Economics of West African Dwarf (WAD) Goat Production among Small Holder Farmers in Humid and Tropical Region of the World.

Abstract

Economics of West African Dwarf (WAD) goat Production among Small Holder Farmers in humid and tropical region was studied using *120 farmers selected from southeast states of Nigeria. The information generated for the study comprised farmers' socio-economic characteristics and other quantitative variables relevant to the study using mainly structured questionnaire and personal interviewed, descriptive Statistics such as percentage response and budgetary technique were used to address the objectives of the study.* The mean of age of the farmer was 54 years, level of education was 11 years, while years of rearing experience and house hold size were 10 and 7 respectively. *The result of net farm income analysis revealed that an average total cost of goat production was ₦44,886 per 12 herds of goat with cost of purchasing breeding kids input resource constituting the highest (30%) of total costs of production. A positive net farm income of ₦84,714 was realized by average goat farmer in the study area, indicating the profitability of the enterprise. The identified problems limiting goat production in the region were poor access credit,* problem of pests and diseases, Seasonality of forage, theft problem, poor extension contact, poor nutrition of confined animal *and technology too costly. There are needs for policies options and measures to enhance farmers' access to education, access to credit, extension services, and access to drugs at subsidized rates to ensure goat production by the farmers.*

Keywords: Economics, West Africa Dwarf Goat, Production, Small Holder Farmers, Humid and Tropical regions, World.

Introduction

26

27   Agricultural development in Nigeria has placed more emphasis on crop production,

28   although the rearing of cattle, sheep and goats have always formed an integral part of the

29   domestic economy and source of wealth for the transhuman pastoralists. The consequence of

30   this imbalance is that most people from the developing countries of the world consume far

31   less than the recommended minimum daily protein of animal origin (Awotwi and Fynn,

32   1992).

33   Apart from poultry, the goat is the most numerous when compared to other domestic

34   livestock species in Humid and Tropics regions(FAO,2006). In many regions of the tropics

35   where goats is raised, traditional systems is most common as the animal mostly roam freely

36   in fallow land, forest and grassland for sustenance.

37   Goat production has the potentials to become an economically viable option for small

38   full-time farmers and the growing number of part-time farmers in the humid and tropical

39   region through among factors including; increasing demand in the region for producing milk,

40   meat, skin, hair and miscellaneous reasons, including investments, insurance against crop

41   failure and slaughtering during religious and customary rites (Upton, 1984)., lower cost of

42   production compared with other livestock, and the ability of goats to effectively utilize poorer

43   quality forage, all year-round goat production with effective reproductive management,

44   excellent browsers and forage for biological controls for weeds, forage on a broader range of

45   plants than do other small ruminant livestock and survive well on poor or fair grazing areas,

46   efficient converters of low quality forages to meat, milk and hide products, require

47   comparatively fewer resources (labor and buildings) than other livestock (Ahamefule *et al.,*

48   2005). Furthermore compared to other meats, chevon is lower in calories, total fat and

49   saturated fat, higher in protein content, unique taste and relative 'healthful' nature of goat

50   meat and easily digestible and Goats can walk for long distances in search of feed and this

51 behaviour assist them in meeting their nutrient requirements than other livestock (Devendra

52 and Mcleroy, 1982)

53   The West African Dwarf is the predominant breed of the humid tropics from southern

54 West Africa through central Africa. This breed of goat is found in the region, south of latitude

55 14^0N across West Africa in the coastal area which is humid and favours high tsetse flies

56 infestation (Daramola *et al*., 2005; Ahamefule *et al*., 2005). The West African Dwarf is small

57 bodied, compact breed short legs and 'blocky' body, very hardy (Phillips, 1977). This breed

58 exhibit variation of colour including; all white, black, brown or spotted black or brown on a

59 white coat which makes it difficult to be distinguish clearly from the Yankasa (Adedeji *et al*.,

60 2012). The adult West Africa male weights approximately 37 kg with a well-developed throat

