

Determinants of Grasscutter (*Thryonomys swinderianus*) Production in Ughelli North Local Government Area of Delta State Nigeria

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ABSTRACT

The study accessed the determinants of the quantity of grasscutter produced in Ughelli North Local Government Area of Delta State, Nigeria. One hundred respondents were selected from five rural communities of the study area. Data were collected using structured questionnaire and personal interview. The result showed that 69% of the respondents were male. The profitability results revealed a net farm profit of (₦944287.5) (\$2950.90). The double log regression result showed that farming experience and income significantly contributed to the quantity of grasscutter produced ($p < 0.05$) in the study area. Among all the constraints encountered by the respondents, 98% reported that high cost of breeding stock was their major problem. It was recommended that financial resources such as loans, grants and incentives should be stimulated by government to boost production and farmers should be encouraged to form cooperative societies to access loans and grants from the government.

Key words: determinants, socioeconomic, grasscutter, production, Nigeria.

INTRODUCTION

Thryonomys swinderianus, known as Grasscutter is a Non timber forest product (NTFP) that is tropical in distribution (Andel, 2006). As a Non timber forest product, it significantly contributes to the rural livelihoods and offers a pathway out of poverty of rural people, (Aiyelaja and Ogunjinmi, 2013). *Thryonomys inderianus* is one of the two species of cane rats the other is *Thryonomys gregorianus* which lives by reed – beds and river banks in sub – Saharan African, they can grow to nearly 2ft (0.61m) in length and weigh a little less than 8.6kg (Morsell *et al* 2012). They are widely distributed in West Africa and central Africa and are found in areas with dense grasses, especially reedy grass growing in damp or wet places (Abioye *et al.*, 2008). They do not inhabit the rain forest, dry shrub or desert regions. Its distribution is determined by the availability of adequate or preferred grass species for food (NRC, 1991). It has a gestation period of 152 days (about 5 months), the females give birth to an average of four (4) young ones which are morphologically identical to adults (Abioye *et al.*, 2008). This NTFP will continue to be a delicacy in a number of countries like Latin America, Africa and Asia, where markets exist for a wide variety of the species for consumption; they are also preferred over other sources of meat, because of higher protein and lower fat content than

most domesticated farm meat. It is also appreciated for its tenderness and taste (Abudulazez, 2011). Considering the meat as a delicacy, grasscutters' are beginning to be raised in cages, which are often referred to as micro livestock (Jaman, 2008).

Grasscutter production could serve to generate income and reduce hunting. It is also a source of employment in both urban and rural areas. The business of producing and transporting grasscutter products should give employment to many people.

The investment rate into grasscutter farming and its development has been on the decline over past years and this situation pose a challenge to farmers who after investing huge amount of money would not make much profit (Ntiama-Baidu, 1997). Policy makers and non-governmental organization are focused on the sustainability production and commercialization of non-timber forest products. Observations and studies have shown that grasscutter production in Ughelli North local government area of Delta state has experienced significant decline due to lack of improved technologies, inadequate market outlay which has affected farmers in terms of marketing of their produce, lack of resource inputs, lack of adequate information and so on, has reduced the motivation for grasscutter production (Obi *et al* 2008)

The study is aimed to investigate determinants of the quantity of grasscutter produced, the net farm income realized and the constraints encountered by grasscutter farmers in the study area.

MATERIALS AND METHODS

The study was carried out in Ughelli North Local Government area of Delta State, Nigeria (Figure 1). The Local Government Area is located between latitude 9°45'N and longitude 8°45'E. It has an area of 818 km² and a population of 321, 028 (NPC, 2006). The local government is one of the twenty five (25) local government areas of Delta State, the indigenes are mainly involved in arable Agriculture such as cassava, yam, potatoes, maize, hunting and also the rearing of animals. Ughelli North local Government area is made up of fifteen communities, namely: Uwheru, Ofuoma, Ewwereni, Agbarho, Agbarha, Ogor, Otor – Iwhreko, Afiesere, Oteri, Ekiugbo, Ododegho, Odovie, Edjekuta, Orogun and Otowodo. Among which five (5) communities was selected, these five communities are; Uwheru, Ewwereni, Ofuoma, Orogun and Agbarho. The population of the study comprises of all grasscutter farmers in the selected local Government area.

