SOCIO – ECONOMIC ANALYSIS OF HOMESTEAD GOAT - KEEPING IN ONDO STATE, NIGERIA

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THESIS

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CERTIFICATION

This work has not been presented elsewhere for the award of a degree or any other purpose.

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DEDICATION

This project work is dedicated to my **LORD Jesus Christ**, a faithful witness and the begotten Son of God, unto Him that loves me and washes me from all my sins in His own blood and also grants me life and inspiration to do this research work.

ABSTRACT

Small ruminants, especially goats are important sources of protein to the *ruralites* in all states of Nigeria, not only because there is no religious taboo against them, but also because they are hardy and can readily convert food wastes and roughages into flesh. Notwithstanding these important economic advantages, very few economic research works are available on them. Thus, this study examined the socio-economic characteristics of homestead goat-keepers in Ondo State, Nigeria; estimated the gross margin per goat-keeper; identified, quantified and estimated the parameters of factors affecting the revenue earned from homestead goat-keeping and, identified and discussed the problems militating against increased revenues from the enterprise. Data collected from 200 households keeping goats at their backyards from five Local Government Areas (LGA) purposively selected from the State with the random selection of four villages from each LGA were analysed, using descriptive statistics, budgetary technique and multiple regression analysis. Results showed that the modal age group of the respondents was 41-60 years while women were more involved in goat-keeping than men. Goat-keeping is an income-supplementing undertaking carried out on small-scale as a part-time enterprise. Fifty three percent (53.0%) of the keepers had less than 11 goats with the main objectives of meeting important financial needs such as paying children's school fees and having animals for ceremonies. The bulk (99.5%) breed of goats kept in

the study area was the West African Dwarf while 90.0% of the keepers practised the semi-intensive system. Results showed that the mean cost of parent stock per goat-keeper accounted over three-quarters (77.8% to 83.9%) of total operating costs; followed by mean feed cost per goat-keeper (8.4% to 15.7%). The average total revenue per goat-keeper was highest in Ondo East LGA (N55, 411), followed by Akure North LGA (47,583) while Ifedore LGA ranked third with N46,188. With gross margin before tax of N6,080 and N5,480 per goat-keeper respectively, the enterprise was most profitable in Ifedore LGA, followed by Owo LGA (N5,515 & N4,898) while Akure North LGA ranked third with (N5,347 & N4,606) respectively. The multiple regression analysis (in logarithm) showed that the included explanatory variables (years of experience of goat-keepers; household size; number of parents stock of goats; age of goat-keeper; cost of veterinary services and cost of feeds with estimated coefficients: 0.040; 0.103; 0.624; -0.035; 0.114 and, 0.145 respectively) explained approximately 68.0% in the variations in the depended variable (that is total revenue earned by the goat-keeper) while the "F-test" showed that the model was significant at the 5.0% level. The constraints to homestead goat-keeping enterprises in the State were lack of capital for expansion, diseases and parasites, difficulty in procuring goat feeds, rampant pilfering of goats and inadequate space to keep animals.

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CHAPTER ONE

1. INTRODUCTION

1.1 Economic Importance of Goat Production in Nigeria

The importance of goats in Nigeria is well recognized. Goat keeping in any community is related to the value attached to its production. Goats are cheap source of animal protein to the populace; they are multi-purpose animals, reared for meat, milk, skin, hair and horns. The primary product is meat. Many people enjoy meat as part of a well balanced diet. It provides abundant sources of high quality protein, B-Vitamins and minerals (Jayeoba, 1994).

Goat meat is rich in most of the nutrients needed for human health. It is an essentially important food for children, adolescents and pregnant and breast-feeding women. Its high concentration of several key nutrients helps in formation of blood and prevents anaemia. Goat meat contains the entire essential amino- acids needed for building body tissues. In contrast, vegetable proteins are incomplete being low in one or more essential amino acids, vitamin B_{12} is present only in animal products and a diet of only plant food is deficient in vitamin B_{12} (Jayeoba, 1994).

The acceptability of goats reflects their importance to the people especially during festivity. Also, they are relatively cheaper compared with cattle. They are second to cattle in terms of milk production; their milk contains high proportion of smaller fat globules which aid digestion. Apart from these functions, they supply hides and skins which are used in

carpet and leather industries respectively. Other importance of goat keeping includes income generation and security against cash crops or food crops failure resulting from drought, pest and disease attack. Goats were probably among the earliest animals to be domesticated some six or eight thousand years ago. They are of great economic importance particularly in the tropics. They fall within the animal group that can be easily sustained and thus, are important property in rural areas.

Goats are hardy animals. They display a unique ability to adapt and maintain themselves in harsh environments while their relatively short generation intervals make increase in their population possible within a short time. Their small sizes and relatively low individual value bring them within the capacity of low-income rural households. Goats are produced and consumed in all ecological zones of the country because they do not suffer religious taboos (Aderinola, *et al*, 1994).

Although the population of goats is more concentrated in the Northern States of the country (see table 1) they are widely distributed throughout the country with varying socioeconomic functions (Aderinola, *et al* 1994).

The production of goats in Ondo State is limited to the breeds that are *trypanoso-tolerant* because the entire area is infested with the levels of *tse-tse* flies which infect the animals with *trypanosomiasis* (Aderinola, *et al,* 1994*)*. The animals are kept as *low-cost* household enterprises.

Table 1: Distribution of Goats in Selected Zones in Nigeria

Zones	Distribution of Goats	Relative Share (%)
North West	7, 690,000	19.30
North East	14,475,000	36.40
Central Zone	11, 430,000	28.70
South East	2, 028,000	5.10
South West	4, 189,000	10.5
Total	**39,812,000**	100

Source: National Agricultural Extension and Research Liaison Services, 1999, Ahmadu Bello University, Zaria

Goats in Ondo State are kept both for home consumption, which is often associated with ceremonial slaughter and for sale.

Although concerted efforts have been made by both State and Federal Governments to develop small ruminants (goats and sheep) as providers of meat and milk at various Livestock Institutes and Research Centres in the country, the results have not yielded tangible dividends in terms of meeting the needs of consumers. In Ondo State, livestock (including small ruminants') research has been haphazard and uncoordinated. According to Aderinola, *et al* (1994) there was a dearth of information and statistics on small ruminants' production in the Ondo State because the animals were produced almost entirely on a small scale, household basis using traditional systems.

1.2 Problem Statement

Research studies have proved animals as rich in sources of protein, vitamins and minerals than the plant sources (Ikede, 1989). However, among livestock species, one of the most neglected and untapped, in spite of its many overriding qualities over the others, is the goat. Over the ages, due to some negative impressions about goats, man has developed an unconcerned attitude towards them so that they are rarely involved in research programmes aimed at improving the animal protein of man's food. The goat is so relegated to the background that it is usually associated with poverty and limited to the rural poor, who keep them at the subsistence level.

Also, a rather obvious question is: why do people keep few goats? Why is the household flock limited to two, three or four breeding females? Furthermore, do socio-economic characteristics of Goat-keepers responsible for this limited flock size. If not what are the factors affecting family income from goat-keeping in Ondo State? Moreover, the level of food production in the country is barely keeping pace with population growth. It is now a common experience throughout the country that, with every passing year, the gap between food requirements and supplies, particularly with reference to animal products, is widening at an uncontrollable rate (Oyenuga, 1975). An average Nigerian consumes less than three quarter of his animal protein needs and the resultant effect of this is malnutrition and kwashiorkor with his attendant problems of

debilitating fatigues, disease and consequent early death (Alimi, 1987). Prices of beef have gone up to such a level that is becoming increasingly difficult for low-income families to purchase. Families have to cut down their animal protein consumption and reduce the quality of their diets to avoid spending abnormally high proportions of their income on food. It is clear that the continued dependence on cattle as the major source of animal protein cannot bridge the widening gap. Increase in the number of goats produced and consumed by the household can bridge the widening gap in animal protein not only in Ondo State but in the entire country. Also in Ondo State goats serve a number of functions including socio cultural and economic needs of the stockowners. The present rural production system is viewed as a serious factor- militating against an increased and improved production. The study therefore concerns itself with the following:

(i) goat-keepers having a flock of not less than five goats because goat-keepers having this flock size purchase feeds for flocks compared with goat-keepers with one or two goats and,

(ii) goat-keepers who give their animals veterinary care.

1.3 Objectives of the Study

The objectives set for this study are as follows:

(a) to examine the socio-economic characteristics of homestead goat-keepers in Ondo State, Nigeria;

(b) to estimate the gross margin of goat-keeping in the study area;

(c) to identify, quantify and estimate the parameters of factors affecting the revenue earned from keeping goats in backyards in the State, and

(d) to identify and discuss the problems militating against increased revenues from homestead goat-keeping in the State.

