (Lokesh, 2022). A country can hardly grow and sustain itself without production because it is only through the production process that output can grow or increase.

In recognition of the fact that a country can hardly grow and sustain itself without productive capacity, successive governments in Nigeria from independence have continuously endeavoured to boost the country's productive capacity across the various sectors of the economy. Specifically, efforts have to be made to boost production in the agricultural sectors. In fact, agriculture was the leading sector of the Nigerian economy back then as the sector contributed some 65 percent of Nigeria's GDP, 70 per cent of her aggregate exports and over 70 percent of employment for the population (Endurance and Nathan, 2021). In addition, agricultural production from peasant farmers alone was enough to feed the entire population. The government then saw agriculture as the country's major revenue earner and focused on increasing the exportation of agricultural products to industrialized countries in order to raise the required fund for building infrastructure needed for long term development of the country There is need to focus attention on boosting production in agricultural sectors. The nagging issues that have crippled the sector's growth over the years despite much money allocated to the sector must be proactively tackled. Prominent among such issues are the difficulty experienced by peasant farmers in accessing modern farm inputs (Endurance and Nathan, 2021). In order to improve farm productivity and standard of living of farmers and to ensure food security, there is need to identify agricultural skills required by farmers for optimal success in various agricultural production practices.

2.3 Empirical Review

Anyanwu *et al.* (2020) investigated the current state of sheep and goat farming amongst households in Imo State South Eastern Nigeria. A total of 150 structured questionnaires were distributed to farmers randomly selected from three Local Government Areas (LGAs) in Imo State namely, Oru West, Ahiazu Mbaise and Ezinihitte Mbaise to determine the socio-economic characteristics, production systems, breeding and reproduction, constraints and strategies for economic improvement in a focus group interview. The results revealed significant decline in sheep and goat farming amongst the households across four generations within the households interviewed. Lack of interest due to poor policy framework, low productivity of existing breeds, difficulty in feed supply and high cost of breeding stock was identified as constraints of sheep and goat production in the areas. It was also observed that older people were more directly involved in sheep and goat farming than youths. Result of the study showed that 59.6% of farmers were females, and 31-50% of the farmers were between the ages of 31 and 50 years. Breeding was mostly observed to be uncontrolled (51.7%). The most important diseases within these areas were worms, ecto-parasites and peste des petits ruminants (PPR). It was recommended that base on the findings of the study that appropriate measures should be ensured by the government to motivate the youths to participate in the activities of sheep and goat production.

Nyam *et al.* (2022) conducted a study aimed to determine the factor influencing the competitiveness of smallholder sheep farmers' and constraints faced by sheep farmers in South Africa. A farm-level cross-sectional data of 217 smallholder livestock farmers in South Africa were used to identify the factors influencing the competitiveness of smallholder sheep farmers in South Africa. The Porter's Diamond Model Framework was used to measure the competitiveness of sheep production in the study areas and principal

component analysis was applied to assess the constraints faced by sheep farmers. The study results found that smallholder sheep farmers in the study area are faced with numerous production constraints, which inhibit their productivity and competitiveness. The most severe constraints include marketing, stock theft, lack of capital, diseases and parasite, and high feed cost. The study suggests that smallholder sheep farmers in the study areas can be competitive and experience growth through the creation of agribusiness enabling environments by promoting policies and strategies that will boost investments in sheep production across the value chain.

Olorunfemi *et al.* (2023) examined the determinants of technologies adoption among small scale sheep and goat farmers in Kogi State, Nigeria. The study employed the use of questionnaires to elicit information from respondents. Data collected for the study was obtained from 240 respondents. Descriptive statistics and probit regression analysis were used to analyses the data. Results from the analysis showed a mean age of 48 years old for sheep farmers and 44 years old for goat farmers. The farmers acquired an average of 8 and 10 years of formal education with a mean of 12 and 11 years of farming experience, among sheep and goat farmers respectively. Most sheep farmers adopted supplementary feeding (26.7%), detection and isolation of sick animals (55%) while goat farmers adopted de-thickening (65%), supplementary feeding (45%), detection and isolation of sick animals (30%) respectively. Extension contacts and cooperative membership significantly influenced the adoption of improved sheep and goat production while herd size significantly influenced the adoption of improved goat production. It was recommended that extension service should be well funded considering its significance in determining adoption. Also, livestock farmers should be encouraged to form cooperative societies to ease their access to credit.