The purposive sampling technique was used for this study. This was due to the fact that grasscutter farming is predominantly practiced in these areas which will also ensure a high degree of accuracy and greater level of precision in data collation. The purposive sampling was used to select the five communities where grasscutter production is predominantly practiced from the study area. A total of twenty (20) grasscutter farmers were randomly selected from each community, making a total of 100 grasscutter farmers sampled. Farmers total revenue, gross margin were determined as well as their total fixed and variable costs. Net farm profit analysis and multiple regression analysis were used to analyze the data obtained. Net farm profit can be determine by subtracting the total fixed cost from the total gross margin, therefore the profitability of grasscutter production in this paper will be determined using the net farm profit analysis.

Model Specification

Net farm profit Analysis Model:

$$TC = TVC + TFC$$

$$TR = P \times Q$$

$$GM = TR - TVC$$

$$NFP = GM - TFC$$

Where

TC = Total cost production (N)

TVC – Total Variable Cost

TFC – Total Fixed Cost (N)

TR – Total Revenue (N)

P – Price of grasscutter meat (N)

Q – Quantity of grasscutter meat (kg)

GM – Gross Margin (N)

NFP – Net farm profit (N)

In statistics, multiple regression analysis is a statistical tool used in estimating the relationships among variables. It is focused on estimating relationships between a dependent variable and one or more independent variables. Multiple regression analysis helps one understand how the typical value of the dependent variable changes when any one of the independent variable changes or varies (Koutsoyiannis, 1981).

$$Y = F (X_1 X_2 X_3 X_4 \dots \dots \dots X_n + U)$$

Therefore the multiple regression analysis was used to estimate how the socioeconomic characteristics affect the quantity of grasscutters production in the study area.

This will be achieved using the linear function, semi – log function and Cobb – Douglas or double log functions.

Linear Function

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \dots \dots \dots + U$$

Semi – log function

$$\log Y = b_0 + b_1 X_1 + b_2 X_2 + \dots \dots \dots U$$

Double log function

$$\log Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + \dots \dots \dots + U$$

Where

Y = Quantity of grasscutter production (kg)

X1 = Distance (km)

X2 = Age (years)

X3 = Household size (numbers)

X4 = Marital Status

X5 = Gender

X6 = Income Status (N)

X7 = Farming Experience (years)

U = Stochastic error term

B0 = Intercept or constant

B1 = Parameter estimates

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Grasscutter Farmers

Results in Table 1 shows that 69.0% of the respondents were male while (31.0%) were female; this shows that males dominate the production of grasscutter in the study area. This agrees with the findings of Aiyeloja and Ogunjinmi (2013) that females engage mostly in marketing; while male do most of the production processes. In addition, 43.0% were in the age group of 31-40 years, with mean age of 36years, an indication that most grasscutter farmers were in their active age.

