The Role of Small Ruminants in the Household Economy of Southeast Zone of Nigeria

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Abstract: A socio-economic study of the role of small ruminants in the farming system of Southeast zone of Nigeria was carried out. Three stage sampling technique was employed in the selection of farmer respondents. One hundred small ruminant farmers were sampled on the whole. Data collection was done by the use of questionnaires. Descriptive statistics such as percentages, frequency tables and averages were used in the analysis of data. The study showed that 83% of the farmers reared West African Dwarf sheep, 1%, respectively kept Ouda and Yankasa breeds of sheep. Crosses were reared by only 15% of the farmers. For goats, 89% of the farmers produced West African Dwarfs (WAD), 1% Borno Red, 6% Kano Brown and 5% Crosses. Only 13% of the farmers adopted extensive system of production while 87% of them adopted semi-intensive method. The main reasons why farmers engaged in small ruminant production include the provision of income, home consumption/entertainment, prestige, provision of animal products eg. manure and security against risk. A gross margin analyses for sheep/goat production under traditional farming systems show that small ruminants hold great potential for reasonable economic returns. For instance, the gross margin for sheep and goats were found to be N16,536.00 and N23,970.00, respectively per small holder farmer during the survey period. The problems of small ruminant producers were identified as disease, feeding problem, accommodation constraint, inadequate capital, destructive habit of the animals and predators, among others. It is recommended that introduction of alley farming system, effective extension system as well as the establishment of adequately equipped veterinary clinics by the government in the region should be pursued for increased production of these animals to solve the protein deficiency problem in Nigeria.

Key words: Role, small ruminants, farming system, Southeast, Nigeria

INTRODUCTION

The 171 million sheep and 144.7 million goats found in Africa represent 28.7 and 20.2%, respectively of the total population of ruminant livestock in the tropics and subtropics. In the West African sub-region, Nigeria has the highest number of goats (52%) but second to the Sahel countries only in the production of sheep and goats (Nuru, 1985).

There are three main varieties of goats in Nigeria: The West African Dwarf, the Sokoto Red and the Sahel. Goats are renowned for their hardiness and can survive in most environments. West African Dwarf goats are kept in the forest zones and in the Middle Belt, Sokoto Reds are kept throughout the north and Sahel goats are restricted to a strip along the frontier with the Republic of Niger. Although pastoral Sahel goats are found in the northern semi-arid zone, the great majority of goats are kept in villages. The most common production system is that of seasonal confinement.

There are four main types of sheep native to Nigeria: The Balani, Uda, Yankasa and West African Dwarf Balani and Uda are kept in the semi-arid regions, West African Dwarf sheep in the south and Yankasa throughout the country. Sheep are the second most numerous pastoral species and small flocks accompany may cattle herds in the north and in the Middle-Belt.

The highest sheep population was recorded in the North West Zone, where Kano State has the highest population of about 2.6 million heads and Zamfara recording the lowest sheep population of about 857,000 heads. The South West zone had about 1.1 million heads of sheep with Edo State having the highest population (668,410 heads) (FMARD, 2002).

With respect to goat, the highest population of about 2.7 million heads was recorded for Kano State and lowest with 2.0 million heads for Zamfara State. The South-west zone had about 4.2 million heads of goat with Oyo State having the highest population with 2.9 million goats (FMARD, 2002).

In terms of productivity, sheep and goat (small ruminant) population and meat production projection are summarized in Table 1 with an assumed annual growth rate of 2.4% and offtake rate of 25% (Umeh, 2004).

Table 1: Projection of small ruminant population in Nigeria (1995-2015)

Year	Sheep		Goats	
	Population	Qty of meat (tonnes)	Population	Qty of meat (tonnes)
1995	24,886.892	933.258	39,027.927	9,756.982
1996	25,484.177	955.657	40,003.625	10,000.906
1997	26,095.797	978.592	41,003.715	10,250.929
1998	26,722.096	1,002.079	42,028.808	10,507.202
1999	27,363.427	1.026.128	43,079.529	10,769.882
2000	28,020.149	1,050.756	44,156.517	11,039.129
2001	28,692.632	1,075.974	45,260.430	11,315.107
2002	29,381.256	1,101.797	46,391.940	11,597.985
2003	30,086.406	1,128.240	47,551.739	11,887.935
2004	30,808.479	1,155.318	48,740.532	12,185.133
2005	31,547.883	1,183.046	49,959.046	12,489.761
2006	32,305.032	1,211.439	51,208,022	12,802.005
2007	33,080.353	1,240.513	52,488.222	13,122.056
2008	33,874.281	1,270.286	53,800.428	13,450.107
2009	34,687.264	1,300.772	55,145.439	13,785.360
2010	35,519.759	1,331.991	56,524.075	14,131.019
2011	36,372.233	1,363.959	57,937.176	14,484.294
2012	37,245.166	1,396.694	59,385.606	14,846.401
2013	38,139.050	1,430.214	60,870.246	15,217.562
2014	39,054.387	1,464.540	62,392.002	15,598.001
2015	39,991.693	1,499.688	63,951.802	15,987.951