61 ruff and are horned. Ewe has mature weights of 25 kg and capable of reproducing twins and

62 triplet (Daramola *et al*., 2005)

63   World goat production was estimated to be 76 million with more than 70% from

64 developing countries. Nigeria constitutes about 24 million goats, which represents about 4%

65 of the current world population (FAO, 2006). Nevertheless, despite the high production of

66 goat and as well as concomitant of other large stock of livestock production, most countries

67 in this zone could not be able to meet their protein requirements of the citizenry. This is

68 evidenced by lowly consumption of about 7grammes of annual protein dairy against the

69 average requirement of 29g/coput/day, representing 75% shortfall that is observed in

70 developing countries (FAO, 2004).

71   Studies show that several factors contribute to low production and productivity of

72 goat, perhaps West Africa Dwarf goat in the region. Horne and Stur, (1999) reported that in

73 addition to problems with parasites that seriously affect small ruminants in the region, there is

74 also a problem of feed shortage, as fences are often constructed around the cropping area, to

75 prevent crop destruction by goats and thus reduce overall grazing areas and in farmers have

76 to spend more time finding feed for their animals. Furthermore, the other constraints to

77 village goat production in the humid zones according to Keynolds and Von-Kayman (1998)

78 are small herd size, low priority from farmers and often government, no industrial feeds,

79 limited extension service and no veterinary care in most rural communities Other limiting

80 factors to the growth of goat industry are seasonality of demand, competition from traditional

81 red meats, erratic carcass quality and seasonality of reproduction in goats which negates the

82 year-round availability of chevon (********).

83   There is therefore, the need to access the socioeconomics characteristics of the West

84 African Dwarf (WAD) goat farmers as it affects their performance in rearing and their

85 productivity in terms of profit accruing from goat production in the study area. This would

86 lead to formulation and implementation of polices that would enable farmers to improve on

87 their performances. Specifically, the objectives were to describe the farmers' socio-economic

88 characteristics, costs and returns in goat production, and constraints to improved goat

89 production technologies.

90

91 **Materials and Method**

92   The South East Nigeria was the main focus of the study, which lies between latitude

93 $5^{\circ}9'$ and $7^{\circ}75'N$ of equator and longitude $6^{\circ}85'$ and $8^{\circ}46'$ East of Greenwich Meridian. It has a

94 total land mass of 10,952.400ha. The zone has population of 16,381.729 people (NPC, 2006).

95 The zone is made up of five states viz: Abia, Anambra, Ebonyi, Enugu and Imo States. It lies

96 within the rainforest and derived savanna region of the country and bordered in the North by

97 Benue and Kogi States, in the West by Delta and Rivers States, in the South by Akwa Ibom

98 State and in the East by Cross River State. South east states have two major seasons in the

99 year, the rainy season which last from the month of April-October and the dry season that

100 lasts from November to March. The temperature of the area varies between $18^{\circ}C - 34^{\circ}C.$

101   About 60-70%. The inhabitants engage in agriculture mainly crop farming, agricultural

102   produce marketing and animal rearing. Other non-agricultural activities engaged by people

103   for sustenance include civil service, petty trading, vulcanizing, driving, carpentry, mechanics

104   and others.

105   Multistage random sampling technique and purposive selection were used to select

106   states, agricultural zones, local government areas, communities and respondents. In stage 1,

107   three out of five states in South East Nigeria were purposely selected because of high

108   intensity of snail production (Dimelu *et al*., 2009; Okoye, 2006). The selected states were

109   Abia, Anambra, and Enugu. Stage 2 involved the random selection of two agricultural zones

110   out of three from each state. This brought to a total of six agricultural zones. The agricultural

111   zones selected were: Enugu North and Enugu West for Enugu State, Anambra and Aguata

112   Zones for Anambra State, while Umuahia and Ohafia Zones for Abia State. These selected

113   zones were further stratified into local government areas. In the third stage, one local

114   government area each out of six local government areas was purposively selected from each

115   zone based on goat rearing performance. The local government areas were Nsukka local

116   government area for Enugu North, Aninri local government area for Enugu West, Oyi local

117   government area for Anambra, Orumba South for Aguata, while Ikwuano and Umunneochi

118   local government areas for Umuahia and Ohafia zones respectively.

