



GROSS MARGIN ANALYSIS OF SOLE GROUNDNUT (*Arachis hypogea* LINN.) PRODUCTION IN BAUCHI STATE, NIGERIA



S. U. Biye*¹, H. Lawal² and A. A. U. Jongur²

¹Department of Agricultural Economics & Extension, Federal University Kashere, PMB 0182, Gombe State, Nigeria.

²Department of Agricultural Economics & Extension, Modibbo Adama University of Technology, PMB 2076, Yola, Nigeria

*Corresponding author: salihubnumarbiye@yahoo.com

Received: November 14, 2016

Accepted: March 05, 2017

Abstract: The study was carried out to analyse the production profitability among sole groundnut (*Arachis hypogea* L.) farmers in Bauchi State, Nigeria. The underlying objectives were to; describe the socio-economic characteristics of groundnut farmers, determine the costs and returns associated with groundnut production and identify production constraints associated with groundnut production. Data were collected from 251 farmers via structured interview schedule using multi-stage (purposive and simple random sampling techniques) and were analyzed using; descriptive statistics and Gross Margin analysis. The result shows that majority; of the respondents were male (70.12%) within the ages of 31-50 years and were married (82.87%). About 37% of them attended secondary school, 31.08% had tertiary education and 15.05 % attained primary education, while 12.35% had Quranic education. While only 3.59% were not literate. They earned a total revenue of (₦140,361.09/ha), a gross margin of (₦56,515.30/ha). The profitability index was 0.4 which signifies that for every ₦10 earned, an average farmer will make a profit of ₦4. Return on investment was 67.40% while operating ratio was 0.59. They encountered constraints such as; unfavourable prices, poor road network, high cost of labour, pests and disease, problems of theft, high costs of hybrid seeds and inorganic fertilizers, problems of adulterated seeds and; flooding in some farms. It is recommended that; financial institutions and stakeholders in agriculture sector should ease the farmers' access to credit so that they can expand production, and also generate more jobs to our teeming unemployed youths.

Keywords: Application, approach, gross margin, groundnut, production

Introduction

Groundnut (*Arachis hypogea* Linn) originated from Latin America and was introduced into West Africa by Portuguese traders in the 16th century. The origin of this crop dates back to 350 Before Christ (B.C.), which was also reported that, the first probable domestication of groundnut took place in the valley of the Panama and Paraguay River systems in the grain Chaco area of South America and then moved to the North America through slave trade (Hammons (1994), cited by (Taru *et al.*, 2008).

Groundnut in Nigeria, as in other major producing areas is largely a smallholder crop, grown under rain-fed conditions in semi-arid areas. Although it is grown in commercial farms in America and Europe, the developing countries with their small scale production, account for over 95 and 94 per cent of world groundnut area and production respectively (Baba *et al.*, 2013).

Groundnut contains about 11% carbohydrate, 30% protein, 45% oil, 2% ash and 5% water (Awoke, 2003). After oil extraction, the residues are good sources of protein useful in bakeries and in the manufacture of livestock feeds. The most commercial product of groundnut is peanut candy, which is sold at supermarkets or hawked in the streets. This study attempts to; analyse the socioeconomic characteristics of groundnut farmers in Bauchi State, determine the costs and returns associated with groundnut production in Bauchi state and also examine constraints militating against sole groundnut production in Bauchi State.

Theoretical Framework

Gross margin represents the difference between the monetary value of all the output per hectare (gross returns) and the total variable cost per hectare (Jongur, 2006). The gross return is obtained by multiplying the total quantity of output produced by the average market price prevailing during the survey period. While the total variable cost is obtained by summing up the costs of labour, seeds, herbicides and all other costs that varied with level of output incurred during production (Tashikalma, 2012). The gross margin is used on the premise

that the fixed costs are negligible. The gross margin of an enterprise is expressed as:

$$GM = \sum P_i Y_i - C_i \quad (i = 1, 2, \dots, n) \dots \dots \dots (1)$$

Where

- GM = gross margin (₦/ha)
- TFC = total fixed cost (₦/ha)
- X_iP_{xi}=total variable cost (₦/ha)
- P_i = price of groundnut and leaves (₦/kg)
- Y_i = groundnut yield and leaves of the ith farmer (kg/ha)
- C_i = total variable cost of groundnut of the ith farmer (₦/ha)

$$\pi = GM - X_i P_{xi} - TFC \dots \dots \dots (2)$$

Where: π = Profit (₦/ha)

