

Feasibility for a Sustainable and Profitable Local Goats Production in Nigeria

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Abstract

This paper provides some important and basic information frequently asked by farmers on commercial goat production as a profit making venture or a business enterprise. In order to meet up the Agricultural transformation agenda of the Federal Republic of Nigeria and the effort to diversify the economy of the country, Agriculture (Animal husbandry) must be brought onto focus and must be given priority. This feasibility is design to encourage and enlighten prospective farmers on the basic requirements of setting up the goat production as an industry and a means of livelihood. We have dwelled on issues pertaining to land selection/acquisition, design of the house, facilities required (including personnel), selecting of the animals and breeding/health program. Moreover, the general production and productivity of goats were expatiated and the aspect of marketing the products such as meat, milk and to lesser extent the manure. Lastly the issue of business sustainability was mentioned through the incorporating the farm workers as shareholders of the business, so as encourage them put in their best and to help in maximizing profit of the business.

Key words: Goat production; feasibility; sustainable; Agriculture; Nigeria.

1.0 Introduction

Goats are reared under extensive farming conditions, mainly for meat (chevon) and to a lesser extent milk. To some extent productivity of goats is low due to various factors such as high kid mortality and lack of good animal husbandry practices. Goats also provide skin of commercial importance and manure for gardens (and crop fields) (Sikosona and Senda, 1990). Goats are raised mostly to safeguard against crop failure and unfavourable crop price in intensive cropping areas (Tesfaye, 2004). Beside their contributions to the economy and food supply of resources to the poor farmers, their specific biological features such as feeding behaviour, reproduction efficiency and small body size are important characteristics for integrating goats into pastoral and sedentary small holder production systems (Zewdie and Welday, 2015). The FAO (1997) stated that 95% of the world goat population is found in developing countries of the tropics and that there are approximately 26.2% are found in Africa. Goats are deeply embedded in almost every African culture and are true friends to the rural poor and yet have received very little attention by African governments and investment in their development (Christie, 2005).

Facilities for goats and sheep are an important aspect of small ruminant production. While shelters and fences are primary components of facilities, there are apparatuses to consider such as feeders, water vessels, working stations, and other equipment (UNP – 0103, 2014). Best management practices are easier accomplished by drafting a comprehensive management plan on paper or computer that includes diagrams of housing, grazing paddocks, gates, etc. (Sikosona and Senda, 1990). Like other ruminant animals, goats convert plant material that is unsuitable for human consumption into high-quality animal products (Coffey *et al*, 2004). Rotational grazing systems control grazing activity by dividing large pastures into smaller paddocks. Rotational grazing systems require more management as goats must be moved more frequently between paddocks (ID – 162 UK, 2007). Goats eat the forages, the goats' manure replaces some purchased fertilizers, and the life cycles of various crop and animal pests are interrupted. The goal of most goat production program is to improve the goat herd's productivity through general husbandry, nutritional management, parasite control, vaccination, and environmental management (Seyedmehdi, 2000).

2.0 Land selection and acquisition

Land size, depends on number of animals considering that there is space requirement per animal such as 0.50 m² (minimum) for an adult goat in stall housing, 1.50 m² for an adult goat in open housing with and outside yard, 0.30 m² for kid before weaning. Land for this proposed Goat enterprise can be purchased and the size will depend on the stocking density and the anticipated increase in number of the animals over time. The location of the land for the farm will be far away from predators, despite the adequate security measures to be put in place for protection of the animals. The land should be provided with adequate water (from source such as borehole). The location of the land should be at the outskirts of the town to provide for possible expansion whenever the need arise. Issues of land documents such as certificate of occupancy must be addressed.