Mesele and Hadgu (2024) conducted a study titled 'African sheep review: productivity and reproductive attributes indication'. The metadata for the review was collected through systematic approach. The reviewed finding showed that Wollo (6.1 months), Begait (11.34) and Afar (12.08) sheep breeds were the three first ranked breed type on age at first lambing while the shortest lambing interval (months) 6.60, 6.67 and 7.30 were found, respectively for Gumuz, Begait and Adilo sheep breeds. For litter size (number) Awassi X Wollo (2.08), Arsi-Bale (1.70) and Bonaga (1.36) performed better. The three larger birth weights (kg) of lamb were reported respectively as 3.90 3.10 and 3.10 for Namaqua Afrikaner, Bepedi and Damara sheep breeds. Red massai (15.00 kg), Damara (14.10 kg) and Awassi X wollo (13.80 kg) sheep breeds had the top three larger lamb weanig weights. Regarding to pre-weaning mortality rate, Aris-Bale (13.9%), Black Head Somolia (18.3%) and Menz (19.2%) had found the lowest one. In general, the results showed that the productive and reproductive performance of African sheep breeds is low; to improve it interferences on management activities are indispensable. The author recommended that breeding strategies, feeding, health caring, husbandry, and other management approaches should be improved so that the sheep producers can be benefited.

3.0 Methodology

The study was designed to identify the entrepreneurial skills required by agricultural education students in tertiary institutions in Kano State for optimal success in sheep

husbandry practices. The study made use of survey research design. Three research questions and three null hypotheses guided the study. The population for the study was 172, comprising of 24 Animal Science Technologists and 148 Agricultural Science Lecturers in public tertiary institutions offering Agricultural Education Programme in the State. All the 24 Animal Science Technologists were involved in this study, while 108 Agricultural Science Lecturers were selected as sample size for the study using proportionate random sampling technique. A questionnaire titled Entrepreneurial Skills Required in Sheep Husbandry Practices (ESRSHP) adapted from research work of Richard (2023) was used as instrument for data collection. The questionnaire was developed on four rating scale; strongly agree, agree, disagree, and strongly disagree with corresponding values of 4,3,2, and 1 respectively and validated by three experts and also subjected for pilot study. Pearson Product Moment Correlation was used to determine the reliability of the instrument in which a coefficient of 0. 73 was obtained. 132 copies of the questionnaire were distributed to the respondents with help of four research assistants, the completed questionnaires were collected back on the spot. All the copies of the questionnaire distributed were successfully returned. Mean and standard deviations were used to answer the research questions. In answering the research questions, any item with mean score of 2.50 and above was considered while any item with mean score of les than 2.50, was considered "Not required.

4.0 Results and Discussion

4.1 Results

Research Question one: What are the entrepreneurial skills required for feeding management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State?

Table 1: Mean Ratings of Respondents on the Entrepreneurial Skills Required for Feeding Management Practices in Sheep Husbandry by Agricultural Education Students in Tertiary Institutions in Kano State, (n = 132).

S/N	Entrepreneurial Skills	$\bar{X}$	SD	Decision
1.	Become familiar with types of feeds and their nutrient values.	3.33	0.69	Required
2.	Recognize common nutritional disorders of sheep.	2.99	0.89	Required
3.	Know how to efficiently feed sheep for optimum performance.	3.01	0.79	Required
4.	Become familiar with a balance feed ration for feeder lambs.	2.97	0.74	Required
5.	Become familiar with a balance feed ration for a pregnant ewe.	3.00	0.81	Required
6.	Know how to train a lamb to drink from a bottle (when applicable).	2.79	0.70	Required

7.	Know basic feed composting techniques.	3.45	0.77	Required
8.	Become familiar with proper grain need for additional feed.	2.98	0.93	Required
9.	Become familiar with proper hay need for feed/additional feed.	3.11	0.95	Required
10.	Be able to evaluate a pasture for forage quantity and quality	2.88	0.71	Required

$\bar{x}$= mean, SD = Standard deviation, R = Required, n = number of respondents

Data presented in Table 1 reveal that the mean ratings of respondents for all the 10 items range from 2.79 to 3.45 are above 2.50 on 4-point rating scale (mean > 2.50). This implies that the respondents agreed with all the items as the entrepreneurial skills required for feeding management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State. The standard deviations for the 10 items that range from 0.69 to 0.95 shows that the responses of respondents were closed to one another.