1.4 Justification of the Study

A research into a socio-economic analysis of homestead goat-keeping in Ondo state will add to the growing literature on economics of goat production in the country. Apart from being a source of information to goat-keepers in the country as a whole, the study will enable us to know what is responsible for the shortages in the production of livestock, with particular reference to goat production, with a view of finding a lasting solution to some or all of these problems. In addition, this study will draw attention of policy makers to policies that should be put in place and what necessary machinery should be set up to improve and sustain homestead goat-keeping enterprises in the country.

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CHAPTER TWO

2. LITERATURE REVIEW

2.1 Economic Analysis of Goat-Keeping

Goats as a source of meat provide proteins that are indispensable to a balanced human diet. Goat rearing and goat meat are not new in Nigeria. Nearly every rural house keeps a few goats while its meat is acceptable to all and sundry in the country. The increasing demand for goat meat makes it necessary to study the socio-economic analysis of homestead goat-keeping particularly in the South-Western Ecological Zone of the country wherein high incidence of *trypanosomiasis* does not permit cattle rearing. Despite the importance of goat production in the South-Western part of the country, very few empirical researches have been done on its economics. Among the few available works on the subject matter are reviewed in the succeeding paragraphs.

Using the gross margin analysis to measure the contribution of goat enterprise to farm total profit, Ogunyemi (2000) found that goat production was a profitable venture. In addition, he found that labour was efficiently utilised in the rearing of goats, especially in terms of feeding. Okoli (1979) conducted a four-month survey in the forest and derived savannah zones of south-western Nigeria. He stated that in south-western Nigeria, goats were not kept for prestige but were kept mainly for sale – adding that they were sold whenever cash needs arose. This, according to him, could be considered as a means of saving rather than as a source of

egular income. He also noted that goats were kept for slaughter during raditional and religious ceremonies and festivals. Upton (1985) stated hat goat kept for breeding is an item of capital. It could be slaughtered for current consumption but instead it is kept to produce more output in he future. The establishment of a breeding flock is therefore, a form of capital investment expected to yield a future return.

To plan any improvement it is necessary to identify the objectives and constraints on small ruminant production. The main objective appears to be financial gain (Upton, 1985). Matthewman (1977) reported that 91% of a sample of 95 farmers in two villages said that this was their reason for keeping small stock. The facts that timing of sales may be adjusted to meet financial emergencies, so that the small ruminant flock acts as a reserve, and that ruminants are slaughtered for ceremonial purposes, do not suggest fundamentally different objectives.

Many small ruminants are sold in the markets; market prices may be used to estimate costs and returns. Animals that are slaughtered for home consumption or for ceremonial purposes may also be evaluate in this way, since the market price represented the opportunity cost (Upton 1985)

On the issue of acquisition of breeding stocks for goats, Okoli, (1979) claimed that the easiest method of acquiring breeding stock in south-western Nigeria was by borrowing from a friend. This phenomenon has an important influence on the distribution of stock among the

population of related localities. He also reported that 54.0% of the interviewed farmers borrowed animals or had animals that were from borrowed stock. The borrower had the advantages of reducing the risk of losing, through the death of an animal, the capital invested and of sharing the offspring equally with the lender. There are disadvantages in borrowing animals, because the lender decides what should happen to the animal, especially when it is sick, whether to slaughter or sell. For this reason, majority of the borrowers reported that they would prefer to buy the breeding stock if they had the money. The owner gains from lending his/her animals because he/she saves his/her time (Okoli, 1979).

ILCA (1977) investigated the reasons for not keeping goats; 16% of the farmers interviewed had never kept goats. Space, especially where the farmers are in villages, was given as one of the most important reasons. In fact, in some villages, goat rearing was totally banned to avoid crop destruction. In small households and villages near towns, lack of time was given as a reason for not keeping goats.

In their socioeconomic study of household production of small ruminants in Ondo State, Nigeria, Aderinola *et al* (1994) estimated the contribution of goats and sheep to household incomes of their keepers in the State. Data collected from 126 small ruminant keepers randomly selected from 24 LGAs in the State, using frequency distribution, the gross value added and return on investment analyses; they found that (i) the average household size of the pooled small ruminant keepers was 10

persons with the modal household size being 6-10 persons. About 70.0% of the respondents consisted of young and middle-aged people, 53.2% and 94.5% of who were women and married person respectively. Eighty-nine (70.6%) of the small ruminant keepers had formal education --- ranging from primary school to tertiary levels with the primary school level having the largest of approximately 28.0%; (ii) household production of small ruminants was a minor job for the bulk (93.6%) of the respondents, whose answers to why they kept small ruminants were mentioned 101 times, 72 times and four times: for family consumption, for the market and for status respectively

In south-western Nigeria, women traditionally keep livestock, especially goats, whereas men usually have more animals and lending is restricted entirely to them. Women have fewer animals and more borrowed animals or animals borrowed from stock. The age of the farmer has some influence on the number and types of animals kept. Older men usually have tree crops such as cocoa and can afford to purchase sheep, which are usually more expensive than goat.

2.2 Homestead Goat-keeping Practices

2.2.1 Domestication and Husbandry Methods

According to Devendra and Burns (1970), goats were the first animals to be domesticated immediately after dogs. Mike (1996) emphasized that goats were probably the first ruminant animals domesticated 8,000 years ago. This occurred in the ancient civilisation

along the rivers of the Nile (Africa), Tigris and Euphrates and Indus (India). When people migrated from these areas the domesticated goat spread throughout the continents. In the past, at least for Western Nigeria, most households keep sheep and goats. Matthewman (1977) found that 50.0% of the household owned goats and up to 30.0% owned sheep. He also reported that there was a seasonal fluctuation in the number of households owning livestock and also in the number of animals owned per household.

In Nigeria, there are three types of breed of goats namely: Sahel, Sokoto Red Goat and West African Dwarf Goat. The West African dwarf goats have an average weight of 18 to 20 kg and vary from 35 to 45 cm in height. They have fairly large curved and backwardly-directed horns in the male, with small beards. The ears are long and horizontal while the common colours are brown, black and sometimes white. The animals are extremely hardy and serve as scavengers in villages. They are used for meat production but the females are poor milk producers. Generally, they are regarded as resistant to *trypanosomiasis*.

2.2.2 Housing and Feeding

In the humid tropics, housing for goats has the prime function of protecting the animals from heat and rainfall, since exposure to excessive moisture from heavy rains leads to a greater incidence of diseases such as pneumonia and worm infestation. For proper goat housing in the humid

tropics, several authors (Devendra and Burns, 1970; ILCA, 1979) make the following recommendations:

(a) The design of the house should be practical, easy to maintain and should offer optimum accommodation.

(b) Cheap and easily available building materials, such as timbers and tree branches should be adequate. The roof materials may consist of thatch, leaves or metal.

(c) The house should provide maximum ventilation but also protection from rain. It should be well drained and easy to clean.

(d) Animals should have access to the shed all day and night

In any livestock production enterprise, adequate nutrition both in quality and quantity is of paramount importance to successful animal performance. The bulk of feed of small ruminants is made up of roughages, which are mostly from natural grassland and improved pasture. In spite of the apparent availability of herbage in the humid tropics, a number of animals still die of starvation. This is often due to the non-availability of the right type of herbage around homesteads and the long distances animals have to trek to graze, losing the young animals in the process.

Goats have special feeding habits on account of their prehensile tongues; they are able to graze very short grass and to browse foliage not normally eaten by other ruminants. Their inquisitive feeding habits enable them to extend their feeding preferences and also perform in situations

where other ruminants may not be able to survive. Cassava products (tuber and peel) and maize offal (a by-product from local maize processing) were the most frequently used feeds under traditional management in south-western Nigeria. The requirements for maintenance of goats include 725.8 g starch equivalent (SE) per day per 100 kg live weight. The energy requirement for live weight gain is 3.0 g SE per kg live weight gain. The Digestible Crude Protein (DCP) requirements for maintenance and milk production are 55 g to 64 g per 100 kg live weight and 70 g per litre of milk respectively. Good feeding is particularly important just before the breeding season commences. This practise helps to improve prolificacy. The rationing of goats should be realistic and should be based on cheap foods such as browse; pasture and agricultural and industrial by-products and crop residues such as rice straw, sweet potato and cassava, should be fully exploited. The mineral and vitamin needs of goats are equally important. Sodium chloride in the form of salt licks or mixed mineral lick should be made available (Devendra and Burns, 1970). More importantly, the provision of adequate water supply is very important as the demand for water increases during the dry season. Salt in one form or the other should always be available. Other minerals, particularly trace minerals such as copper and cobalt, need to be made available in one form or another if a deficiency is identified or suspected.

