



**PROFITABILITY ANALYSIS OF WARA (*Soya Bean Cheese*) PRODUCTION IN SABON GARI
LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA**

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ABSTRACT

The study examined profitability analysis of Wara (*Soya Bean Cheese*) production in Sabon gari local government area of Kaduna State, Nigeria. Data were collected using a structured paper questionnaire through personal interviews from a total of 50 randomly sampled respondents. Data were processed using Microsoft excel and SPSS Software Packages and subjected to different forms of analysis using different statistical tools that include; Descriptive statistics and Gross Margin analysis. The findings of the study reveal that the mean age of the respondents was approximately 30 years with a minimum age of 14 years among the respondents and a maximum age of 48 years respectively. The study also revealed that 80% of Wara producers in the study area were females and only 20% were males. However, 52% of the respondents were married with average annual income of ₦443,600.00. The study also revealed that 36% of the respondents had attended the secondary education, 30% have tertiary education as their highest level of qualification, while 32% of the respondents have no formal education. The study also estimated the total variable cost of producing Wara per day was ₦11,640.86/day. The purchasing cost of soybeans contributed to about 39.7% of the total variable cost. Averagely, Wara producer makes a net revenue of ₦18,972.3/day, a gross margin of ₦7,331.47/day, a net marketing margin of ₦4,112.64/day. Wara production and marketing in the study area was revealed to be profitable as the finding reveals a positive return per naira invested of ₦1.28 on each ₦1.0 invested in the business.

Keywords: Analysis, Cost, Profitability, Returns and Soybean

INTRODUCTION

Wara, also known as soya bean cheese, is a popular dairy alternative made from soybeans. Soybean (*Glycine max*) is a grain legume that is very nutritious and contains on average 40% protein. It is gaining ground internationally due to its multiuse use as human food, livestock feed, manufacturing purposes, and more recently, as a source of bio-energy (Myaka *et al.*, 2005). Currently it also comes to be the world's most important source of vegetable oil. Unlike most other beans it contains 40% protein compared to 20% and 13% protein content in meat and egg, respectively (FAO, 2010). Moreover, it contains 20% non-cholesterol oil and its fortified foodstuffs are considerably low-priced than other sources of high-quality protein. It can be utilized directly for nourishment in the family unit or handled for soy milk, cooking oil and a scope of different items including newborn child weaning sustenance.

The production and marketing of Wara can be a profitable venture for farmers, as demand for plant-based dairy alternatives continues to rise (FAO (2020). According to a study by (Ozor *et al.* 2017) the cost of production for Wara can vary depending on factors such as seed cost, labor, and processing equipment. However, with proper management and efficient production processes, farmers can realize significant returns on their investment in Wara production. In terms of



marketing, there is a growing market for plant-based dairy alternatives, including Wara, both locally and internationally. With the increasing awareness of the health and environmental benefits of plant-based diets, consumers are turning to products like Wara as a healthy and sustainable alternative to traditional dairy production. (Greenberg and Hartung, 2016).

The cost and returns to Wara (*Soya Bean Cheese*) production and marketing study is essential to provide insights into the economic viability and profitability of producing and selling this dairy alternative made from soybeans (Khan *et al.*, 2020). Understanding the costs involved in production, processing, and marketing, as well as the potential returns, can help farmers and entrepreneurs make informed decisions and optimize their operations (Magdi, 2014). A study conducted by Ozor, Aba, and Onu in 2017 titled "An analysis of costs and returns to Wara production in Southeast Nigeria" investigated the economic aspects of Wara production in the region. The study examined various factors such as seed costs, labor expenses, processing equipment, and marketing strategies to determine the overall costs and potential returns associated with producing Wara. By analyzing the cost structure and revenue potential of Wara production, the study aimed to provide valuable information to stakeholders in the agriculture and dairy industry. Understanding the profitability of producing Wara can help farmers assess the feasibility of investing in this dairy alternative and optimize their production processes to maximize returns. (Murtala *et al.*, 2016)