Research Questions two: What are the entrepreneurial skills required for heath management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State?

Table 2: Mean Ratings of Respondents on the Entrepreneurial Skills Required for Heath Management Practices in Sheep Husbandry by Agricultural Education Students in Tertiary Institutions in Kano State, (N= 132).

S/N	Entrepreneurial Skills	$\bar{X}$	SD	Decision
1.	Recognize a normal temperature of healthy sheep.	2.99	0.90	Required
2.	Know how to recognize a sheep that is sick.	3.55	0.75	Required
3.	Know how to take rectal temperature of sheep.	2.92	0.97	Required
4.	Know how to correctly give an intramuscular injection.	3.66	0.71	Required
5.	Know how to administer an oral de-wormer.	3.77	0.88	Required
6.	Know how to properly trim hooves.	2.78	0.70	Required
7.	Become familiar with common sheep diseases in your area.	2.88	0.74	Required
8.	Restrain an animal without stressful treatments.	2.87	0.86	Required

9.	Recognize plants poisonous to sheep in your area.	2.78	0.58	Required
10.	Know how to trim the horns of adult rams.	2.94	0.81	Required
11.	Know how to pare sheep's feet.	2.68	0.77	Required
12.	Know how to castrate male lambs.	3.00	0.89	Required
13.	Know how to correctly give subcutaneously injection.	3.62	0.72	Required

$\bar{x}$= mean, SD = Standard deviation, R = Required, n = number of respondents

Data presented in Table 2 reveal that the mean ratings of respondents for all the 13 items range from 2.68 to 3.66 are above 2.50 on 4-point rating scale (mean > 2.50). This implies that the respondents agreed with all the items as the entrepreneurial skills required for health management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State. Standard deviations for the 13 items range from 0.58 to 0.97 indicated that the respondents were closed to one another in their opinions.

Research Question three: What are the entrepreneurial skills required for reproduction management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State?

Table 3. **Mean Ratings of Respondents on the Entrepreneurial Skills Required for Reproduction Management Practices in Sheep Husbandry by Agricultural Education Students in Tertiary Institutions in Kano State, (N= 132).**

S/N	Entrepreneurial Skills	$\bar{X}$	SD	Decision
1.	Recognize when an ewe is about to give birth.	3.33	0.78	Required
2.	Recognize a normal birth.	3.56	0.57	Required
3.	Recognize abnormal birthing (dystocia).	3.00	0.99	Required
4.	Know how to disinfect newborn's naval cord.	2.97	0.87	Required
5.	Be able to recognize and treat a retained placenta.	3.02	0.67	Required
6.	Know how to perform basic first aid on a sheep/lamb.	3.65	0.90	Required
7.	Know how to handle a newborn lamb safely.	3.77	0.89	Required
8.	Calculate/estimate time of lambing from breeding date.	2.87	0.94	Required

9.	Become familiar with reproductive tract diseases common. to sheep, how they are spread and how they can be prevented	3.45	0.72	Required
10.	How to protect yourself and workers from zoonotic disease.	3.07	0.87	Required
11.	Develop a working relationship with a local veterinarian.	3.05	0.68	Required

$\bar{x}$= mean, SD = Standard deviation, R = Required, n = number of respondents

Data presented in Table 3 reveal that the mean ratings of respondents for all the 11 items range from 2.87 to 3.65 are above 2.50 on 4-point rating scale (mean > 2.50). This implies that the respondents agreed with all the items as the entrepreneurial skills required for reproduction management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State. The standard deviation ranged from 0.57 to 0.99 indicates that the respondents were not too far from the mean and from the opinion of one another in their responses.