Determinants of grasscutter production

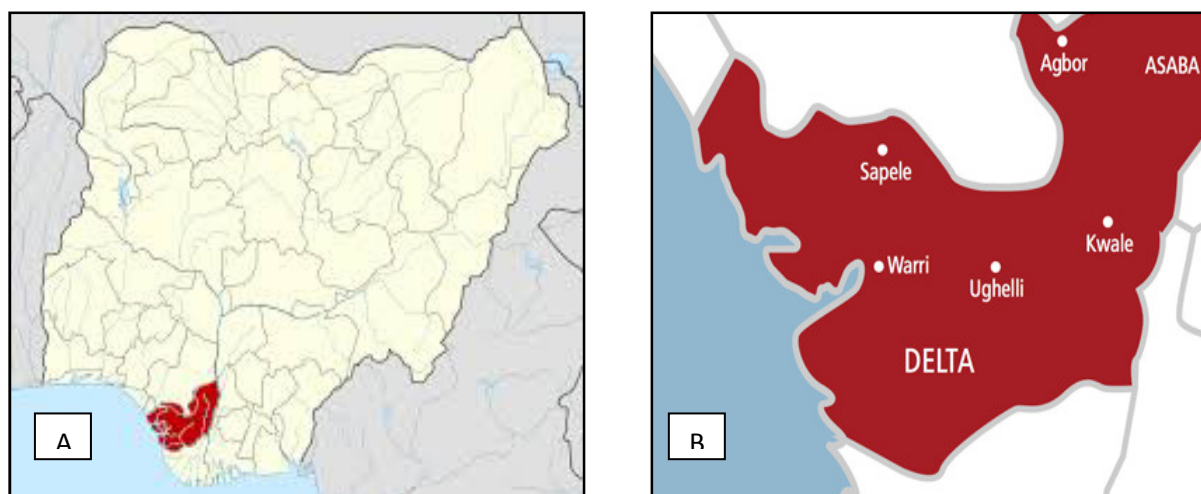


Figure 1: Map of Nigeria showing Delta State (A) and Map of Delta State showing Ughelli (B).
(Source http://www.nigeriagallery.com/Nigeria/States_Nigeria/Delta/Delta_State.html)

Table 1: Socio-economic characteristics of grasscutter farmers in Ughelli North Local Government Area

Variable	Frequency	Percentage
Sex		
Male	69	69
Female	31	31
Age (years)		
>60	1	1
20-30	30	30
31-40	43	43
41-50	24	24
51-60	2	2
Mean	36	
Marital Status		
Single	30	30
Married	58	58
Widower	7	7
Divorced	5	5
Farming experience		
0-2	15	15
3-5	85	85
Mean	4	
Household size		
0-2	4	4
3-5	60	60
6-8	35	35
9-11	1	1
Mean	4	

Table 2: Regression models showing the effect of socio-economic characteristics on output of grasscutter production in Ughelli North

Variables	Linear Model			Semi-Log Model			Double-Log Model		
	Coefficient	Std Error	t-value	Coefficient	Std Error	t-value	Coefficient	Std Error	t-value
Age	1.01	0.643	1.572	0.012	0.007	1.674	-0.112	0.224	-0.499
Marital status	3.133	6.076	0.516	0.072	0.066	1.092	0.175	0.144	1.211
Farming experience	2.343	6.360	0.368	0.016	0.069	0.224	0.399	0.160	0.2500**
Household size	-4.005	3.237	-1.237	-0.06	0.035	-1.689	0.740	0.160	-0.702
Distance	5.414	5.371	1.008	0.073	0.058	1.246	0.800	0.080	0.981
Income	0.000	0.000	7.227	2.325	0.000	5.993	0.574	0.520	11.121**
Gender	3.521	10.198	0.345	0.029	0.111	0.265	0.029	0.122	0.238
R ²	0.454			0.395			0.647		

**significant at 5% level

Table 3: Net return on grasscutter production

Items (value)	Unit	Price Unit (N)	Quantity (kg)	Total Amount (N)
Total revenue	350	3500 (\$11)	2100	1,225,000.00
<i>Variable cost</i>				
Cost of feed		3,258	52	169,416.00
Transportation				2,045.92
Tatal variable cost (TVC)				180,695.96
Gross margin (GM)=TR-TVC				1,044,304.10
<i>Fixed Cost</i>				
Cost of building				92,400.00
Cost of Feed trough				3,779.90
Cost of Water trough				3,836.73
Total Fixed Cost (TFC)				100,016.63
Total Cost (TC)=TVC+TFC				280,712.59
Net Farm Income (NFI)=GM-TFC				944,287.50

The results further show that 58.0% of the respondents were married with mean householdsize of 5, this implies that grass utter farmers have a number of family members that can provide cheap labor which is the major characteristics of the farmers in the study area. The mean farming experience of 85.0% of the farmers was four years, this indicates that majority of the farmers had a relatively few years of experience in grasscutter farming.