MATERIALS AND METHODS

The Study Area

The study was conducted in Sabon Gari Local Government Area of Kaduna. It is located in north-western Nigeria, on the Kaduna River. It is a trade Centre and a major transportation hub as the gateway to northern states of Nigeria, with its rail and important road networks. The population of Kaduna was at 760,084 as of the 2006 Nigerian census. Rapid urbanization since 2005 has created an increasingly large population, as of 2023, the estimated population is 1.1 million. The state is located at the Northern part of Nigeria's high plains. The vegetation cover is Sudan Savannah type, characterized by scattered short trees, shrubs and grasses. The soil is mostly loamy to sandy. A substantial amount of clay is found also. Its northern half became Katsina state in 1987. The state is bordered by seven states: Zamfara for 117 km (73 miles) and Katsina for 161 km (100 miles) to the north, Kano to the north-east for 255 km, Bauchi and Plateau to the east, Nasarawa and Abuja Federal Capital Territory (for 45 km) to the south, and Niger to the west. The Kaduna state is located between latitude 10°38'58" N and 10°25'36" N and to longitude 7°22'14" E and 7°32'00" E. The state was ranked number four by total area of land and number three by population.

Research Design

The research design adopted for this study was the descriptive survey design. The reason for the choice of this research design was because of its appropriateness to help the researchers identify the characteristics of the population.

Sample and Sampling Technique

A simple random sampling technique was used to draw the sample size for the study. A total of fifty (50) respondents were interviewed on various aspect of Wara production and marketing across 10 randomly selected wards in Sabon Gari LGA, at least five respondents from each of the wards. from the list of sampled population.

Method of Data Collection

Structured questionnaire was use for data collection which was administered randomly selected respondents.

Analytical techniques

Data collected from the field were processed using Microsoft excel and analyzed using SPSS software. Data were subjected to different forms of analysis that include;

Descriptive Statistics:

Descriptive statistics is a method of summarizing and presenting data in a meaningful way. It includes measures of central tendency, variability, and distribution, such as mean, median, mode, standard deviation, and frequency. This tool was used in achieving objectives i part of objective iii and iv respectively. The descriptive statistics tools include;

The Arithmetic mean of a set of values is the ratio of their sum to the total number of values in the set. Thus, if there are a total of N numbers in a data set whose values are given by a group of x -values, then the arithmetic mean of these values is given by the formula below.

$$X = \frac{\sum Xi}{N} = \frac{X1 + X2 + \dots + Xn}{N} \quad \dots (1)$$

Where,

X = Mean

Σ = Summation sign

Xi = Individual Observation

$n = 1, 2, 3, \dots, n$ th observation

N = Total number of observation (sample size)

The mean (X) was used to compute the mean of quantitative data obtained from the field.

Percentage: In mathematics, a percentage is a number or ratio expressed as a fraction of 100. It is often denoted using the percent sign, “%”. It also a dimensionless number (a pure number). Hence it mathematically expressed as;

$$\% = \frac{X}{N} \times 100 \quad \dots (2)$$

Where;

% = Percentage

X = Individual observation

N = Total observation (sample size)

It was used to determine the proportion of the respondents to a particular response.

Gross Margin Analysis:

A Gross Margin (GM) analysis was used in achieving objective ii. Total Revenue (TR), Net Income (NI), Gross Margin (GM) percentage share of each cost aspect in Total Cost (TC) were estimated. Other financial ratios for determination of profitability were also estimated. Generally, the gross margin analysis used include detailed analysis of all the costs and returns of Wara production and marketing at different level of activities. It includes estimation of Total cost of production and marketing (Fixed cost + Variable cost), Gross Revenue generated (Total quantity x Unit price), Net Income and return per Naira invested. The various measures used for this analysis include;

Net Income (NI) analysis; it is the difference between the Gross Income (GI) and Total Cost (TC) of production. It is mathematically represented as;

$$NI = GI - TC \quad \dots (3)$$

Where,

NI = Net Income from Wara

GI = Gross Income

TCP = Total Cost of Wara Production

The Gross Income (GI); this is obtained by adding the total revenue generated by selling Wara after deducting the quantity consumed, quantity given as gift and quantity loss.

Total Fixed Cost (TFC); it is the cost incurred for the purchase of all fixed inputs used in production or marketing process.

Total Variable Cost (TVC); it is the cost incurred for the purchase of all variable inputs used in the production or marketing process.