119   In the next stage, two communities out of four were randomly selected from each of

120   the local government areas, giving a total of 12 communities. The lists of the goat farmers

121   with the help of agricultural extension agents and local leaders respectively in the

122   communities were obtained to form the sample frame. However, 10 goat farmers were

123   randomly selected from each community. This gave a total of one hundred and twenty

124   farmers for the study.

125   Structured questionnaire and interview schedule were used to collect information on

126   farmers' socio-economic characteristics, such as age, education level attainment, farming

127   experience and income level of the household heads. More so, information were gathered on

128   items used to compute cost and returns in goat production and constraints to goat production.

129   The data were analyzed using mean counts and net farm income.

130   The net farm income can be calculated by gross margin less fixed input. The net farm

131   income can be expressed as thus:

132   Gross Margin (GM) = $\sum_{1-1}^{n} F_1 Q_1 - \sum_{1-1}^{m} r_1 x_1$ - - - - - (1)

133   Return per naira (RPN) was calculated using the formula, RPN = NR / TC. Where

134   NR = Net returns and TC=Total Cost (Ogbonna and Ezedinma, 2005) - - (2)

135   The various ratios were computed to explain the extent to which a goat farmers employs the

136   production factors at his/her disposal to the fullest in order to achieve some desired goals.

137   (i) Operating expense ratio = Total Variable Cost / Gross Revenue - - - (3)

138   (ii) Net farm income (NFI, Profit) = Gross margin (GM) – Total fixed cost (TFC) or

139   Net farm income (NFI) = $\sum_{1-i}^{n} P_1 Q_1 \left[\sum_{1-1}^{n} r_1 x_1 + K \right]$ - - - - - (4)

140   Where GM = Gross margin; NFI = Net farm income; P_1 = Market (unit) price of output Y

141   (₦); Q = quantity of output Y (kg); r_1 = unit price of the variable input (₦); x_1 = quantity of

142   variable input (kg); x_1 = quantity of variable input (kg); Kn = Annual fixed cost

143   (depreciation) (₦); i = 1 2 3 ……………n; j = 1 2 3 ……………. M

144   (iii) Benefit Cost Ratio (BCR) = Total Revenue (TR) / Total Cost (TC) - - (5)

145   **Results and Discussion**

146   Table 1 shows the average statistics of socio-economic characteristics of the farmers

147   in the study area. The mean age of the respondents was 54 years. This implies more ageing

148   goat farmers than the young ones. Youth prefer white "collar job" to farming, particularly

149   goat rearing which they assumed is left for the aged (Upton, 1985). The result also showed

150   that the average household size was 7. Family size is an important source of family labour.

151   The implication of high number of family size that is of labour age according to Ekwe *et al*

152   (2010) would help to reduce the cost of hired labour as most poorer household head in

153   particular employ the services of his/her members in order to conserve the money that could

154   have been offered for labour. The mean of level of education was 11 years. The finding

155   concurs with Ume *et al* (2009), who reported a mean of 10. It is expected that educated

156   farmers will be more receptive to improved farming techniques (Ajibefun and Aderinola,

157   2004). The average years of rearing experience was 12 years. The years of farming

158   experience helps the farmers in setting realistic targets (Tanko and Opara, 2010). The mean

159   no. of extension contact was 10.14. This implies good extension outreach. Extension helps to

160   dissemination innovation to the farmers in order to enhance their productivity.

161   Table 1 also revealed that the mean income of the respondents was ₦35,000. This

162   finding agrees with work of Ume *et al* (2007). Mohammed (2001) reported that high income

163   farmers are often categorized as early adopters in adoption process.

164   Table 2 shows the estimated results of the tobit model. Four variables were considered

165   to be significant in explaining the adoption of goat production technologies in the study area.