Elizabeth (1988) said that each goat is a law unto herself as far as feeding is concerned. Ration that may be palatable to one may be refused

y another, though this habit is more common among the higher-yielding oats. On the other hand, food that may have no effect on the bowels of n average milker might result in scouring in the highest yielder. The bservant goat-keeper is therefore at an advantage. He stated further that oats are highly conservative and may go hungry rather than eat a articular kind of food to which they have been newly introduced. After a ew days, a new food that has passed the test will be consumed with vidity. The diets of farm animals consist of plants and plant products, lthough some foods of animal origin are used in limited amounts. Animals depend on plants for their existence; consequently, a study of nimal nutrition must necessarily begin with the plant itself.

Elizabeth (1988) stated that water is essential to life. The goat must consume a sufficient quantity daily from the water bucket besides the vater that is in the sueculent foods. Water is one of the components of nany essential body secretions. Nutrients are carried round in the blood stream that consists mainly of water. Water is passed out when the animal breathes or urinates. Milk also consists of 86% water. The body emperature control is largely by evaporation of water from the lung surfaces and, to a lesser extent, through the skin. Therefore, she must nave access to adequate clean water at all times. The water container should be replaced at regular. Many animals prefer plastic rather than metal. On the other hand, it may be the other way round. Scrub out the

water container daily, and change the water frequently. A goat fed on high concentrates likes its water warmed.

The choice of potential forage species for the West African humid tropics is very wide, and may be made from indigenous or exotic plants. Although West African dwarf goats under traditional management systems are fed almost entirely on natural forages, household refuse and other agro-industrial by-products supplement these. Supplemented feeding is justified when forage supply is inadequate (quantitatively or qualitatively), or when the cost of supplementation is less than the value of increased animal production. A number of authors, including Rutherrberg (1974), recommended the following species of grass: *panicum maximum* (guinea grass), *pennisetum purpureum* (elephant grass), *cynodon plectostachyus* (giant star grass), *andropogon tectorum* (southern Gamba grass) and their hybrids with *chloria gayanus*. Recommended legumes include *stylosanthies giayanensis, centrosema pubescens* and *pueraria phaseoloides*. Although comparatively little information is available on shrubs, Asare (1974) identified *flaminfia spp, cajanuc Cajan* and *baphia nitida* as promising species.

The nutritional requirements of dwarf sheep and goats have been reviewed by several authors. Daily metabolizable energy (ME) requirements for maintenance were approximately 100 Kcal/kg metabolic weights or live weight. The digestible crude protein (DCB) requirements for maintenance ranged from 0.74 to 1.96 g/day/kg metabolic weight.

2.2.3 Diseases and Health Management

Disease is the most important constraint on goat production in the humid tropics of West Africa. Although West African dwarf goats are known to be hardy and well adapted to the environment of the humid zone, mortality from disease is very high.

The most important diseases to which small ruminants are subjected to in the humid zones of West Africa are mainly viral, bacterial, ecto- and endoparasitic. Among these, *Peste des Petits Ruminants* (PPR), otherwise known as *Kata,* is the most important. The viral disease is closely related to Rinderpest, or measles in man. Reports from the available literatures indicate that PPR affects the animals of all ages, although young animals are more commonly affected. Goats are reported to be more susceptible than sheep. In ILCA's village study, no case of PPR infection was observed in sheep. Outbreaks of PPR are rendered more severe by secondary bacterial pneumonia and helminthiasis (Obi, 1980). It is also known that heavy disease losses occur mainly because of PPR infection, when several groups of sheep or goats from various regions are brought together.

Experiments and field trials have demonstrated that Tissue Culture Rinderpest vaccine (TCRV) provides protection for a 12-month period. Obi (1980) reports that rinderpest hyper-immune serum needed to be administered to the animals at least ten days to the use of TCRV. Mortality and morbidity rates owing to PPR are high. Obi (1980)

concluded that from four outbreaks in two villages covered during an 18-month ILCA survey, morbidity varied between 13.7 and 50%, and mortality varied between 3.6 and 36.8%. he further noted that PPR outbreaks in south-western Nigeria occur mainly during the harmattan and dry season (November to January), although outbreaks are reported to occur at the beginning of the rainy season (April – June). Other viral infections common among goats in the West African humid zone include goat pox, contagious pushilar dermatitis (otherwise known as "orf"), foot and mouth disease and blue tongue. Compared to PPR, these viral diseases are less frequently reported to cause damage.

Among bacterial diseases, infectious pneumonia (caused by the pastuerella bacteria, p. haemplytica and p. mullocida), is a very common cause of loss among sheep and goats, occurring as the primary infection or secondary to other viral infection, notably PPR. It may result from adverse conditions during the rainy season or from overcrowding (Obi, 1980). Proper management, especially housing, is considered a good preventive measure against pneumonia. The classical contagious caprine pleuropneumonia (CCPP) was reported not to occur in the humid zone, possibly because goats under traditional management systems in this zone are generally kept in small flocks, thus limiting the spread of the disease. Other damaging bacterial infection, such as anaerobic diseases (tetanus and blackleg), foot-rot and diseases of public health (*brucellosis and salmonellasia*) are present among small ruminants throughout the humid

zone of West Africa. There is no clear evidence that their prevalence or heir effects on small ruminants' productivity is significant.

Under intensive (commercial) management systems, where large numbers of animals are grazed on enclosed pastures often with little rotation, parasitic gastro-enteritis becomes a serious problem, owing to the ingestion of infective worm larvae from deposited faeces. On the other hand, under extensive (traditional) management systems, as found in south-western Nigeria, small ruminants are generally kept in small household flocks of varying ages, and the animals forage extensively. The chance of animals ingesting infective worm larvae is fewer because faeces are deposited over a wide area. Preventive measures against *helminthiasis* include controlled grazing, especially under intensive management systems, and treatment, drenching for example.

The most important ectoparasites in goats in the humid zone of West Africa are ticks, mites, lice and fleas. Ticks cause local lesions and damage from blood sucking and transmit a number of diseases such as heart-water. In ILCA's village survey (1978 – 1980), ticks were observed on small ruminants, especially during the rainy season. But death-causing ticks were not observed. Among the major causes of loss of small ruminants, especially goats under traditional management systems, mange, caused by mites is considered to rank after such big killers as PPR, pneumonia and *helminthiasis*, from 373 goats in ILCA's village survey (1978 – 1980), mortality rates as high as 2.1% owing to mange

were recorded, while mortalities due to PPR, pneumonia and *helminthiasis* were 27.8, 0.8 and 1.9% respectively. Uncontrolled grazing and crowded housing contribute to the maintenance and spread of ectoparasite infestations, especially under intensive management. Among control measures, proper management practices particularly controlled grazing, adequate housing and routine dipping and spraying are recommended (ILCA, 1979). Animals are dipped once in a month.

Notably, under intensive (commercial) management system, metabolic diseases and mineral or vitamin deficiencies or imbalances such as hypocalcaemia, pregnancy toxaemia and acidosis are reported to occur occasionally. As earlier noted, the humid zone of West Africa is infested with tsetse- flies, the vectors of *trypanosomiasis*. The indigenous West African dwarf goats live under conditions of high tsetsefly challenge, yet do not show serious clinical symptoms of *trypanosomiasis*. These animals can be classified as trypanotolerant. Reporting on susceptibility of dwarf goats to *trypanosomiasis*, Matthewman (1979) addressed the question of host preference and noted that some trypanosome species prefer certain animal to others. For example, c. taelrinoides prefers cattle and feeds less readily on sheep and goats. He concluded that although host preference of the vector is an important factor in determining susceptibility, the ability of the dwarf goats to survive and thrive in tsetse-infected areas shows their tolerance or immunity resulting from earlier exposure to infection. Despite their

tolerance, quoted by Matthewman (1979) detected trypanosomes (trypanosomo vivax and T. congolenae) in 13.8% of West African dwarf goats.

There is a possibility that trypanosome infection among tolerant animals result in poor health that may lower their resistance to other diseases and parasites generally, there is very little information on the susceptibility of West African dwarf goats to *trypanosomiasis*. Mike (1996) stated that goats in the tropics are hardy, adaptable animals, which show a high resistance to diseases. They are able to manage in environments of changing climate and fluctuating food supplies, including zones in which sheep and cattle would not easily survive. However, once actually ill, goats may quickly decline and die. Prevention of diseases is therefore very important. He further stated that healthy goats are both easy to manage productive, while dead and dying goats clearly represents losses.