3.0 Design of the house

Goats should be housed to protect them from bad weather for example rain, sun and wind. Each adult goat should be allowed a floor space of 1.5 m². For example if one has 10 goats then the house/pen should be 1.5 x 10 which 15 m² is (Sikosona and Senda, 1990). Structure materials will vary depending on the designer, facility needs, and the budget. Designs often utilize a combination of wood, metal, and plastic, which are readily accessible, affordable, practical, and easy to maintain. For safety purposes, protruding glass and metal should be avoided and acted upon accordingly (UNP – 0103, 2014). Goats seem to enjoy water for drinking but not as much for bathing. In fact, when the water comes from above, they seek shelter. During warmer weather, this may only cause discomfort. But, in colder temperatures, goats should not remain cold and wet for long periods. Young goats are particularly vulnerable to respiratory infection and to hypothermia (Harwell and Pinkerton, 2008). The primary need for housing is during kidding, especially if kidding occurs during cold weather. A dry, draft free area is needed. Doe can kid in large community pens. Some producers use kidding (mothering) pens to separate Does and their litters. Building plans for livestock housing (as in appendix I) are available at most state extension offices or can be adapted locally to suit the need of the production.

The wall of the housing should be 1.5 m long, and the roofing's made up of thatch and the walls at one part made up of mud blocks or mud ("bani-bani") and at other parts made of tree branches or bamboo ("Gora") closely tied together with local ropes ('Kargo') as shown in Fig. 1. While the floor will be locally made of properly rammed clay soil mixed with coal tar to make it stronger, impermeable and for easy collection of manure when accumulated. Also there will be construction of watering and feeding troughs within the farm as well as the spray race and or dips around the farm surrounding. The construction of the house will depend on the size of the land and the number of animals intended to start with or expected and the expected increase as time goes on. However, the house will be partitioned to consist of the general pen also referred as dry pen that will contain dry animals known as growers or weaners. Pens for pregnant animals, kidding, suckling animals, Quarantine, Isolation and animals should be kept in pens based on sex and age.



Fig. 1: Local goat housing wall Adapted from Rukkamsuk (2007).

The plan for the construction of the farm is available in most extension service offices of the state or federal ministry of agricultures or in the agricultural research offices or centres. Goat housing should be designed with manure handling in mind. Ventilation is an important aspect of animal housing, particularly closed housing. Poor ventilation can be detrimental to animal health and performance. Harmful gases and dust can cause respiratory problems, while temperature extremes can reduce animal and human productivity (Schoenian, 1999).

4.0 Facilities required in the farm

4.1 Facilities

Feeding and watering trough (concrete, metal or plastic), Weighing scale and or weighing tape 'heart-girth' tape, Wheel barrow, Shovel, Buckets, Rain boots, Lab. Coat, Hand gloves, Head pan (Bowl), Ear tags, Log book, Hooves trimmer and Burdizzo should be provided.

4.2 Personnel

A veterinarian should oversee the entire affairs of the farm. A livestock superintendents/ assistant should supervise the feeding and feeding formulation as well as management of some minor problems in the absence of the vets. The farm manager does the administrative and financial operations of the farm. Three (3) labourers should be responsible for feeding and watering the animals, cleaning of the entire farm, collection and disposal of manure, etc.

5.0 Selection of animals

5.1 Breeding Programme

Selection of breeding animal, only those with history of previous parturition will be purchased (at least of proven fertility)

- a) Two intact teat properly formed and placed in female
- b) Strong legs for male.
- c) Does reach maturity at 8-9 month or up to 1yr depending on nutritional status of the animal.
- d) Animals should be grouped according to age and sex.
- e) Sex ratio is 1:10 for effectiveness.
- f) Pregnant animal will be housed separately for effective care and high plain nutrition.
- g) Animals will be flushed (feed adequate balance diet) before breeding
- h) Take females to the male for breeding not the other way round.
- i) Twice kidding in a year with quality management and good breeds also with creep feeding of young animals.
- j) Observations become very important i.e. that the animal is served in anticipation of new kids. Observations will enable farmer select animals as replacement stock; some of the traits to look at are: twining ability, mothering ability, growth rate, milk production and kidding intervals