Total Cost (TC); is the sum total of all fixed cost and variable cost incurred by the respective value chain actors during production or marketing process. It is expressed mathematically as;

$$TCP = TVC + TFC \quad \dots(4)$$

Where,

TCP = Total Cost of Production

TVC = Total Variable Cost

TFC = Total Fixed Cost

Depreciation value (D); on farm tools and equipment. This was computed using a straight-line depreciation method as expressed below;

$$\text{Depreciation (D)} = (P-S)/N \quad \dots(5)$$

Where;

P = Purchase price

S = Salvage value

N = Expected life span of fixed asset

The items depreciated include sprayer, tractor, and water pump.

Garrett's ranking technique

This Ranking Technique was used in analyzing objective v in which the range of constraints affecting Wara production and marketing were identified and ranked. The constraints were arranged based on their effectiveness and severity from the point of view of the respondents. Hence, the same number of respondents on two or more constraints may have been given different rank. Garrett's formula for converting ranks into percent is:

$$\text{Percent position} = 100 * (R_{ij} - 0.5)/N_j \quad \dots(6)$$

Where,

R_{ij} = rank given for ith constraint by jth individual;

N_j = number of constraints ranked by jth individual.

RESULTS AND DISCUSSION

Socioeconomics Characteristics of Wara Producers in the Study Area

Table 1 provide information on the socioeconomic characteristics of the respondents. It revealed that the mean age of the respondents is approximately 30 years with a minimum age of 14 years among the respondents and a maximum age of 48 years respectively. Respondents within this age range are believed to be in their youthful and active ages, implying that the respondents are capable of high productivity and are likely to utilize new production and marketing innovations to improve their Wara business. Gender participation in Small and Medium Enterprises (SMEs) is very important as it determines the type of farming activity male or females performs (Iorzua *et*

al., 2020). This study reveals that 80% of Wara producers in the study area are females with only 20% of the Wara business owners as males. It also reveals that majority (52%) of the respondents are married with a mean household size of 11 people per household in the study area. which indicated that there is level of responsibilities among the respondents. The average annual income of Wara producers in the study area was also revealed to be ₦443,600.00 which may not be sufficient enough to cater for household with average number of people as 11.

Education increases the awareness of small and micro business owner in respect of expanding their businesses by adopting new innovations and technologies that will increases their output and income. It is true that a person who is well educated is more likely to approach new technology more positively, logically and analytically (Khan *et al.*, 2020). Findings of this study (Table 1) reveals that 36% of the respondents have attended the secondary education as their highest level of educational qualification, 30% have tertiary education as their highest level of qualification, while 32% of the respondents have no formal education. More educated people contribute to more democratic societies and sustainable economies, and are less dependent on public aid and less vulnerable to economic downturns (OECD, 2012). That is, the higher the level of educational attainment, the more knowledge and skills gained, which in turn leads to a sound economic decision. This supports the findings of Suleiman *et al.* (2024).

Table 1: Socioeconomics characteristics of wara producers in the study area

Variables (n=50)	Age	Years of Exp.	House Hold Size	Average Annual Income
Mean	30	3.6	11	443,600.00
Std. Deviation	8.36	2.15	7.17	447,134.92
Minimum	14	1	2	50,000.00
Maximum	48	10	30	3,000,000.00
Gender	Frequency		Percent (%)	
Female	40		80.0	
Male	10		20.0	
Marital status				
Divorced	2		4.0	
Married	26		52.0	
Single	16		32.0	
Widow	6		12.0	
Education status				
Non formal	16		32.0	
Primary	1		2.0	
Secondary	18		36.0	
Tertiary	15		30.0	

Source: Field survey (2024)

Cost and Returns in Wara Production and Marketing in the Study Area

Cost of production and marketing in Small and Medium Enterprises (SMEs) covers all the investment expenses realized in the purchase of all variable inputs and services rendered by fixed inputs in the production and marketing of Wara. All cost realized by the respondents during production and marketing processes were computed (Table 2) and the percentage contribution of

each cost component as used in the total cost was also computed. The result on Table 2 reveals the estimated cost of Wara at different level production and marketing operations as realized by respondents in the study area. The result revealed the total variable cost of producing Wara per day as ₦11,640.86/day where the cost of purchasing soybeans contributed to about 39.7% of the total variable cost. The total fixed cost was estimated as ₦3,218.83 per day. The estimated total cost of producing and marketing Wara in the study area was estimated as ₦14,859.69 per day.