2.2.4 Productivity of Goats

Productivity is affected by both environmental and genetic factors. Differences thus exist between breeds, but management, climate and disease can all influence fertility (Mike, 1996). He stated that farmers see fertility as the ease with which a nanny successfully conceives after mating. The shorter the period or the fewer the number of services the more profitable the exercise and the happier the farmer. The farmer would consider the number of services needed to get the nanny pregnant

to be an indicator of fertility of the buck. Ability to produce kids improves with age, with most nannies progressively giving more kids per litter up to their fifth or sixth kidding, where mating is uncontrolled as in West African village herds, all females may be mated at first oestrus, and first kidding occurs at 11 – 12 months. In some cases, absolute age may not be as important as physiological age and body weight, in which case well fed and rapidly growing goats will achieve sexual maturity before slower-growing ones. Dwarf goats are believed to have a shorter reproductive cycle than other breeds.

Age at first kidding is important because of its effects on economics of goat production. Goats achieve sexual maturity at 4 – 6 months of age, but it is better to delay mating to the time when the matured body weight is achieved, usually 12 months, so that the first kidding comes up when goats are about 18 months of age. The duration of the oestrus cycle is 18 – 21 days, but variation occurs for most tropical breeds. Heat (oestrus) normally lasts for 24 – 36 hours, but sometimes it lasted only a few hours; as a result, the female goats should be taken to the male goat as soon as possible after heat signs are observed. Heat signs are (1) excited behaviour and bleated, (2) redness around the vulva and, sometimes, a mucous discharge, and (3) frequent swathing of the tail. The gestation period is about 146 – 150 days. Although two kidding in a year is possible, this is seldom achieved in practice; the common one is to have three kidding in two years in the tropics. Ovulation in the goat occurs

towards the end of the oestrus; therefore, mating is best arranged at that time, which is about twelve hours after oestrus is first observed. Since time of mating can affect the number of kids born, double mating (the second service following 24 hours after the first) is usually advocated.

Twinning is common in goats and this could be observed among the goats on free range in the tropics; more importantly, it increases with age. It was rightly observed that fertility in goats appears to be maximal at about five to six years of age. There are evidences from literature that atmospheric condition affect semen quality. The decrease in the quality of the semen from the buck (male goat) subjected to high environmental temperature appears to be related to a rise in temperature of the subcutaneous tissue of the scrotum. Most studies of dwarf goats show that these animals are bred throughout the year. This is true for the dwarf goats even under the temperate conditions of Europe (Devendra and Burns, 1970). In the literature, dwarf goats are reported to have a high reproductive performance, even under village conditions. To gauge reproductive performance, it is necessary to measure fertility (the number of parturitions per annum), prolificacy (the average number of offspring in each year), and fecundity (the number of offspring produced per year).

Among goats under research farm conditions in Ghana, fertility rate of 1.24% noted. Recorded births included 32.1% singles, 52.9% twins, 13.7% triplets and 1.3% quadruplets, giving an average prolificacy rate of 184%. This implies a fecundity rate of 260%, that is, each doe

produces 2.6 kids per year. Two villages in south-western Nigeria observed fertility rate of 155% for dwarf goat (Matthewman, 1977). It is known that prolificacy increases with the age of the dam. Devendra and Burns (1970) noted that the proportion of twin and triplet births increased from 19% at first kidding to 79% in the second and later kidding. The same authors concluded that maximum fertility in goats is reached at the age of 5 to 6 years. Single and multiple births are greatly influenced by the level of nutrition. Goats are mainly scavengers and usually have multiple births during the dry season, when they feed on post-harvest crop residues and household refuse, which is plentiful due to maximum availability of household food supply

In order to ensure efficient conception rates, optimum male/female ratios are necessary under village conditions in South-western Nigeria. Sellers *et al* (1974) found out that 120 rural houses kept a total of 118 adult rams and 347 ewes, giving a ratio of 1:2.8. 381 adult bucks were kept with 1,635 does, giving a ratio of 1:4.3. Matthewman (1977) found out that adult bucks kept with 153 does giving a ratio of 1:17. Under research and commercial farm conditions, male to female ratios ranging between 1:20 and 1:60 have been recommended for sheep and goats respectively. Birth weight is also an important factor in productivity. It influences pre-weaning mortality, growth rate and size of an adult animal. Among the factors that influence birth weight, genetics and environment (feeding, management) are the most important. Birth weights are also influenced by

sex (male or female) and type of birth (single or multiple) (Devendra and Burns, 1970).

Goat husbandry system is classified as intensive, semi-intensive and extensive, or variations of these. But in the tropics, these distinctions are sometimes less instructive than those between sedentary, transhumant and nomadic systems. The nomadic system is an example of subsistence agriculture.

2.2.5 Subsistence Agriculture and Goat Production

Subsistence agriculture is a system of farming whereby the farmer is concerned mainly with the provision of food and basic needs for his family without any intention of exporting any surplus produce and it may involve crop husbandry or livestock production. In livestock production, the subsistence farmer keeps a few goats, sheep, rabbits or pigs. These animals are usually allowed on limited freedom to roam about with control and proper management. In the arid regions, the subsistence livestock farmer is mainly nomadic and moves with his animals from place to place in search of pasture. The animals provide him with food, clothing, milk and butter which may be exchanged for money. This system is purely extensive.

In semi-intensive system, goats are commonly grazed on tethers and housed at night. The animals may receive supplementary feed such as household vegetable (Matthewman, 1977). Intensive form of production involves continuous housing or zero grazing. This provides maximum

protection from adversities of difficult environments and gives complete control over the destructive aspect of the goats' feeding habits. Grass or forage is brought to the goat and this is supplemented with concentrates.

Goats under the intensive system of management performed better than those under the semi-intensive system of management in terms of weekly body weight and weekly heart girth. They stated further that confined goats, though deprived of certain facilities like sunlight for vitamin D synthesis and natural habit of grazing, had turned out to be of advantage in utilising available feed resources for their proper body development. They recommended that goats in the savanna zone should be managed intensively as this will not only enhance productivity but will also secure goats against adverse conditions. It will also prevent them from causing destruction to plants during the planting season.

Tethering management of goats during the rainy season may serve as an alternative to the traditional extensive management systems in regions with high population densities, where mixed livestock systems are practised. Tethering management of goats is not stressful, and may not have negatives effect on their productivity. It is, apparently a good management technique aimed at preventing goats from damaging crop during the rainy season in the zone.

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CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 The Study Area

The study was carried out in five Local Government Areas out of 18 LGA of Ondo State, comprising Ifedore, Akure South, Akure North, Owo and Ondo East. The State, which is well endowed with abundant human and material resources, has an estimated land area of 14 767.71 square km and a provisional population of 2. 53 millions (National Population Commission, 1996). There are eighteen Local Government Areas in Ondo State. The State lies between longitudes 04° 30° E and 06° 00°E and latitudes 05° 45°N and 08° 15°N. It is entirely within the tropics and bounded by Ogun and Osun states in the West, Ekiti State in the North, Edo and Delta States in the East while it extends to the Atlantic Ocean in the South. The state is well endowed with climatic and vegetation zones from the coast of the Atlantic Ocean to the derived Savannah Zone of the North that are suitable for agricultural activities.

The five Local Government Areas were purposely selected because of the large population of goat-keepers in the areas. The area within the tropical forest enjoys high rainfall of about 1 500 mm annually spreading through April to October. The livestock farmers in the Local Government Areas are involved in the production of poultry, ruminants such as goats, sheep and cattle and non-ruminants such as pigs, fish and rabbits.

3.2 Sources of Data

Both primary and secondary data were used for this study. The Primary data were in form of the structured questionnaires administered to homestead goat-keepers in Ondo State. The questionnaires were designed in such a way to elicit socio-economic information from the respondents as close and open-ended questions were adopted. Personal interviews were carried out in order to provide additional useful information. The questions were tailored towards meeting the set objectives of the study. Data were collected on information such as the location of homestead goat-keepers, their sexes, ages, years they started goat-keeping business, marital status, the total number of goats in their flock in the present and previous seasons, total number of goats bought and sold in the season and problems encountered in goat-keeping. Secondary data were sourced from published sources available from journals, magazines and other publications. In order to know the trend of annual production of livestock, data on livestock population in Nigeria were collected from the Federal Office of Statistics and *Quarterly Bulletin of Statistics*.

3.3 Sampling Procedure

The multi-stage sampling technique was used in order to get true reflection of the population of prospective respondents. This involved purposive sampling and random sampling methods. Five Local Government Areas (LGAs) were purposively sampled to include those

GAs with large number of goat-keepers in the State. Four villages were ndomly selected from each LGA while the number of goat keepers erviewed from each village depended on (i) having a flock of not less n five goats because goat-keepers that have this flock size purchase eds for their animals compared with goat-keepers with one or two goat employment of veterinary services. Hence, a total of 200 households re interviewed to provide data for analysis in this study.