166   The X^2 was highly significant at 1% level of probability, indicating goodness of fit. The

167   coefficient of education and extension contact were positive and highly significant at 1%

168   level of probability, while that of age of the farmer was positive and significant at 5% alpha

169   level. This implies that increase in the variables will lead to increased adoption of goat

170   production technologies.

171   Educational attainment has the capability to enhance persons' efficiency in resource

172   use, less risk averse and more readily innovation acceptance (Mejaha *et al*, 2010). The

173   number of extension contacts has profound effect on technology adoption. The effect is stem

174   from the fact that extension services help to disseminate information and mode of application

175   or usage of technology as well as the availability of technological inputs to farmers

176   (Asiabaka, 2002).

177   Table 2 shows the costs and return of goat farmers in the study based on the

178   2014/2015 market price of inputs and output. The analysis revealed that cost of breeding goat

179   (kid) (30.9%) had the highest share of the total cost of production. Reynolds and Von-

180   Kaufman, (1998) asserted that kids particularly from doe, who could give at least three kids

181   in a kidding are endeared to the farmers and often very scarce and expensive to procure.

182   Furthermore, cost of feed constituted about 21.1% of the total cost of production. Cost

183   of feed is expensive, particularly during dry season when forages are scarce and

184   supplementary feeds such as concentrate are used to maintain the animals' health and

185   productive life. These concentrates like grants apart from being grossly inadequately

186   produced domestically couple with its recent import ban in the country are in serious

187   competition among man, livestock and industries. These, thus make the concentrates more

188   expensive and scarce especially during late season of the crops (Tewe *et al*, 2002).

189   Table 3 showcased that cost of veterinary (19.7%) occupied a significant portions of

190   the total cost of production. High cost of drug coupled with adulteration and substandard for

191   instance is a major threat to livestock industry in Nigeria (Effiong, 2005). The least (4.3%)

192   was cost of transportation. The implication could be that most of the farmers' purchase their

193   production inputs such as breeding goat, concentrates and others from local markets within

194   their communities of which little or no transportation cost. Goat is profitable venture with net

195   farm income of ₦84,714. The benefit cost ratio was ₦2.88, indicating that every one naira

196   spent, ₦2.88 will be realized.

197   Table 3 shows that majority (87.5%) of the respondents encountered the problem of

198   lack of finance/credit facilities. Farmers' poor access to credit according to Omoruyi *et al*

199   (1998) could be attributed to high collaterals, high interest rate, short loan repayment period

200   as charged by lending agencies and location of these lending agencies in urban area. This

201   finding corroborated by CIMMTT (1993) who reported that paucity of fund for adoption of

202   the technologies is a persistent problem in the adoption process. Also, 72.5% of the

203   respondents encountered problem of pests and diseases. Upton (1984) reported that because

204   of lack of veterinary posts in the most rural area of the humid zone of West Africa, goat and

205   other small stock is decimated by diseases, notably Pests de Petits Ruminant (PPR).

206   Furthermore, 68% of the respondents complained of poor contact with extension

207   agent. Extension services are the major source of innovation dissemination and technical

208   assistance to farmers in the developing countries (Rogers, 2003). However, poor extension

209   outreach is partly because of wide gap of extension agent and farmers ratio have been

210   variously acknowledged to be responsible for extension services' failure to perform its' major

211   roles (Asiabaka, 2002, Rogers, 2003 and Chukwu and Nwosu, 2010). This has negative sign

212   to agricultural development in the country.