Assumptions: (1) Annual growth of sheep and goat 2.4 and 2.5%, respectively, (2) Off take rate is based on 25% for sheep and goats. Source: Federal Deptartment of Livestock

Gefu *et al.* (1994) in a survey of old Anambra State found that mean flock size/household was 2.4 and 6.2 for sheep and goats, respectively. Household wastes and cut forages were major sources of animal feed and there was very low awareness of agroforestry practices such as feed gardens and alley farming. Chidebelu and Ngo Ndjon (1998) working in Anambra, Enugu and Imo States observed that average WAD/goat/HH was 6 with expansion limited by labour and feed procurement. While males and females owned goats, males dominated the live goat market and female goat meat sale. Goat production was a part-time activity to realize cash for school fees, hospital bills, women's group uniform, etc.

Small ruminants contribute immensely to the farming system and the general economy as source of cash, meat and milk supply, provision of quality leather, as well as for sacrifices and ceremonies, among others (Okali and Upton, 1984; Osuagwuh, 1985; Okali and Sumberg, 1984; Mack *et al.*, 1984; Matthewman, 1977; Winrock International, 1983). These notwithstanding, constraints to small ruminant production in Nigeria were rankeds by farmers as feed, need of fencing, time, cash (capital) and disease.

In order to encourage more research on small ruminants, the objectives of this study focus on: The description of the farming systems, economic importance of small ruminants as will as their production constraints/ problems.

Small ruminants are an integral part of traditional crop-livestock production systems in Sub-Saharan Africa (SSA). Raising of small ruminants (sheep and goat) is an important economic activity from which food (meat, milk) and non-food commodities (manure, hides and skins, wool, etc) and cash income are derived. Meat is one of the most important small ruminant products (Seyoum, 1992).

All Nigerian sheep are used for wool, but are rarely milked. In the north they are regularly eaten and form part of every-day protein supply, but there is also a marked variation in demand conceding with religious festivals (Bourn *et al.*, 1994).

Nigerian sheep and goat (small ruminant) population total about 57 million consisting of 34.500,000 goats and 22.100.000 sheep. In monetary terms, the value of Nigerian livestock resources, based on prevailing market prices in mid-1991, was conservatively estimated to be in the order of US$6 billion (Bourn *et al.*, 1994).

MATERIALS AND METHODS

The study area: The study area was the southeast zone of Nigeria comprising of five states, namely, Abia, Anambra, Ebonyi, Enugu and Imo. The southeast zone is located within longitude 5° 3' and 2° 3' and latitude 4° and 5° 2'. It is bound in the West by the River Niger, in the south by the Atlantic ocean and in the North by Kogi and Benue States.

The case study areas of Anambra and Enugu States in the Southeast zone of Nigeria are located within latitudes 5° 45' N and longitudes 6° 40' E and 8° 28' E. They have rich and vast agricultural and mineral resources. Their population density is about 215 km^{-2}. Anambra State consists of 4 agricultural zones, namely

Aguata, Awka, Amawbia and Onitsha and 16 Local Government Areas (LGAs). Enugu State, on the other hand, comprises of Enugu North, East West and Enugu East senatorial zone, with 17 constituent federally recognized LGAs.

Sampling technique: Three stage random sampling procedure was used in the selection of respondents for the study. The first stage involved the random selection of the Local Government Areas (LGAs), viz, Anambra Aguata and Idemili LGAs from Anambra State and Nkanu West, Igbo-Eze North and Udi from Enugu State. The selected communities in the 6 sampled LGAs formed the second stage units while the chosen small ruminant farmers represented the third stage units. In all, 240 small ruminant producers were sampled for the study, 40 farmers from each of the selected LGAs.

Data collection and analysis: Formal survey was employed and data collection done by the use of questionnaires. This was done with the help of resident enumerators in each of the 6 sampled LGAs.