5.2 Health Programme

- a) Foot bath will be placed at the main entrance of the farm as a biosecurity measure.
- b) There will be litter materials on the floor such as saw dust
- c) Manure will be regularly collected and disposed of.
- d) Isolation of sick animals and Quarantine of newly introduced animals in their individual pens.
- e) Regular deworming exercise at least three times every year.
- f) Dipping / Spraying against external parasites (ticks particularly)
- g) Vaccination programme against preventable diseases such as PPR and CCP
- h) Screening of pens against insects and pests as the case may be and whenever necessary.
- i) Provision of quality Housing to prevent undue stress on the animals.
- j) Provision of quality water also to prevent ingestion water borne infections like salmonella
- k) Provision of feed supplements such as concentrates for quality growth and vigour.

5.3 Reproduction Programme

- a) Animals will be synchronized to enable kidding at the same time (a particular season of the year when the condition is favourable for growth of the kids).
- b) Animals will be mated within a very good age (8-9 month or up to 1yr) depending on the physical appearance and the development of sex organs on the animals.
- c) Excess male animals in the flock would be castrated and isolated in one pen for fattening and subsequently disposed.

6.0 Feeds and feeding

Perennial source of water from bore holes, wells, stream, and river or earth dam is necessary because in animals a 10% loss of water is fatal. Nutrition is fundamental to any production program and feed nutrients such as protein, energy, and minerals should be considered. Feed are given to animals for maintenance, growth, pregnancy and production (Shelby and Amy, 2015). Factors affecting nutrient requirement of goats such as maintenance and activity level, stage of pregnancy, kidding rate, stage of lactation/milk production and growth or weight gain should also be considered. Other important points such as high nutrient requirement, period of gestation which is different from that of the cow are also of paramount importance (Shelby and Amy, 2015). Feed stuffs such as hay, silage, and concentrates as supplements must be fed to the animals ad libitum.

7.0 General productivity

Milk production as it has been observed that a good milker produces 1-1.5L of milk per day and a litre is sold at about N60, Sales of animals to the butchers for slaughter in the abattoir, or sales of meat in the farm i.e. in situation where the need may arise to slaughter the animal around the farm. Sales of live animals as replacement stock to prospectus buyers. Sales of organic fertilizer (manure) to farmers. 100kg of the manure is sold at about N700 – N900. Manure market has also been extended to poultry farmers as it is now incorporated in poultry feeds formulation for it increases the yolk pigmentation, it was observed to increase pigmentation to up to 85%. The initial capital requirement for establishment of the program is as indicated in table 1.

7.1 Monthly incentives for the personnel

The veterinarian should be paid the sum of N20, 000/ month (part-time) or consultancy services. The livestock assistant should be paid sum of 16,000/ month (part-time) or consultancy services. The administrative officer should be paid N15, 000/month, While the three labourers should be paid the sum of N10, 500 each (X3) = N31, 500. In addition, 5% of the total initial amount invested in the farm will be paid to the person that designs the herd health program And N10, 000 should be paid to the watchman that guard the farm overnight.

7.2 Product / Expected output after 12 – 15 months

At the end of about 7 – 8 months all the female animals are expected to get pregnant, after kidding assuming that all the 11 animals kidded twins and at almost the same time because they are expected to be bred at the same time, even though there is a possibility that few of them may deliver triplets. Assuming the extra number of kids take care of any kid mortality that may likely occur. Therefore we will have 11 x 2 kids' i.e. 22 kids. Let's also assume that of the 22 kids obtained, 66% (15 kids) are female and the remaining are males i.e. 34% (7 kids). Even though the does will come to heat after they kid, one should really wait to breed the doe. Because kidding and lactating take a lot of energy out of the doe and therefore she need to adequately rest between kidding.