Table 2: Cost and returns in Wara production and marketing in the study area

Cost components	Average annual Cost	Percentage share in total cost
Variable cost (VC)		
Soybeans	5,902.20	39.7
T_COST	330.00	2.2
Cost of grinding	1,004.00	6.8
Energy	915.00	6.2
Oil	1,992.91	13.4
Ingredients	714.00	4.8
Packaging materials	282.75	1.9
Shop rent	500.00	3.4
Total Variable Costs	11,640.86	78.3
Fixed Costs (FC)		
Frying pan	333.3	2.2
Charcoal	500.0	3.4
Tax	371.0	2.5
Labour	500.0	3.4
Communication	200.0	1.3
Bowls	231.5	1.6
Plates	104.5	0.7
Buckets	682.5	4.6
Others	296.0	2.0
Total Fixed Cost	3,218.83	21.7
Total Cost (TC)	14,859.69	100.0

Source: Field survey (2024)

Profitability of Wara Production and Marketing in Sabon Gari

Result in Table 3 reveals the Gross Income and Gross margin generated by the respondents. Averagely, Wara producer makes a net revenue of ₦18,972.3/day, a gross margin of ₦7,331.47/day, a net marketing margin of ₦4,112.64/day. Wara production and marketing in the study area was revealed to be profitable as the finding reveals a positive return per naira invested of ₦1.28 on each ₦1.0 invested in the business

Table 3: Profitability of Wara production and marketing in the study Area

Revenue Components	Amount
Total produced (Pieces/day)	459.42
Quantity consumed (Pieces/day)	28.24
Quantity given out (Pieces/day)	15.12
Quantity sold (Pieces/day)	416.06
Unit price (₦/Piece)	45.6
Total Daily Revenue (₦/day)	18,972.3
Gross marketing margin (₦/day)	7,331.47
Net marketing margin (₦/day)	4,112.64
Return per Investment	1.28

Source: Field survey (2024)



Marketing Strategies Used by Wara Producers in the Study Area

A marketing strategy process involves matching the resources used in business and the capabilities to external environmental opportunities for the business long-term development. Result in Table 4 provide information on the marketing strategies used by Wara producers in the study area. First, the information reveals that Wara business is conducted in free open spaces by 58% of respondents in the study area. Secondly, majority (86%) of the respondents don't belong to any cooperative or associations. Very few (14%) belongs to Wara producers association in the area. Majority (94%) of the respondents processed Wara locally with their hands which may be attributed to high cost of processing machineries and equipment. The findings also reveal that majority (76%) of the respondents produce Wara for commercial purpose solely.

Table 4: Marketing strategies used by Wara producers in the study area

Association membership(n=50)	Frequency	Percentage
No	43	86.0
Yes	7	14.0
Processing method		
Locally with hand	47	94.0
Mechanical using machine	3	6.0
Reason for processing		
Consumption and sale	38	76.0
For sale	9	18.0
Own consumption	3	6.0
Location of Business		
House	9	18.0
open place	29	58.0
Shop	12	24.0
Source of capital		
Borrowed	20	40.0
Personal savings	30	60.0
If borrowed source		
Association	4	8.0
Family and Friends	40	80.0
Money Lenders	6	12.0
Soybeans source		
Farmers	4	8.0
Open market	44	88.0
Own production	2	4.0
Reliability of sources		
Fairly reliable	11	22.0
Not reliable	2	4.0
Very reliable	37	74.0
Sales Wara every day		
No	16	32.0
Yes	34	68.0

Source: Field survey (2024)

CONCLUSION AND RECOMMENDATIONS

The study concluded that Wara business enterprise is an important enterprise in Small and Medium Scale Enterprises (SMEs) that support the livelihood of many low-income families Sabon Gari LGA of Kaduna State. The enterprise creates jobs and serves as a source income for many



low-income families in the study Area. Base on the calculated revenue, net income and return per investment, it is concluded that Wara business is a highly profitable enterprise that worth investing.

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