4.2 Discussion of Findings

The findings of the research question one in Table 1 revealed that the entrepreneurial skills required for feeding management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State are; ability to recognize common nutritional disorders of sheep, know how to efficiently feed sheep for optimum performance, become familiar with types of feeds and their nutrient values, know basic feed composting techniques, be able to evaluate a pasture for forage quantity and quality, become familiar with proper hay need for feed/additional feed, become familiar with proper grain need for additional feed, know how to train a lamb to drink from a bottle (when applicable), become familiar with a balance feed ration for a pregnant ewe and become familiar with a balance feed ration for feeder lambs. This is because the mean scores of the items are greater than 2.50 (mean > 2.05). These findings are in line with that of Baridoma and Nlebem (2022) revealed that agricultural education students should acquire skills in managing available grazing land and skills in planting nutritive grasses for feeding management practices.

The findings of the research question two in Table 3 showed that the entrepreneurial skills required for health management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State are; recognize plants poisonous to sheep in your area, know how to recognize a sheep that is sick, become familiar with common sheep diseases in your area, restrain an animal without stressful treatments, recognize a normal temperature of healthy sheep, know how to take rectal temperature of sheep, know how to administer an oral de-wormer, know how to correctly give an intramuscular (IM) injection, know how to correctly give subcutaneously injection, know how to castrate male lambs, know how to properly trim hooves, know how to trim the horns of adult rams and know how to pare sheep's feet. This is because the mean scores of the

items are greater than 2.50 (mean > 2.05). These findings are in agreement with that of Baridoma and Nlebem (2022) who revealed that skills in administering drugs and skills in caring for the pregnant animal are needed for enterprise productivity and profitability as well as individual prosperity. Woiwode (2021) also pointed out that appropriate use of animal drugs and vaccines is part of skills for maintaining animal well-being in a well-designed, health management program. This involves monitoring flock health, treatment, and preventing diseases in the flock. The author further suggested that shearing should be done about one month prior to lambing. Amadi. and Raji (2021) also reported that skill for pest control is among the skills in the agricultural education program that learners could acquire during the course of the program.

The findings of the research question three in Table 5 indicated that the entrepreneurial skills required for reproduction management practices in sheep husbandry by agricultural education students in tertiary institutions in Kano State are; know how to calculate/estimate time of lambing from breeding date, become familiar with reproductive tract diseases common to sheep, how the diseases spread and how they can be prevented, know how to perform basic first aid on a sheep/lamb, ability to recognize when an ewe is about to give birth, recognize a normal birth, recognize abnormal birthing (dystocia), be able to recognize and treat a retained placenta, know how to disinfect newborn's naval cord. know how to handle a newborn lamb safely, know how to protect yourself and your workers from zoonotic disease and develop a working relationship with a local veterinarian. This is because the mean scores of the items are greater than 2.50 (mean > 2.05). These findings ere in line with Woiwode (2021) who revealed that under most conditions, water should always be available and in order to avoid digestive upset, changes in diet should be made gradually to allow rumen microorganisms to adequately adapt to the change. Use feeding and watering equipment designs that will avoid injury and contamination to the animals.

5.0 Conclusion and Recommendations

5.1 Conclusion

The findings of this study showed that all the 34 identified skills in this study were required by agricultural education students in tertiary institutions in Kano State for optimal success in sheep husbandry practices. Hence Lecturers in tertiary institution in Kano State are required to make use of the skills in training their students to enable the students acquire the entrepreneurial skills required in order to make them self-employed after graduation.

5.2 Recommendations

Based on the findings of the study, the following recommendations were made;

1. Lecturers for Agricultural Education Programme in tertiary institution in Kano State should focus on essential skills required for sheep husbandry in teaching process that would help develop their students to become entrepreneurs.

2. Curriculum designers for Agricultural Education Programme in tertiary institution should consider the identified skill in developing the curriculum for training students to ensure that the students clearly understand entrepreneurial skills during their study, thus, making them active to exhibit the skills for the future.

3. Skill acquisition centres in Kano State should package the identified entrepreneurial skills for sheep husbandry into a programme and be used in training youths to make them self-reliance.

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