$$PI = \pi / TR$$

Where

- TR = Total revenue (₦/ha)
- TC = total cost (₦/ha)
- TVC = total variable cost (₦/ha)
- RRVC = rate of return on variable cost (₦/ha)
- Rate of Return on Investment = $(\pi / TC) \times 100 \dots \dots \dots (3)$

$$RRVC = \frac{(TR - TFC)}{TVC} \times 100 \dots \dots \dots (4)$$

$$\text{Operating ratio (OR)} = TVC / TR \dots \dots \dots (5)$$

Materials and Method

The study area

The study was conducted in Bauchi state, it is located in the North Eastern part of Nigeria, it lies between latitudes 9° 3' and 12° 3' N of the equator; and Longitude 8° 50' and 11° E of the Green which Meridian (National Population Commission, 2006). The state is bordered by seven states, Kano and Jigawa to the north, Taraba and Plateau to the south, Gombe and Yobe to the east and Kaduna to the west. Bauchi state of has a land area of 549,260 square kilometre, about 5.3% Nigeria's total land mass. It has a population of 4, 653, 066 people, which comprise of; 2, 369 266 males and 2, 283 800 females (NPC, 2006) and it is estimated to be 5, 700, 000 at 2.5% growth rate by the year 2015.

Gross Margin Analysis of Sole *Arachis hypogea*

Major ethnic groups found in Bauchi State include Hausa, Fulani, Sayawa, Bolewa, Karekare, Kanuri, Warjawa, Zulawa and Badawa, a total of 55 ethnic groups. The most widely spoken languages are Hausa and English which is treated as official language, but Fulfulde is also widely spoken. The State is predominantly Islamic but Christianity is widely practiced in some areas. They are predominantly farmers; other occupations in the State include fishing, hunting, blacksmithing, crafts and trading (NPC, 2006).

Data and sampling procedure

Data from 251 sole groundnut farmers were collected with aid of structured questionnaires, using multistage, purposive and simple random sampling technique. Multi-stage, purposive and simple random sampling techniques were employed in the selection of the respondents. Hence in the first stage, four local government areas from the northern zone, three from the Western zone and two local government areas from the central were selected. In the second stage, twenty seven, which makes up 40 percent of the villages, were selected from the nine local government areas. In the third stage, forty two respondents from Misau, seventeen from Dambam, fourteen from Gamawa, eighteen from Jam'are, thirty one from Ningi, forty from Ganjuwa, twenty seven from Alkali, thirty four from Toro and twenty eight from Bauchi local government areas, making a total of two hundred and fifty one (251) sole groundnut farmers in all were randomly selected.

Analytical techniques

The data was analyzed using simple descriptive statistics and gross margin. The descriptive statistics used include simple percentage and frequency distribution. Gross margin is given by;

$$GM = TR - TVC$$

Where: TR= total revenue, TVC = total variable cost

The result shows that most of the respondents (61.32 %) were within the age ranges of 31-50 years, while only 5.18% of them were 20 years and below. The maximum age was 65 years and the minimum age was 22 years while their mean age was 42.42 years with a standard deviation of 6.5, an indication of significant variation in age of the respondents who are relatively young and physically active. This has a direct effect on the ability of the respondents to seek and comprehend improved production practices relative to older respondents. This has influenced their tendency of recording higher efficiency among farmers. This is in line with Battese and Coelli (1995); Otitoju and Arene (2010); Adeyemo *et al.* (2010); Ebong *et al.* (2009); Ekunwe *et al.* (2008); Idiong *et al.* (2009) who found a positive relationship between farmer's age and inefficiency, thus express concern that aging population has negative impact on the farmers' efficiency as well as profitability.

Male farmers constitute the majority (70.12%) while only few (29.88%) of them were female, which implies that there are more male farmers than female farmers engaged in groundnut farming in the area. Otitoju and Arene (2010), Fasoranti (2006) and Frischmuth (1999) also found that male significantly aid in security and wellbeing of the family; planning agriculture and many other aspects of rural life. Most (82.87%) of the groundnut farmers in the study area were married, while 10.76% and 5.58% of the respondents were single and widowed/widowers, respectively. However, less than 1% of the respondents were divorced/divorcee. 37% of them had attended secondary school, 31.08% tertiary education and 15.05% primary education, while 12.35% had Quranic education. However, only 3.59% had not attained any form of education.