Simple descriptive statistics such as percentages, frequency tables and averages were used in the analysis of data. Gross margin analysis was used for the assessment of the profitability of sheep and goats as well as their role in the farming system of Southeast, Nigeria.

RESULTS AND DISCUSSION

Small ruminant distribution: The survey result showed that about 75% of all households in Aguata LGA owned sheep and/or goats, 40% in Anambra and 57% in Idemili LGAs of Anambra State. In Enugu State, 63% of all households in Nkanu West kept small ruminants while only 16% of the households in Udi LGA owned these animals. Thirty-five percent of households in Igbo-Eze North kept sheep and goats. About 67% of all the households kept sheep and goats jointly, about 19% goats only and about 13% owned sheep only. The household distribution of small ruminants by sex showed that for sheep, 15% were males and 85% females. The average herd size per household with respect to sheep was 3.8 and for goat 4.3 during the survey.

Breeds of sheep and goats reared: There are four breeds of sheep in Nigeria-the Yankasa, Uda, West African Dwarf and the Balami. Goat breeds in use are Kano Brown, Borno White, Red Sokoto or Maradi and West African Dwarf (WAD) goat (Manson, 1951; Orji, 1985; Osuagwuh, 1985). Various breeds of small ruminants were found to be kept by the farmers in Anambra and Enugu States, Nigeria. In the case of sheep, it was observed that 83% of

them reared West African Dwarf (WAD) sheep, 1%, respectively had Uda and Yankasa breeds. Fifteen percent of the farmers kept the crosses. With respect to goats, 89% of the farmers engaged in the production of West African Dwarfs (WAD). One percent of them had Borno Red, 6% Kano Brown and 5% Crosses.

The West African dwarf breeds of sheep and goats appear to be most common in Anambra and Enugu States because of their genetic adaptation to the farming system and environments of Southern Nigeria. Uda and Yankasa breeds of sheep as well as some goat breeds (Borno Red and Kano Brown) dominant in the northern parts of Nigeria seem to have found their way into the households of some Anambra and Enugu State farmers as a result of market interaction between the northern and southern livestock farmers. The crosses, on the other hand, were offsprings from the mating of the different breeds of sheep and goats, respectively.

The study also showed that these farmers procured their stock from different sources. In the case of sheep, 45% of the farmers purchased the animals they kept, 6% borrowed from their farmer-neighbours and 9% of them depended on gifts from friends and 32% got theirs from the sheep born to their original stock. For goats, 45% of the farmers purchased their stock from the open market or neighbouring farmers, 7% borrowed while about 10% of them depended on gifts. Others (6%) got their stock through care-taking and 33% of them from those born of stock within the households. Overall, the majority of the farmers had their stock of sheep/goats through purchases from the markets or farms as well as dependence on those born of their original household stock.

Production systems and farmers goals: The small ruminant production systems in Nigeria have remained largely traditional with the following systems identifiable: Free-range/Extensive, Tethering, Herding and Fulani system (Olaloku, 1985). The survey showed that the extensive and semi-intensive methods were prevalent in Anambra and Enugu States of Southeastern Nigeria.

With the extensive system, animals were not housed nor fed but were allowed to graze on natural pastures and available browse as well as scavenge on domestic food wastes in the environment. This is practiced in areas where community by-laws against free-remaining livestock were not too strict or only during the dry season when crops have been harvested. Only 13% of the farmers adopted this system in the study areas. On the other hand, 87% of them adopted the semi-intensive system. This involves the restriction of the animals at different periods of the year. The methods adopted by different farmers were tethering (35%), confinement within an enclosed space (47%) and penning (18%).

The farmers production goals or their reasons for keeping these animals were identified. Nine percent of them kept small ruminants as a traditional practice, 97% provision of income, 17% interest (i.e., for pleasure) and 85% home consumption or entertainment. Twenty-five percent of these farmers, however, kept these animals for ceremonial purposes, 15% for prestige and 41% for the provision of animal products such as manure, leather, wool and bone and 1% as security against risks arising from crops failure and unprecedented family needs. Others (4%) found it convenient to keep them because of their adaptability to the farming system, non-selective feeding habit as well as the prolificacy of the animals. Thirteen percent of the farmers had such miscellaneous reasons as research, employment, breeding purposes and their low initial capital requirement.

Gross margin analysis: This was carried out separately for sheep and goats during the survey period to determine their economic viability. In the computation of gross margins, the prevailing market prices of these animals at the time of the study were used. Labour costs were computed by using inputed costs of labour at the peak period of agricultural production.