Effect of Socio-Economic Characteristics on Output of Grasscutter Production in Ughelli North.

The result of double log multiple regressions (Table 2) shows that age of the respondents is statistically not significant in increasing the quantity of the grasscutter

produced. Also, no significant relationship between marital status of the respondents and quantity of grasscutter produced, the farming experience was significantly and positively related to the quantity of grasscutter produced by the farmers. Household size is not statistically significant in increasing the quantity of grasscutter produced. This finding reveals that grasscutter production requires lots of techniques to increase output. Distance from farm to market is positive but not statistically significant in increasing the quantity of grasscutter produced. Income was strongly positive and significant in increasing the quantity of grasscutter produced. The strong influence could be as a result of more procurement of foundation stocks, establishment of feeds farms and housing. Gender is statistically significant in increasing the production of grasscutter.

From the result, males dominate the venture of grasscutter production. The R² of 65% from the double logged regression result shows that sixty –five percent of the quantity of grasscutter produced was explained by the explanatory variables included in the model .This shows that the independent variables have a strong relationship with the output produced.

The Net Return of Live Grasscutter Production in Ughelli North Local Government Area.

Table 3 shows that all the farmers interviewed incurred total average variable cost of ₦180695.96 (USD 564.67) with a total fixed cost of one hundred thousand, and sixteen naira, sixty-three kobo (N100, 016.63) (USD312.55). They also realized a total average revenue of one million two hundred and twenty five thousand naira only (₦1, 225000.00) (USD3828.13) .The net farm profit of the enterprise was determined using the calculations below:

1. Net farm profit NFP = Gross Margin (GM) – Total fixed cost of the Grasscutter farmers.
2. NFP= N 1044304.1 - N100, 016.63 = (N944287.5) (USD2950.90).

Thus, an average net farm profit of nine hundred and forty four thousand, two hundred and eighty seven naira, and fifty kobo (N944287.5) (USD2950.90) was realized by the sampled farmers. This has shown that grasscutter production is profitable in the study area. A similar study by Aiyeloja and Ogunjimi (2013) revealed that grasscutter production in Osun state has the highest cost-benefit ratio of 3.64 which indicates good profitability level in the western states of Nigeria.

Reported Constraints to Grasscutter Production by the Respondents

The major constraints encountered by grasscutter-farmers in Ughelli North Local Government Area are shown in Table 4. Majority (98.0%) reported that high cost of stock was the major constraints to grasscutter production. Others are as follows; time constraints (97.0%), high cost of labor (96.0%), and lack of fund to invest (95.0%). High cage materials (93.0%), this is in line with the findings of Benjamin *et al.* (2006), who strongly emphasized that the current trend in Grasscutter farming was towards increased stock levels.

Table 4:Farmers’ distribution according to the reported constraints encountered

Constraints	*Frequency	Percentage (%)
Poor producer training	1	1
Lack of credit	92	92
Disease infestation/mortality	22	22
High cost of stock	98	98
High cost of labor	96	96
High cage materials	93	93
Lack of market information	94	94
Lack of technical know-how	93	93
Labor unavailability	96	96
Time constraint	97	97
High cost of feed	95	95
Lack of fund to invest	95	95
Lack of extension services	95	95
Problems of seasonal variation	96	96
Poor wire fencing	92	92

*Multiple responses recorded

CONCLUSION AND RECOMMENDATIONS

The study deduced that there were more males than females in the business. Among the explanatory variables included in the double logged regression model, gender, farming experience and income were statistically significant in increasing the quantity of grasscutter produced in the study area. Also, the profitability of this enterprise has shown that anyone who engages into this enterprise will earn good income. This level of profitability could be improved upon by the injection of technology into the system. Farmers claimed that the major constraint confronting them is high cost of stock procurement. The study therefore concludes that grasscutter production is male dominated and recommends that government should provide credit facilities to the farmers to enable them acquire more production resources, especially farm labor and other modern inputs like wire, concrete cage and other equipment. Farmers should also form cooperatives societies which encourages government assistance for more improved farming.

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