Methods of Data Analysis

The data collected were analysed using descriptive statistics, the dgetary technique and multiple regression analysis. Descriptive tistics such as mean, mode and median were used to examine socio-onomic characteristics of the respondents while the budgetary chnique involved the use of gross margin to determine the contribution homestead goat-keeping to family income as expressed by equation (1)

$$GM_i = TR_i - TVC_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

here:

GM_i = Gross margin accruing to the i^{th} goat-keeper (N);

TR_i = Total Revenue from the sale of goats by the i^{th} goat-keeper (N);

TVC_i = Total Variable Cost incurred by the i^{th} goat-keeper (N).

The multiple regression analysis involved the specification and timation of the factors influencing the revenues earned from goat-eping as specified by equation (2).

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, U) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where:

Y = Total revenue earned by the i^{th} goat-keeper (N);

X_1 = Experience of the i^{th} goat-keeper (years);

X_2 = Household size of the i^{th} goat-keeper;

X_3 = Number of goats (parent stock size) of the i^{th} goat-keeper;

X_4 = Age of i^{th} goat-keeper (years);

X_5 = Cost of Veterinary services incurred by the i^{th} goat-keeper (N);

X_6 = Cost of feeds incurred by the i^{th} goat-keeper (N);

U_1 = Error term.

Two functional forms, namely: linear and Cobb Douglas (double log) functions were tried to determine the format that gave the best fit to the data.

Criteria Properties of Linear and Cob Douglas Models

(i) The models can be easily estimated by statistical procedure,

(ii) The models adequately represent the relationship between revenue from goat-keeping and factors affecting it,

(iii) The model can be easily manipulated in terms of economic analysis.

Explicitly, the models are represented by equations (3) and (4) respectively:

Linear:

$$Y = b_o + b_1x_2 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + U_i \quad \ldots\ldots\ldots\ldots \quad (3)$$

Double log:

$$\log Y = \log b_0 + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + b_6 \log x_6 + \log U_i \quad \ldots\ldots\ldots\ldots \quad (4)$$

Where:

b_0 = intercept or constant and b_1 to b_6 are parameters to be estimated.

3.5 Evaluation Criteria

The evaluation criteria used included the adjusted R^2 ($\overline{R}^2$) and the magnitude as well as the signs carried by estimated coefficients.

3.6 Measurement of Explanatory Variables and a Priori Expectation

It was expected that all parameters of the explanatory variables except ages of goat-keepers would be positive. This implies that both the independent and dependent variables will be moving along the same direction. That is, as each of the variables increases, the revenue of the goat enterprise will also increase, all things remaining equal.

(a) Experience of goat-keeper (X_1): This is the length of time the respondent had been involved in the goat-keeping business. It was expected that the longer the years of experience, the more money (sales) the respondent makes from the enterprise. Thus, it was expected that X_1 would carry a positive sign.

(b) **Household Size (X_2):** it was expected that the larger the size of the household employed in goat-keeping, the larger the flock size. Invariably, the higher the revenue from the goat enterprise.

(c) **Number of Parent Stock Size (X_3):** The number of goats (parent stock size) was expected to increase revenue from goat enterprise. Thus, it was expected to have a positive sign.

(d) **Age of goat-keeper (X_4):** It was expected that there should be an inverse relationship between the age of goat-keepers and his level of income from the enterprise. This expectable is premised on the fact that the older the goat-keeper becomes, the lower the chances that he/she will adopt innovations capable of improving his/her goat-keeping, all things being equal.

(e) **Cost of Veterinary Services (X_5):** Mortality mainly due to diseases constitutes one of the constraints to goat enterprise development. It was expected that the larger the size of the flock, the higher the cost incurred to employ services of animal health officers.

(f) **Cost of Feed (X_6):** This is the cost incurred in feeding the goats to market size. It was expected that the larger the number of goats, the higher would be the total cost of feeds.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

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4.1 Socio-economic Characteristics of Goat-keepers

4.1.1 Age Distribution

The age distribution of the sampled homestead goat-keepers is presented in table 2. The table shows that the modal age group of the goat-keepers which was (41- 60) years accounted for approximately 46.0% of the sample. The Table also shows that goat-keepers within the age-groups of 41-60 and 61-80 years pooled together accounted for 77.0% of the sample. This indicated that homestead goat-keeping in Ondo State was dominated by ageing and aged people.

4.1.2 Sex, Marital Status and Household Size

Results showed that 74.5% of the homestead goat-keepers were women while only 25.5% of them were men. Also, results showed that all the respondents were married with a modal household size of 4-8 members which represented about 56.0% of the sample (see table 3).

4.1.3 Level of Education

This is presented in table 4. The Table shows that 41.0% of the respondents had no formal education while 23.0% did not have more than primary school education. However, 36.0% of the sample had secondary school and tertiary education – suggesting that about one-third of the homestead goat-keepers might be responsive to adoption of goat improvement practices in order to increase output, all other factors being

Table 2: Age Distributions of the Homestead Goat-keepers in Ondo State, Nigeria

Age (Years)	Frequency	Relative Frequency (%)
< 20	1	0.50
20 – 40	34	17.00
41 – 60	91	45.50
61 – 80	63	31.50
81 – 100	11	5.50
Total	200	100.00

Source: Data Analysis 2004.

Table 3: Household Sizes of Homestead Goat-keepers in Ondo State, Nigeria

Household Size	Frequency	Relative frequency (%)
<4	83	41.50
4 – 8	111	55.50
9 – 12	6	3.00
Total	200	100.00

Source: Data Analysis 2004.

Table 4: Educational Levels of Homestead Goat-keepers in Ondo State, Nigeria.

Educational Level	Frequency	Relative frequency (%)
No formal education	82	41.00
Primary School education	46	23.00
Secondary School education	51	25.50
Post Secondary education	21	10.50
Total	200	100.00

Source: Data Analysis 2004.

held constant.

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4.2 Reasons for Keeping Goats

The reasons for keeping homestead flocks of goats by the respondents are presented in table 5. Majority of the respondents (58.50%) claimed that they kept goats "to raise emergency cash". The goats served as "savings account" for this group of keepers. These "deposits" were withdrawn (the goats were sold) mainly in times of emergency needs for cash such as when large sums were required for children's education. Goats were kept for consumption by 15.0% of the respondents, this activity occurred mainly during ceremonies and festivals. It was quite unusual for households to slaughter goats just because they lacked meat. For goat-keepers to be encouraged to consume more of their product, it would be necessary to increase the herd size.

4.3 Major Occupations

None of the pooled goat-keepers had the enterprise as a main job – they all engaged in it as a subsidiary occupation. Table 6 shows the distribution of the respondents according to their major occupations. Ninety-four (47.0%) of the respondents had trading as major occupation, 62 (31.0%) were crop farmers. The results in table 6 show that goat-keeping was not at the commercial level and confirm the reasons for keeping the animals in the study area. It is unlikely that much could be done to boost the production of goat meat in the study area!

Table 5: Reasons for Keeping Goats by Homestead Goat-keepers in Ondo State, Nigeria

Reasons	Frequency	Relative Frequency (%)
Emergency cash	117	58.50
Consumption	30	15.00
"A way of Life"	14	7.00
Emergency cash and consumption	39	19.50
Total	200	100.00

Source: Data Analysis 2004.

Table 6: Major Occupations of Homestead Goat-keepers in Ondo State, Nigeria

Major Occupations	Frequency	Relative Frequency (%)
Trading	94	47.00
Crop Farming	62	31.00
Civil Service	22	11.00
Studentship	1	0.50
Artisan	21	10.50
Total	200	100.00

Source: Data Analysis 2004.

4.4 Sources of Finance

The distribution of the respondents according to the sources of initial capital is presented in table 7. Majority (69.5%) of the respondents took-off goat-keeping business from personal efforts rather than relying on outside assistance. Assistance from friends only represented 21.5% while 5.0% was obtained from soft loans from Cooperative Societies.

Table 7: Sources of Initial Capital invested by Homestead Goat-keepers in Ondo State, Nigeria

Sources of Finance	Frequency	Relative Frequency (%)
Personal savings	139	69.50
Loan from friends	43	21.50
Cooperative	10	5.00
Gift	8	4.00
Total	200	100.00

Source: Data Analysis 2004.

4.4.1 Acquisition of Parent Stock

The mode of acquisition of parent stock of goats is of prominent importance to their keepers. Goat-keepers normally prefer to have adequate information about the performance of "mother goats" before acquiring their progenies for breeding. Such information include length of parturition, number of kids per kidding, "Mothering ability" of the "mother goat" and maturity period (that is the age at which she-goat can get pregnant).