In the case of feed, fodder and natural feed supplements have no market value and therefore were not costed. Also, the inclusion of imputed cost of feed in the gross margin will amount to double counting since the

imputed cost of labour approximates to that of feed. This is because labour is essentially used for the provision of pasture/fodder for the animals.

Sheep: The result of the gross margin analysis for sheep are shown in Table 2. Amount realized from sales of sheep was N2.505.00. The sheep consumed were valued at N2,350.00 while the ones given away amounted to N2,140.00. With the sale of manure at the rate of N501.00 per 50 kg bag the sum of N5,010.00 was realized. Thus, the total revenue from all these items amounted to N29,020.00.

With respect to expenditure, the computed cost of veterinary drugs was N2,505.00 while that of labour amounted to N9,979.00. Thus the total variable cost summed up to N12,484.00. The Gross Margin (GM) was estimated to be N16,536.00.

Goat: Computation of gross margin for goat was done in a similar way as that of sheep. Costs and returns were as shown in Table 3. Amount realized from the sale of 5 goats was N3,340.00. The value of the goats consumed was N3,030.00, that of 2 goats given away amounted to N 3,340.00. The total amount realized from manure sales was N501.00. The total revenue per annum/small-holder farmer with respect to goat production was N23,970.00.

Expenditure on veterinary drugs was estimated at N 2,505.00 and that of labour N9,979.00. Thus the total variable cost involved in the production of goats under

Table 2: Gross margin analysis for small-holder sheep production

Item	Unit	Qty	Price/Unit	Total amount
Revenue			(₦)	(₦)
No. of sheep sold	No	6	2,505.00	15,030.00
No. consumed	"	2	2,350.00	4,700.00
No. given away	"	2	2,140.00	4,280.00
Manure sales (50kg bag)	"	10	501,00	5.010,00
Total Revenue (TR)	"			29,020.00
Variable costs				
Veterinary drugs	-	-	-	2,505.00
Labour	Man-hours	85	117.40	9,979.20
Total Variable Cost (TVC)				12,484.00
Gross Margin				
(GM) = TR-TVC	N29,020.00	N12,484.00	=	N16,536.00

Source: Field data computation, 2006, *USS1 = ₦127

Table 3: Gross margin analysis for small-holder goat production

Item	Unit	Qty	Price/Unit	Total amount
Revenue			(₦)	(₦)
No. of goat sold	No	5	3,340.00	16,700.00
No. consumed	"	2	3,030.00	6,060.00
No. given away	"	2	3,340.00	6,680.00
Manure sales (50 kg bag)	"	14	501.00	7,014.00
Total Revenue (TR)	"			36,454.00
Variable costs				
Veterinary drugs	-	-	-	2,505.00
Labour	Man-hours	85	117.40	9,979.00
Total Variable Cost (TVC)				12,484.00
Gross Margin (GM) = TR-TVC	N36,454.00	N12,484.00	=	N23,970.00

Source: Field data computation, 2006, *USS1 = ₦127

household management system amounted to N12,484.00. Gross Margin (GM) for goat was therefore computed to be N23,970.00. Overall, sheep and goats contribute reasonably to household income and serve as store of wealth.

Relative importance of small ruminants in the farming system: Apart from sheep and goats, other types of livestock are reared by small holder farmers in the Southeast zone of Nigeria. The survey results showed that 5% of the farmers kept cattle, 11% pig, 76% chicken and 12% duck. Also 13% of them reared Turkey, 1% pigeon, 4% rabbit and 2% dog. On the scale of preference, 27% of the respondents opined that chicken was more important, 25 cattle, 15 goat, 7 sheep and 2% pig.

With respect to sheep and goats, 53% of the farmers showed preference for goats as against 47% for sheep. Thus goat appears to be more favoured than sheep in the social life of the people of Southeastern Nigeria. This may be because the population of Moslems is very minimal. The survey showed that 86% of the farmers were Christians, 12% traditional worshippers and 3% Moslems. Many other reasons were, however, preferred for this preference. Seventeen percent of the farmers, respectively indicated religious worship and prolificacy of the animal; and 21% of them for its manure. Others (14%) preferred goat for its palatability and high demand (21%). Five percent of the farmers, respectively favoured goat because of its adaptability to the environment and for entertainment purposes. The overall preference of chicken in relation to other farm animals, notwithstanding, the position of the small ruminants in the socio-cultural life of the people is quite significant.