Results and Discussion

Table 1: Socio-economic characteristics of the respondents

Variable	Percentage	Mean	Standard dev.	Min.	Max.
Age (years)					
≤ 20	13	5.18	42.42	22	65
21 – 30	37	14.74			
31-40	72	28.69			
41-50	82	32.67			
51 – 60	41	16.33			
≥ 61	6	2.39			
Total	251	100			
Gender					
Male	176	70.12			
Female	75	29.88			
Total	251	100			
Marital status					
Single	27	10.76			
Married	207	82.87			
Widower	14	5.58			
Divorcee	2	0.79			
Total	251	100			
Educational level					
Uneducated	9	3.59			
Quranic education	31	12.35			
Primary education	40	15.94			
Secondary education	93	37.05			
Tertiary education	78	31.08			
Total	251	100			

Source:Field Survey, 2015

Profitability of analysis

Gross margin analysis was conducted to find the profitability of sole groundnut enterprise in the study area. This was on the premise that the cost associated with the fixed assets is negligible, and data for only a farming season was considered. The result therefore shows that groundnut production in the area is profitable, with a gross margin of ₦23,346,470.43

(₦56,515.30/ha). The total revenue recorded was ₦57,983,167.48 (₦140,361.09/ha), while the total variable costs was ₦34,636,695.85 (₦83,845.79/ha) over a total land area of 413.1 ha. Seed has the highest variable cost contribution of 55.94%, herbicides contributed 25.49%, while pesticides has the least contribution variable cost of 0.31% of the total variable cost in the study area. The profitability index

Gross Margin Analysis of Sole *Arachis hypogea*

of 0.4 implies that for every ₦10 earned, an average farmer will make a profit of ₦4. Return on investment was 67.40%. Operating ratio (OR) index of 0.59 recorded indicates that for every ₦10 spent on total variable cost in sole groundnut production in the study area, a revenue of ₦5.90 is earned. Hence, from the foregoing analysis it is evident that sole groundnut production is profitable. The result was close to the one recorded by Alabi *et al.* (2013) who observed a gross margin of ₦115,000/ha, but far greater than what Ahmed *et al.* (2000) who reported a gross margin of ₦7,000 for the period of four months indicated a low profitability for farmers in the study area.

Constraints to groundnut production

Groundnut farming in Bauchi State is faced by good number of constraints which have a direct bearing on the farmers' profitability. The result obtained revealed that groundnut farmers in the area face a varying range of constraints; the prominent among them are shown in Table 3 below. The constraints were ranked on the basis of their severity as perceived by the farmers in the area during the farming season under consideration. The result shows that, poor access to farm credit (55.00%) was identified as the first most serious constraint, Limited access to loanable funds poses a serious consequences on farmers efficiency as it is one of the factors of any meaningful production, without which the farmers cannot expand production and also limit the ability to purchase the required inputs at the right time. This result is in line with Biye (2016); Ajeigbe *et al.* (2014) and Rabinowicz (2002) who reported that small – scale farmers do not have adequate capital to expand their production level to take advantage of profitable packages of technologies to boost productivity. Unfavorable prices of groundnut especially at harvest (53.78%) were identified as the second most severe problem. Poor road network (53.00%) was ranked third. Poor road network limit farmers access to farm during the production period and also making it difficult to transport the produce to the market as reported by Baba *et al.* (2013). High cost of labour (30.28%) was ranked as the fourth most severe constraint followed by pests and disease infestation (25.10%) ranked fifth. Problem of pests and diseases tend to be related, as the incidence of pests and diseases leads to increase in the cost of production and in turn lower farmers' efficiency and profit. This finding conforms to the assertion made by Ajeigbe *et al.* (2014) that groundnut rosette epidemic and foliar diseases, aflatoxin contamination affect productivity and lower its market value. Poor access to functional extension services (22.71%) was ranked sixth. Problems of theft (10.36%) being the seventh, high cost of hybrid seeds (8.37%) was ranked eighth, while high cost of inorganic fertilizers (5.98%) the ninth, followed by problems of adulterated seeds (4.80%) in the market and finally flooding (3.19%).

Table 2: Constraints faced by sole groundnut farmers in the Area

Type of Constraint	Frequency	Percentage
Poor access to loan	138	55.00
Low market prices	135	53.78
Bad road network	133	53.00
High cost of labour	76	30.28
Pests and diseases	63	25.10
Poor access to extension service	57	22.71
Theft	26	10.36
High cost of hybrid seed	21	8.37
High cost of fertilizers	15	5.98

Adulterated hybrid seeds	12	4.80
Flood	08	3.19

*Multiple responses

Source: Field Survey, 2015

Conclusion

From the foregoing, it can be seen that sole groundnut production in Bauchi state is profitable in view of the average Gross margin/ha of ₦56,520/ha. 14, although it is confronted by numerous problems, which if arrested to its barest minimum will further increase profitability. Provision of access to credit at affordable rate, good road network and guaranteed price for their produce will definitely be very helpful in raising their efficiency which will in turn affect their profitability positively.