The mode of acquisitions of sample of goat-keepers is presented by table 8. The Table shows that majority of goat-keepers, 75.0% purchased their parent stock and the herd grew through birth (kidding). However, the practise of goat leasing was used by 21.0% of the respondents to enter into the goat production industry. These practices reduced the initial costs of entering the goat enterprise

to those of feeding, housing and care. The leasers (owners) had title to the initial stock but shared the kids in a rotational fashion while the lessees

Table 8: Distribution of Homestead Goat-keepers according to Modes of Goats' Acquisition of Parent Stocks in Ondo State, Nigeria

Modes of Acquisition	Frequency	Relative Frequency (%)
Purchase	150	75.00
Leasing	42	21.00
Gift	8	4.00
Total	200	100.00

Source: Data Analysis 2004.

(keepers) supply the feed, labour, housing and care. The disadvantages of acquisition of parent stock by leasing are: (1) leaser can lose the goat to thieves or sickness and;

(2) the lessee can be dishonest and unfaithful to the terms of agreement. The choice of initial stock was influenced mainly by the fertility of the animal, especially twinning and mothering ability. These require that foundation stocks be obtained from sources well known to the rearers, since no outstanding strain of WAD goats with proven economic potentials were available in the market place.

4.5 Production Characteristics

4.5.1 Flock Size

This is presented by table 9. The Table shows that homestead goat-keeping was a small scale enterprise in the study area. The modal flock size was 5-10 into which 45.5% of pooled keepers fell. The fact that the average flock size was 12 goats and that 46.5% of the sample kept more

Table 9: Sizes of Parent Stocks of Homestead Goat-keepers in Ondo State, Nigeria

Flock sizes	Frequency	Relative frequency (%)
3 – 4	16	8.00
5 – 10	91	45.50
11 – 20	76	38.00
21 – 30	13	6.50
Above 30	4	2.00
Total	200	100.00

Source: Data Analysis 2004.

than 10 goats indicated that goat-keeping was practiced on small scale basis. Goatry flock size was small in the area because it was undertaken as family enterprise on part time, semi –intensive basis. In addition, there were lack of space and capital to invest. It was found that none of the pooled goat-keepers received any form of assistance from Financial Institutions. Other reasons included outbreak of diseases and lack of adequate veterinary care.

4.5.2 Breeds of Goat and Management practices

The results showed that the predominant breed of goat kept by the respondents was the West African Dwarf (WAD). This accounted for 99.5% while Red Sokoto Breed accounted for 0.5%. WAD goats have the following advantages over non-native goats: (i) easy/quick adaptation to unfavourable climate; (ii) depend on crop residue and food waste; (iii) kid twice in 14 months with twin or triplet kid; (iv) provide more meat; (v)

command higher market prices; (vi) provide tastier meat and (vii) less susceptible to diseases and respond to treatments very fast.

Results also showed that two management systems, namely semi-intensive and the extensive or free-range systems were identified in the study area. The semi-intensive management system, which was practised by 90.0% of the pooled

goat-keepers, involved keeping the animals in the backyard at night and releasing them to go out in the morning. Only 10.0% of the goat-keepers practised the free-range system. Furthermore, goat-keepers in the study area adopted the following health management practices: cleaning of the goat pen; removal of infected animals from flock; disinfection of animals to reduce parasites and treatment of flock with de-wormer.

4.5.3 Types of Feed Fed

Table 10 shows the distribution of the respondents according to their sources of animal feed. Eighty-five (42.5%) of the respondents fed their goats with various mixtures of feeds while 31.5% of them fed the animals with agricultural by-products such as beans bran, maize residues, soya bean waste, rice bran, yam peels, plantain peels and cassava peels. Only 1.5% of the respondents fed the animals with concentrates. This is a challenge for animal scientists to commercialise the goat enterprise by packaging goat feeds in such a

way that they can be obtained conveniently and in bulk to enable goat-keepers increase their herd size as the poultry nutritionists have done.

Table 10: Types of Feed Fed to Homestead Goats in Ondo State, Nigeria

Types of Feed	Frequency	Relative frequency (%)
Concentrates	3	1.50
Mixture of various feeds	85	42.50
Agricultural by-products	63	31.50
Agricultural products	49	24.50
Total	200	100.00

Source: Data Analysis 2004.

4.6 Marketing and Market Prices of Goats

Distribution of the respondents according to point of sale of goats is shown in table 11. Most goat-keepers (35.5%) brought their goats to the local market for

sale while 34.5% of them do sell their animals at home. The market is usually within walking distance from their homes or points of production. The marketing channels were goat-keepers to final consumer or goat-keeper to butcher/retailer to final consumer. 12% of the respondents kept goats mostly for consumption.

Goat commands a very high price at the market especially during important religious ceremonies. Table 12 shows market price range among various types of goats in Ondo State. Adult female goat (doe) was sold for between N4000 and N8000 while adult male goat (buck) was sold between N2500 and N3000. The castrated adult male goat was sold

Table 11: Points of Sale of Homestead Goats in Ondo State, Nigeria

Point of Sale	Frequency	Relative frequency (%)
Farm gate	69	34.50
In the market	71	35.50
Farm gate and market	36	18.00
No sale	24	12.00
Total	200	100.00

Source: Data Analysis 2004.

Table 12: Market Price Range among Various Types of Goats in Ondo State in Year 2004

Types of Goats	Unit Price (₦)
Doe (adult female goat)	4000 – 8000
Buck (adult male goat)	2500 – 3000
Adult castrated male goat	4000 – 8000
Weaner (young female goat that has stopped sucking milk)	2000 – 2500
Weaner (young male goat that has stopped sucking milk)	1500 – 2000
Kid (young female goat between the ages of 1 and 2 months)	500 – 1000
Kid (young male goat between the ages of 1 and 2 months)	400 – 800

Source: Data Analysis 2004.

between N4000 and N8000. The female goat that had stopped sucking milk (weaner) was sold at N2000 and N2500 while the male that had stopped sucking milk was sold between N1500 and N2000. The young

female goat (kid) of one or two months old was sold between N500 and N1000 while the young male goat (kid) of one or two months old was sold between N400 and N800. Goats were not weighed nor did they have standardized measures. However, the sex, size, appearance of the goats and the bargaining power of buyers and sellers affected prices of the animals.

4.7 Mean Gross Margin per Goat-keeper

The mean gross margin (GM) per goat-keeper was estimated LGA by LGA while results of the LGAs were pooled to provide figures for the State. Analysis of costs and returns are presented in tables 13 through 15. Table 13 shows that the mean depreciation values for buildings took the lion-shares (85.5% - 90.5%) of the durable assets used for homestead goat-keeping in the State.

The highest percentage of 90.5 for Akure South LGA was probably not unconnected with the urbanization factor associated with the fact that the LGA houses the capita city of Ondo State while the lowest value of 83.5% for Owo LGA suggested that the further away from the urban centre, the less the value of landed properties.

Analysis of mean operating cost showed that the mean stock cost of goat-keeping per goat-keeper accounted for the lion-share of total operating costs in all the LGAs ranging from 77.8% to 83.9% as presented in table 14. The Table also showed that this was followed by mean feed cost per goat-keeper which accounted for between 8.4% and

Table 13: Mean Estimated Depreciation Values of Fixed Capital penditure Pattern on Local Government Basis per Goat-keeper in Ondo State, Nigeria (N)

ms	Ifedore LGA	Akure South LGA	Akure North LGA	Owo LGA	Ondo East LGA	Ondo State
erage preciation* ue on ldings.	513 (85.5%)	579 (90.5%)	661 (89.2%)	515 (83.5%)	900 (89.8%)	634 (88.1%)
erage preciation** ue on nkers.	39 (6.5%)	32 (5.0%)	32 (4.3%)	54 (8.8%)	48 (4.8%)	41 (5.7%)
erage preciation** ue on ders.	48 (8.0%)	29 (4.5%)	48 (6.5%)	48 (7.8%)	54 (5.4%)	45 (6.3%)
tal	600	640	741	617	1002	720

The straight-line method was applied on initial costs of the sheds under the assumptions of zero junk value and ten years' economic lifespan.

The straight-line method was also used on the initial cost while it was assumed that the life span of the feeders and drinkers was four years.

Figures in parenthesis are percentages of total value of depreciation for each LGA.

urce: Data Analysis.

Table 14: Mean Estimated Operating Cost per Goat-keeper on Local Government Basis in Ondo State, Nigeria (₦)

Items	Ifedore LGA	Akure South LGA	Akure North LGA	Owo LGA	Ondo East LGA	Ondo State
Average cost of parent stock per homestead goat-keeper	31,332 (78.1)	26,914 (78.6)	33,683 (79.7)	32,693 (83.9)	40,843 (77.8)	33,093 (79.5)
Average cost of feeds per homestead goat-keeper	6,035 (15.0)	5,298 (15.5)	5,643 (13.4)	3,265 (8.4)	8,253 (15.7)	5,699 (13.7)
Average cost of veterinary services per homestead goat-keeper	1,151 (2.9)	1,277 (3.7)	1,755 (4.2)	1,863 (4.8)	1,888 (3.6)	1,587 (3.8)
Average cost of transportation per homestead goat-keeper	753 (1.9)	75 (0.2)	338 (0.8)	312 (0.8)	554 (1.1)	406 (1.0)
Average cost of labour per homestead goat-keeper	837 (2.1)	666 (1.9)	817 (2.1)	849 (2.2)	942 (1.8)	822 (2.0)
Total	40,108	34,230	42,236	38,982	52,480	41,607

( ) Figures in parenthesis are percentages of total operating cost for each LGA.