Because a goat kids of either sex can be fertile at 7 weeks of age, that is not enough reason why they should be bred at that time and Intact bucks and does over 7 weeks of age will not be kept together because a young buck can, and will, breed a female at 2 months of age, this includes his mother and 2 month old sister!. (Breeding does). For the purpose of this farm therefore kids are allowed to reach 7 – 8 months before they will be bred, which implies that there will be 15 +11 (26 does) ready for breeding at that time, and of the first F1 generation, only 1 buck will be selected for

breeding 15 does of his set, therefore we will be left with 6 bucks and they will be kept for fattening. Also 26 does will be bred again at the same time, and assuming that all become pregnant and after a gestation period of about 6 months all the does kidded a minimum of 2 kids each, it is then expect to have $2 \times 26 (= 52)$ kids. And let also assume the same as in above that 66% of 52 kids are (females i.e. 34) and 34% are (males i.e. 18). Therefore, as regard to the number of animals, 15 months after setting up the farm there will be a total of $11+3 + 22 + 52 = 88$ out of which by estimate 60 are females and 18 are males. Based on male to female ratio of 1:10 therefore only 4 of the male (bucks) animals will be selected on merit for breeding, the remaining 14 will be castrated and kept for fattening.

Table1 : Financial requirement for a goat farm

Drinking trough (plastic bowl)	5	300	1,500
Detergents	3 (1kg)	270	810
Disinfectants	2	120	240
Bag of maize bran	5	1,800	9,000
Bag of Wheat bran	5	2,000	10,000
Cost of purchasing the land	100/200sq M	300,000	300,000
Cost of fencing, construction of pens and other settings in the farm.		20,000	20,000
Salaries for all the workers	12 months	55,500	666,000
Cost of Construction of bore hole	1	45,000	45,000
Cost planting pasture on the land		10,000	10,000
Drenching gun	2	3,500	7,000
Automatic syringe	1	5,000	5,000
Antibiotics (Inj.Terramycin LA)	5 (100mls)	400	2,000
Multivitamins (injection)	5 (100mls)	250	1,250
Dewormers (liquid albendazole)	6 (1 liter)	250	1,500
Hypodermic syringe and needles (5mls)	3 packets	600	1,800
Miscellaneous			31,250
Total			1,200,000

Milk produced by the lactating does will be collected for sale and based on experience the does produced excess milk that can be collected comfortably for sale, in addition to the quantity used for feeding their kids. It was also observed and stated that one of the reasons why small ruminants (particularly does) kept by the Fulani nomads do not usually suffer from mastitis, is because of the fact that they do milk them alongside with the cows, and therefore no excess milk is incidentally found in the udder of the animals and so a significant reduction in cases of mastitis compared to the does kept in household that are not milked.

8.0 Financial outcome

8.1 Sales of Milk

Assuming 15 months after the establishment of the farm 26 does would have produced about litres of milk (assuming 1-1.5liters of milk can be produced daily by each for 5 – 6 months under good nutrition). And for the period of initial 15 months we have 33 does that have become pregnant and kidded, it is therefore assumed that if each of these 33 animals will produce at least 1.25 litre of milk the following will be obtained; 33 animals; $33 \times 1.5 = 49.5$ litres of milk / day. $49.5 \text{ litres} \times 30 \text{ days} = 1485 \text{ litres of milk/ month}$. $1,485 \text{ litres} \times 5 \text{ months} = 7, 425 \text{ litres of milk / 5 months}$. And if a litre of milk is sold at N60. Then the animals will generate the sum of N 447,120 to the farm on milk alone.