References

- Adeyemo R, Oke JTO Akinola AA 2010. Economic Efficiency of Small Scale Farmers in Ogun State, Nigeria." *Tropicultura*, 28(2): 34–41.
- Ahmed S, Rafay A, Singh RK & Verma UK 2000. Response of groundnut varieties to spacing. *Indian J. Agron.*, 31(3):248-251.
- Alabi OF, Owonibi B, Olafemi SO & Olagunju S 2013. Production analysis of groundnut in BirninGwari Local Government Area of Kaduna State. *Produ. Agriculture & Techn.*, 9(2): 102-113. Online copy available at www.patnsukjournal.net/currentissu.
- Awoke MU 2003. Production analysis of groundnut (*Arachishypogaea*) in Ezeagu Local Government Area of Enugu State, Nigeria. *Global J. Agric. Sci.*, 2(1):40.
- Baba MD, Dabai JS, SenchiandDB Umar A 2013. Cost and returns of groundnut production in Zuru Local Government Area of Kebbi State, Nigeria. *Advances in Agric. Sci. & Engr. Res.*, 3(11): 63-75.
- Battese GE & Coelli TJ 1995. A model for technical inefficiency effects in stochastic frontier production function for Panel Data. *Empirical Economics*, 20: 325 - 332.
- Bauchi State Online: Geographical Position. www.ng.all.biz/regions. accessed on 5th October, 2015
- Biye SU 2016. Analysis of production efficiency and profitability among groundnut (*Arachis hypogea* L.) farmers in Bauchi State, Nigeria. Unpublished PhD Thesis, Department of Agricultural Economics & Extension, School of Agriculture and Agricultural Technology, Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria, p. 140.
- Ebong VO, Okoro US & Effiong EO 2009. Determinants of technical efficiency of urban farming in Uyo Metropolis of Akwa Ibom State, Nigeria. *J. Agric. & Social Sci.*, 5: 89–92.
- Ekunwe PA, Orewa SI & Emokaro CA 2008. Resource Use Efficiency in Yam Production in Delta and Kogi States of Nigeria. *Asian J. Agric. Res.*, 2(2): 187-201.
- Fasoranti MM 2006. *A Stochastic Frontier Analysis of Effectiveness of Cassava-Based Cropping Systems in Ondo State, Nigeria*. Ph.D. Thesis, Department of Agricultural Economics and Extension, FUTA, Akure.
- Frischmuth C 1999. Gender is not a Sensitive Issue: Institutionalising a Gender-Oriented Participatory Approach in Savionga, Zambia. *Gatekeeper Series No. 72*. International Institute for Environment and Development (IIED). Sustainable Agriculture and Rural Livelihoods programme.

Gross Margin Analysis of Sole *Arachis hypogea*

- Idiong IC, AgomDI, EffiongEO &Ohen SB 2009. "Analysis of Technical and Economic Efficiencies in Rice Production Systems in the Niger Delta Region of Nigeria."InSustaining Agricultural Growth to Meet National Economic DevelopmentGoal. *Proceedings of the 23rd Annual Conference of the Farm Management Association of Nigeria (FAMAN)*, 185-220.
- Jongur AAU 2006. An Economic Analysis of Masakwa Sorghum Production in Yola South Local Government Area of Adamawa State, Nigeria. Unpublished Doctoral Dissertation,Ahmadu Bello University, Zaria, Nigeria.
- NPC 2006. National Population Commission of Nigeria (web). www.citypopulation.de accessed on 1st January, 2015.
- Otitoju M &Arene CJ 2010. Constraints and determinants of technical efficiency in medium-scale soybean production in Benue State, Nigeria. *Afri. J.Agric. Res.*,5(17): 2276–2280.
- Taru VB, KyagyaIZ, Mshelia SI &Adebayo EF 2008. Economic Efficiency of Resource Use in Groundnut Production in Adamawa State of Nigeria. *World J.Agric. Sci.*,4(S): 896-900.
- Tashikalma AK 2012. Comparative Efficiency and Profitability Analysis of Some Selected Rainfed and Irrigated Food Crops in Adamawa State, Nigeria. Unpublished Doctoral Dissertation,Department of Agricultural Economics Extension, AbubakarTafawaBalewa University, Bauchi, Nigeria, p. 118.