Source: Data Analysis 2004.

15.7% of mean operating expenses per goat-keeper in the study area.

The mean GM and profit before tax per goat-keeper are presented by table 15. Results showed that average total revenue per goat-keeper was highest in Ondo East LGA (N55,411) followed by Akure North LGA (47,583) while Ifedore LGA ranked third with N46,188. Table 15 also shows that ATC per goat-

Table 15: Mean Profitability per Homestead Goat-keeper in Ondo State, Nigeria (₦)

Items	Ifedore LGA	Akure South LGA	Akure North LGA	Owo LGA	Ondo East LGA	Ondo State
Average Total Revenue (ATR)	46,188	36,911	47,583	44,497	55,411	45,869
Average Total Variable Cost (ATVC)	40,108 (98.5)	34,230 (98.2)	42,236 (98.3)	38,982 (98.4)	52,480 (98.1)	41,607 (98.3)
Average Total Fixed Cost (ATFC)	600 (1.5)	640 (1.8)	741 (1.7)	617 (1.6)	1002 (1.9)	720 (1.7)
Average Total Cost (ATC)	40,708	34,870	42,977	39,599	53,482	42,327
Mean Gross Margin (ATR – ATVC)	6,080	2,681	5,347	5,515	2,931	4,510
Profit before Tax (ATR – ATC)	5,480	2,041	4,606	4,898	1,929	3,791

Note: Gross Margin = Total Revenue –Total Variable Cost
Profit = Total Revenue –Total Cost
Source: Data Analysis 2004.

keeper accounted for more than 98.0% of TC in each of the LGAs studied with the highest (98.5%) in Ifedore LGA. The Table also showed that the mean GM and profit before tax per goat-keeper were N4,510 and N3,791 respectively. With GM and profit before tax of N6,080 and N5,480 per goat-keeper respectively, the enterprise was most profitable in Ifedore LGA, followed by Owo LGA (N5,515 & N4,898) while Akure North LGA ranked third with (N5,347 & N4,606) respectively.

Income derived by goat-keepers in keeping of goats are channel into the following areas in order of importance: improving quantity and quality of food consumed by households, meeting family educational

ed, source of quick money in time of emergency, increasing family come, meeting medical needs and clothing needs.

8 Multiple Regression Analysis

Results of the multiple regression analysis (in logarithm) showed at the included explanatory variables explained approximately 68.0% in e variations in the depended variable (that is total revenue earned by the goat-keeper) while the "F-test" showed that the model was significant the 5.0% level. All the independent variables carried the expected sign Table 16). The negative sign on the coefficient representing the age of e goat-keeper indicated that the older the goat-keeper, the less the evenue he earned from goat-keeping. This result is economically lausible because the older the goat-keeper becomes, the less interested e is in increasing his flock size and in adopting production practices that ould enhance his income earning capacity. More often than not, the older eople tend to keep goats more "for pleasure" than for money-making. lowever, this variable was not significantly different from zero at the .0% level. On the other hand, the positive sign on the variable epresenting cost of veterinary services suggested that the higher the cost f veterinary services, the higher the sales' revenue from "goatry" ecause proper veterinary care keep the animals healthy and reduce ortality rates, thereby giving the keeper more animals for sale. Results lso showed that only the estimated coefficients of the variables epresenting number of parent stock, cost of veterinary services and costs

Table 16: Estimates of the Factors Influencing Total Revenue from Goat-keeping in Ondo State, Nigeria (in Logs).

Parameters	Variables	Coefficients	Standard Error
Constant		3.060	0.252
X_1	Experience of Goat-keeper	0.040	0.041
X_2	Household size	0.103	0.054
X_3	Number of goats (parent stock)	0.624 *	0.077
X_4	Age of goat-keeper	–0.035	0.108
X_5	Cost of veterinary service	0.114 *	0.029
X_6	Cost of feeds	0.145 *	0.052

Note: * indicates the estimated coefficients were significant at 5.0% level

$R^2 = 0.690$

Adjusted $R^2 = 0.676$

F – Ratio = 63.003

Source: Data Analysis 2004.

of feeds were significant at the 5.0% level. Finally, the estimated coefficient of each of the independent variables showed inelasticity towards revenue earned by goat-keepers in the State.

4.9 Constraints to Homestead Goat Production

4.9.1 Lack of Capital for Expansion

Majority of the goat-keepers lacked capital for expansion. The study revealed that none of the goat-keepers received any form of loan from any financial institution for goat-keeping. This financial constraint limited the expansion of homestead goat-keeping.

4.9.2 Diseases and Parasites

A number of diseases were identified and these include pneumonia, diarrhoea, mange, *petit de peste* Ruminant (Kata) and external parasites. The outbreak of these diseases and parasites may lead to a total death of the whole flock if proper care is not taken or veterinary services are not regularly available.

4.9.3 Difficulty in procuring Goat Feeds

The problems of feeding and caring for the goats were one of the reasons why rearers restricts the number of goats kept at any period. In areas experiencing rapid urbanization, forages were being pushed farther away from living houses. As a result of this, obtaining goat feeds has become a time

consuming and laborious task. Also, the feed and concentrates available for the animals were not adequate to meet their dietary requirements and some homestead goat-keepers could not afford to buy the concentrates. Feeding the animals to their satisfaction is one of the methods of restricting the animals from straying away into the hands of thieves and neighbouring houses where they can be beaten, wounded or killed.

4.9.4 Theft

Most of the respondents complained of the rampant stealing of their animals. This restricted the homestead goat-keepers to rearing a limited number of goats in order to reduce the risk of losing a large number of their animals to thieves.

4.9.5 Inadequate space to keep the Animals

Most farmers interviewed indicated their interest to expand. However, some were restricted because of inadequate space to rear goats.

4.9.6 Accidents

In areas experiencing rapid urbanization, the animals are often killed by vehicles. Some animals were also injured when they strayed to farms. Traps were set by some farmers purposely to discourage the animals from coming to their farms. Some animals were poisoned or when they eat bad plants or bitten by snakes.

CHAPTER FIVE

SUMMARY OF MAJOR FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Major Findings

The study undertook a socio-economic analysis of homestead goat-keeping in Ondo State, Nigeria with the following objectives: (i) to examine the socio-economic characteristics of homestead goat-keepers in the State; (ii) to estimate the gross margin of goat-keeping in the study area; (iii) to identify, quantify and estimate the parameters of factors affecting the revenue earned from keeping goats in backyards in the State, and (iv) to identify and discuss the problems militating against increased revenues from homestead goat-keeping in the State. Data collected from 200 households keeping goats at their backyards from five LGAs purposively selected from the State with the random selection of four villages from each LGA were analyzed, using descriptive statistics, budgetary technique and multiple regression analysis. Results showed that:

(a) the modal age group of the respondents was 41-60 years into which 91 (45.5%) of them fell;

(b) women were more involved (74.5%) in goat-keeping than men in the study area;

(c) forty-one percent of homestead goat-keepers had no formal education;

(d) goat-keeping was a part-time small-scale family enterprise in which 53.0% of the keepers had less than 11 goats with the main objectives of meeting emergency financial needs such as paying children's school fees and having animals for ceremonies;

(e) the predominant (99.5%) breed of goats kept in the State was the WAD while 90.0% of the keepers practiced the semi-intensive system;

(f) the mean cost of parent stock per goat-keeper accounted for the lion-share of total operating costs in all the LGAs ranging from 77.8% to 83.9%; followed by mean feed cost per goat-keeper which accounted for a range of 8.4% to 15.7% of mean operating expenses per goat-keeper;

(g) the mean average total revenue per goat-keeper was highest in Ondo East LGA (N55,411) followed by Akure North LGA (47,583) while Ifedore LGA ranked third with N46,188;

(h) with GM and and profit before tax of N6,080 and N5,480 per goat-keeper respectively, the enterprise was most profitable in Ifedore LGA, followed by Owo LGA (N5,515 & N4,898) while Akure North LGA ranked third with (N5,347 & N4,606) respectively;

(i) the multiple regression analysis (in logarithm) showed that the included explanatory variables (years of experience of goat-keepers; household size; number of parents stock of goats; age of goat-keeper; cost of veterinary services and cost of feeds with

estimated coefficients: 0.040; 0.103; 0.624; -0.035; 0.114 and, 0.145 respectively) explained approximately 68.0% in the variations in the depended variable (that is total revenue earned by the goat-keeper) while the "F-test" showed that the model was significant at the 5.0% level;

(j) the constraints to goat-keeping enterprise in the State were lack of capital for expansion, diseases and parasites, difficulty in procuring goat feeds, rampant pilfering of goats, inadequate space to keep animals.