213   Moreover, 67.7 percent of the respondents complained about seasonality of forages

214   for goat feeding problem. This finding concur with Phonepaseuth, (1997) who reported that

215   Seasonality of forages leads to feed shortage since feeds are abundant only during the wet

216   season. Also He opined that and in most localities in the goat rearing zone, animals need to

217   be confined or tethered in many areas to avoid damaging of the crops, thus farmers spend a

218   lot of time and labour to find, cut and carry natural grasses for their animals. In addition, poor

219   nutrition of the goat confined was complained by 60% of the respondents. This problem is

220   more peculiar to confined goat as their growth rate is usually half of of free roaming goat free

221   roaming animal particularly goat is capable of selecting more nutritious part of grass and

222   browse but confined animals are limited in choice to what farmer provide from bush and

223   fallow land (Uptoc, 1994).   More so, 76.7 percent of the respondent encountered the problem

224   of theft to especially goat tethered in the bush to graze forages. High cost of technologies

225   (50%) adversely affected the adoption of goat production technologies in the study area. The

226   high cost of technologies in relation to high cost of building material in constructing animals'

227   pen and high cost of veterinary drugs affected negatively the adoption of the technology.

228   Iwueke, (1999) reported that lots of yam minisett farmers in south eastern Nigeria farming

229   system refused to adopt the technologies introduced to them because of inadequate and high

230   cost of production inputs which are critical to the success of the technology.

231   **Conclusion and Recommendations**

232   The results from this study showed that goat production is a profitable venture. The

233   important factors directly related to adoption of goat production technologies were education

234   level, extension contact, age of the farmer and family size.

235   The most important limiting factors to the adoption of goat production technologies

236   were lack of fund, technology too costly, innovation too difficult and unaware and

237   insufficient information.

238   Based on the result, the following recommendations were made:

239   **(1)**   Policies option aimed at improving farmers' access to education through aggressive

240   awareness campaign and mass mobilization as most farmers were old and cannot go

241   to school.

242   **(2)**   There is urgent need to improve extension delivery and agricultural credit availability

243   to the farmers in order to enhance promotion of the adoption of goat production

244   technologies

245   **(3)**   Improved goat production technological inputs for adoption should be made available

246   and at subsidized rate bearing in mind that most of the farmers are resource limited.

247 **(4)** Farmers with large household size should be encouraged to be actively involved in

248 adoption of these technologies, since large household size can provide the much

249 needed labour at least cost.

250 **Table I: Summary Statistics of Socio-economic Distribution of the respondents**

Variable	Mean	Standard Deviation	Minimum	Maximum
Age (yrs)	54.2	8.72	26	73
Household size (No)	7.10	7.07	4	12
Level of education	11.08	5.92	0	20
Farming experience (yrs)	12.04	6.72	4	23
Extension contact (No.)	10.14	4.72	4	8
Income (N)	35,000	57,311	6,750	46,000

251 **Source: Field Survey, 2015**

252 **Table II: Costs and Return Analysis in Goat Production**

Item	Costs and Return	Percentages
Revenue		
Revenue from the sales of 8 she goat at N10,200	89,600	
Revenue from sales of four he goat as N8,700	34,800	
Cost of manure	5,200	
Total revenue	129,600	
Cost		
Total fixed cost		
Cost of goat house depreciation	2,846	
Total variable cost		

Cost of veterinary service	8,860	19.7
Cost of purchasing she goat at N1,250 each	10,000	
Cost of purchasing four he goat at N950 each	3,900	30.97
Cost of labour	6,200	13.8
Cost of trnasportatoin	1,950	4.3
Cost of feed	10,800	21.1
Total variable cost	41,700	
Total cost (TVC + TFC)	44,886	
Gross Margin TR – TVC	87,890	
Benefit cost ration $\dfrac{TR}{TC}$	2.88	
Net farm income = TR – TC	84,714	

253 **Source: Field Survey, 2015**

254 TC = Total cost, TR = Total revenue, TFC = Total fixed cost

255 **Table III: Constraints to Goat Production**

Constraints	Frequency	Percentage
Lack of finance/credit	70	87.5
Theft problem	54	67.7
Poor extension contact	50	62.5
Poor nutrition of confined animal	50	62.5
Technology too costly	40	50
problem of pests and diseases	58	72.5
Seasonality of forage	54	67.5
Inadequate time	20	25

256 **Source: Field Survey, 2015**

257   *Multiple response

258

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