8.2 Sales of Castrated Bucks and Does

The 14 bucks after castration and proper fattening until they reach a live weight of 50 – 60 kg before they will be sold, and it will be made in such a way that the time for disposing them coincides with any of the festivities i.e. either Christmas, Easter, or ‘Sallah’ festivities so that it will be valuable. If a buck is sold for N5, 500, then the 14 bucks would generate N77, 000 for the farm. Also because there is going to be a particular number of animals to be maintained in the farm, even the does will from time to time be culled out of the farm for sale to prospectus buyer in order to maintain that number. At this point therefore there will be about 20 does for sale to the public, and assuming a sexually matured doe cost about N5, 000 and that 20 does would generate N 100, 000

8.3 Sales of Manure

If a 100 kg of manure will cost N700 – 900 and it is expected to collect at least 100 kg every five days for the first 6 months when the number of animals is 14. And because as the number of animals' increases the quantity of manure will also increases proportionately therefore let's assume that as from the 7th month 150 kg of the manure will be collected daily for 15th month. Therefore amount of money that will be generated is calculated as follows; 100 kg every 5 days, and therefore 600 kg will be generated for 1 month As such 3,600 kg of manure will be generated over the period of 6 months. Therefore generating the sum of N28, 800 if sold at N8 / Kg. And 150 kg of manure is collected daily for the remaining 9 months this will be translated as 4,500 kg of manure / month, and it means 40, 500 kg of manure in the period of 9 months, And this means a sum of N324, 000 also when sold at N8 / Kg. Altogether generating the sum of N352, 800 to the farm.

9.0 Product/ profit expected

9.1 After 5 years

At the end of first 15 months of setting up the farm a total sum of (N 447,120 + N177, 000 + N352, 800) N 976, 800 is expected to be generated and as such in 5 years it will expected to generate N 976, 800 x 60/15 = N 3 907 200 where 60 represents number of months in 5 years.

9.2 After 10 years

Therefore by direct deduction it is expected to generate the sum of (N 3 907 200 x 2) N 7 814 400 after 10 years of setting up the farm.

10.0 Provision for future expansion

For the purpose of continuity of the enterprise the following will be adapted as the number of years post setting up the farm progresses. The salaries of the farm workers will be reviewed from time to time commensurate to the profit made in the farm, apart from bonuses that will be paid to them during period of festivities, all these is to encourage and maintain them and to attract other people in case the need for such will arise.

The farm will operate as a limited liability company after about 10 years of inception, such that about 40% of the shares will sold to the farm workers or their friends or relatives for maximum productivity. In situation where excess milk is produced and there is no ready-made demand or market for it, the management will consider processing the milk to yoghurt or cheese, even if it entails mixing it with cow milk in order to overcome the stigma most people have for goat milk. The management will also consider transporting the animals for sale to the eastern part of the country especially during festivities such as Easter and Christmas and for ready market that exists in such places.

11.0 Conclusion and recommendation

Choosing the goats against any other species is to disabuse the mind of people of the stigma against them and to make them realize that they can be equally profitable as sheep and cattle if not even more when managed properly. And that the goats have a better genetic potential in terms of milk production and efficient feed conversion ability. The residents of the state (Bauchi, Nigeria) especially the metropolis have an inherent dislike of the goats, therefore the animal is completely relegated to the background as such all their potentials are wasted. With the successful take up and implementation of this program we believe that even the government especially at the local level or cooperative societies will be willing to invest in this kind of business. And it will fit into the poverty alleviation policy of many administrations.

This enterprise is worthy of implementation based on the estimate made it is expected that a sum of N 1.2 million is the take up grant and it is clearly indicated that after just about 5 years the business will generate roughly the sum of N 3.9 million and about N 7.8 million in 10 years this is just a conservative estimate. However, subtracting the recurrent expenditures such as staff salaries, cost of purchase of drugs and vaccines, consumables such as syringes etc. of N 630, 600 x 5 years = N 3 153 000, the difference of it with the N 3 907 200 generated over the 5 years period serve as the Profit which represented as N 754 200 and therefore in 10 years the sum of (N 754 200 x 2) N 1 508 400 is generated as profit. Moreover it is important to note that the values mentioned above may not necessarily represent the exact amount that may be generated they are just estimated values, as such the exact figures may likely be more than what is presented here. At the end of it all we will like to categorically state that this enterprise is worth implementing.

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