5.2 Conclusion

From the major findings of this study, it is safe to conclude that although homestead goat keeping was undertaken on small-scale, semi-intensive basis, the enterprise was profitable and worthwhile. The enterprise enabled the keepers to meet financial obligations such as paying children's school fees, meeting medical needs, clothing needs and for family consumption especially during special ceremonies.

5.3 Policy Recommendations

In views of the findings of this study, it is believed that homestead goat-keeping enterprise, if established and properly maintained has a lot of benefits and important roles to play in the economy. Thus, the following policy recommendations are hereby proffered:

(a) Goat-keepers should locate market where there is high demand for goat products that command high market price

(b) Goat keepers should be encouraged to sell large percentage of their goatherd during an important cultural and religious festival when goats are mostly demanded and command high market price.

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APPENDIX

QUESTIONNAIRE

AKURE LIBRARY

Dear Sir/Madam,

I am a postgraduate student of the Department of Agricultural Economics and Extension of the Federal University of Technology, Akure, Nigeria. In partial fulfilment of the requirements of my programmes of study, I am conducting a research on "Socio-Economic Analysis of Homestead goat keeping in Ondo State, Nigeria" for my Master of Technology, M.Tech Degree.

This research has nothing to do with taxation or any financial assessment. All information given by you will be kept as very confidential and use for academic purpose only. I shall be very grateful for your full cooperation by completing the questionnaire below as accurate/factual as possible.

Thank you in anticipation of your cooperation.

Name of Enumerator .....

LGA.....

1. Please supply information to the following personal data

Name of respondent (Optional)	Age (Yrs)	Marital status (single/married)	Sex (M/F)	Household size	Education level

. What is your major occupation? (Tick the appropriate one)

a) Trading ( ) (b) Crop farming ( ) (c) Civil Servant ( ).

(d) Others (specify) ----------

FINANCIAL INFORMATION

3. Where did you obtain initial capital to Finance your goat production business? (a) Personal Savings ( ) (b) Loan from friends ( ) (c) Cooperative ( )

(d) Bank loan ( ) (e) Others (specify) ----------

4. If not bank loan, have you made any attempt to obtain additional finance from other organisations or financial agencies? (a) Yes ( ) (b) No ( )

5. If yes, what are the problems associated with obtaining the credit?

(a) Not enough ( ) (b) Scarce ( ) (c) High interest rate ( ) (d) Bureaucracy ( ) (e) Others (specify) ----------

6. If No, what in your opinion is the main reason of your inability to get funds from the financial agencies?

(a) Lack of finance to follow up ( ) (b) lack of managerial ability ( )

(c) Lack of government backing ( ) (d) Others (specify) ----------

PRODUCTION CHARACTERISTICS

7a For how long have you been raising goats? ----------

7b. Why did you take up goat raising?

(a) I just like rearing goat ( ) (b) to have additional source of income ( )

(c) For consumption ( ) (d) Others (specify) ----------

8. Give the number of your goat and their age and estimated or actual cost per head (goat) at the beginning (01/01/04) of year 2004.

Type of Animal	Average Age (month)	Quantity	Actual or Estimated cost of acquisition per head (N)	Total cost (N)
Buck (Adult male)				
Doe (Adult female)				
Kid (young female)				
Weaner (Male one that has stopped sucking milk)				
Weaner (female one that has stopped sucking milk)				

9. How many goat did you add to your flock and cost per head (goat) during (02/01/04 – 30/12/04) the year 2004?

Type of Animal	Average Age (month)	Quantity	Actual or Estimated cost of acquisition per head (N)	Total cost (N)
Buck (Adult male)				
Doe (Adult female)				
Kid (young female)				
Weaner (Male one that has stopped sucking milk)				
Weaner (female one that has stopped sucking milk)				

10. Why are you not keeping goats in large number? (a) Inadequate space ( ) (b) theft ( )

(c) Disease ( ) (d) capital ( ) (e) others (specify) ----------

11. Where do you keep your animals? (a) In a house specifically constructed for them ( ) (b) At backyard ( ) (c) Animals find just

anywhere to sleep ( ) (d) In the kitchen ( ) (e) Inside the house ( )

(f) Others (specify) ----------

12. What breeds of goat do you keep? (a) West African Dwarf goat ( ) (b) Red Sokoto or Maradi ( ) (c) Sahel ( ) (d) Others (specify) ----------

13. State breed most suitable and give reason ----------

14a. How did you get your parent stock? (a) by purchase ( ) (b) by rentage (Afunsin) ( ) (c) From neighbours (on gift) ( ) (d) Others (specify) ----------

14b. If your response is "b" what are the advantages and disadvantages of renting goats?

i. ----------

ii. ----------

15. What type of parent stock did you start with? (a) Weaners ( )

(b) Matured ( )

16. What factors do you think, affecting productivity of your flock?

(a) Climate ( ) (b) Breed source ( ) (c) feeding ( ) (d) disease ( )

(e) Others (specify) ----------

17.At what age did your doe (female goat) start kidding? Specify ----------

18. What was the litter size? Specify ----------

19. How many kidding per year? Specify ----------

Sources of feed used (a) concentrate ( ) (b) Grass ( ) (c) Mixture of arious feeds ( ) (d) Agricultural by-product (cassava peels) ( ) (e) gricultural product ( ) (f) Others (specify)----------

What species of legumes and grasses do you observe that influence the growth of your flock most? (i) Grasses (specify) ----------

(ii) Legumes (specify) ----------

What are your sources of labour? (a) Permanent employee ( ) (b) amily Labour ( ) (c) Casual labour ( )

Do you receive veterinary services? (a) Yes ( ) (b) No ( )

What are your sources of water supply? (a) River ( ) (b) Stream ( ) (c) Well ( ) (d) Bore holes ( ) (e) Taps ( )

Which of the following diseases or parasites have you observed to be revalent on your flock? (a) Mange ( ); (b) Petit de peste Ruminant Kata)); (c) Foot and mouth disease ( ) ; (d) Endo- parasites (worms) ( ) Ecto-parasites (Tick/lice) ( ); (f) Pneumonia ( ); (g) Diarrhoea ( )

Are you able to cure them? (a) Yes ( ) (b) No ( ) if yes how?

What are the management practices you adopt in controlling of diseases n your farm? (a) cleaning of goat pen ( ) ;(b) removal of infected animal rom the flock ( ); (c) dipping and spraying of animals to reduce arasites ( ); (d) treatment of stock with *anthelmintis* ( ) (e) Others specify) ----------

8. What is the number of mortality you have recorded from your flock during the year, 2004?

Type of Animal	Quality of dead goat
Buck (Adult male)	
Doe (Adult female)	
Kid (young female)	
Weaner (Male one that has stopped sucking milk)	
Weaner (female one that has stopped sucking milk)	

29. What is the average cost (N) incurred on the listed items in the year, 2004

Items	Cost (N)
Feeds	
Veterinary services	
Transportation	
Labour	
Miscellaneous	

30. What is the average cost incurred on the following items?

Items	Buildings (huts)	Drinking container	Feeding container	Browse establishment	Wheel barrow	Well
Cost (N)						

31. Please indicate information on output of goat enterprise in your farm (total number of your goats) at the end (31/12/04) of the year 2004.

Type of Animal	Average Age (month)	Quantity	Actual or Estimated price per head (goat)	Total amount
Buck (Adult male)				
Doe (Adult female)				
Kid (young female)				
Weaner (Male one that has stopped sucking milk)				
Weaner (female one that has stopped sucking milk)				

32. Please indicate number and actual or estimated price of goats disposed from your flock (by selling, as gift, slaughtering) in (02/01/04-30/12/2004) the year, 2004.

Type of Animal	Average Age (month)	Quantity	Actual or Estimated price per head (goat) (N)	Total amount (N)
Buck (Adult male)				
Doe (Adult female)				
Kid (young female)				
Weaner (male that has stopped sucking milk)				
Weaner (female that has stopped sucking milk)				

33. How do you sell your goats? (a) Farm gate ( ) (b) Sell at Market) ( ) (c) Others (specify) ----------

34 Who do you sell to? (a) Butcher ( ) (b) Restaurant operation ( ) (c) Middle men ( ) (d) others (Specify)

35. As goat farmer, what major problems are being encountered in raising goats? ----------

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36. In what ways do you think the problems can be solved?