Production constraints: Various problems or constraints were found to militate against increased production of sheep and goats by small holder farmers in Anambra and Enugu States of Nigeria. From the study, 88% of the farmers identified feeding problem as a serious constraint, 88% disease, 32% accommodation problem and 29% management problem. Others mentioned lack of veterinary services (13%), inadequate finance/cash (9%) and water problem (2%). Fourteen percent of the farmers, however, said that the destructive habit of small ruminants especially goats on farm crops constituted one of their major constraints, 13% mentioned predators (e.g., wild animals and thieves).

It is apparent from the result of this study that feeding problem and disease prevalence constituted the major constraints of the small ruminant farmers. The problem of feeding is most acute during the dry season when most of the pastures have dried up and become coarse, lignified, non-nutritious and malnutrition in the animals which consequently lead to low body resistance to various diseases, reduced growth rate and low reproductive performance (e.g., poor conception, low kidding/lambing rate and poor weaning ability, among others). The animals are fed mainly on browses of palm fronds and fig leaves at this period. In the rainy season, even though there may be enough green pastures for the small ruminants to graze on, the community bye-laws would not permit the animals to go on free-range grazing. On the other hand, the farmers would hardly have enough time for cutting and bringing fodder for them because of crop farming activities at this rainy period.

On disease problem, even though the farmers were able to note it as a major constraint, most of them could not identify specific diseases by name. However, with the help of veterinary assistants such diseases as diarrhoea (25%), Bloat (13%), Caprine pneumonia (12%), Still birth/Toxoplasmosis (7%), accidents (e.g., snake bites), foot rot and cough (5%, respectively) and scabbies and mange (4%) were found to be prevalent. Figures in parenthesis are percentage farmers whose stock were associated with specific disease problems. These diseases caused lots of deaths in small ruminant herds in Anambra and Enugu States. High motality of the animals, notwithstanding, they also led to poor reproductive performance and slow growth rate in the animals. Their lack of veterinary services seemed to have contributed a great deal to their helplessness in controlling the diseases of these animals.

The problem of accommodation has to do with land space for grazing as well as house/pen construction for the animals. This situation invariably limits herd size per household as well as reduce total contribution of small ruminants to family income. The farmers also lacked the technical know-how and relevant education for better management of sheep and goats. This would mean poor resource allocation and inefficiency of utilization of production inputs and consequently reduced output of sheep and goats per household. The low finance/cash base of these farmers also constituted a serious handicap to the purchase of sizeable number of stock, pen construction and other modern livestock inputs, among others.

CONCLUSION

The results of this study show that small ruminants hold great potential in terms of productivity and

socio-economic importance under traditional household conditions of Southeast zone, Nigeria, the various identified constraints notwithstanding. The effective implementation of the appropriate interventions/ recommendations will significantly reduce production constraints as well as contribute to increased output of small ruminants in Nigeria.

RECOMMENDATIONS

In order to exploit the small ruminant resources to meet animal protein needs in Nigeria as well as in Africa as a whole, the following interventions would be appropriate:

Introduction of alley farming system for dry season feed supplementation: Alley farming is an ecologically sound, low input farming system that links crop and livestock production (Reynolds and Atta-Krah, 1989). It involves the cultivation of food crops between hedgerows of multipurpose trees. Use of woody legumes provides N-rich mulch and green manure to maintain soil fertility and enhance crop production and protein-rich fodder for livestock (Kang *et al.*, 1990). On-farm trials in southern Nigeria have demonstrated that alley farming is appropriate and acceptable to small farmers (Reynolds and Atta-Krah, 1989). With the introduction of good woody legume trees appropriate for alley farming on acid soils of Southeastern Nigeria, the problem of dry season feed supplementation will be highly reduced. Already farmers use Acioa in traditional alley farming in the humid region of Southern Nigeria. Sanchez (1987) recently reported the potential of Inga edulis for alley farming on acid soils.

Provision of effective extension system: Twenty-nine percent of the small ruminant farmers had management problem while 88% of them had problem of feeding the animals; 88% of the farmers also were constrained by animal diseases. Livestock extension workers should be trained in sufficient numbers to improve on the present poor extension staff-farmer ratio of 1:5000. They will educate the farmers on modern husbandry methods, use of good livestock inputs as well as on the need to increase their household flock sizes for higher economic returns.

Farm credit support: A critical problem of the small ruminant farmers was identified to be capital/finance to purchase the necessary livestock production inputs including veterinary drugs, feed as well as management. Through a cooperative channel, these farmers can be assisted with credit facilities to encourage them to increase production and maintain a profitable small ruminant enterprise.

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