
ANALYSIS OF DRY MAIZE (*ZEA MAYS*) MARKETING STRUCTURE AND PROFITABILITY IN NNEWI NORTH LOCAL GOVERNMENT AREA OF ANAMBRA STATE, NIGERIA.

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ABSTRACT

The study examined analysis of dry maize (*zea mays*) marketing structure and profitability in Nnewi North local government area of Anambra State, Nigeria. Specifically, it described the socio-economic characteristics, profitability of dry maize marketing, marketing efficiency of dry maize marketing, market structure of dry maize and constraints faced by the dry maize marketing in the study area. Two-stage sampling and random procedure was employed to select four (4) major daily markets and 120 marketers (respondents). Descriptive, Shepherd-Futrell technique, Enterprise Budgeting, Gini coefficient and relative index were the analytical tools employed. Finding from socioeconomic characteristics showed that majority of the marketers were within the age bracket of 30 and 50 implying that the marketers were young and energetic, female dominated the enterprise (84.8%) and all the marketers had one form of formal education or the other and new entrants to the enterprise were minimal. On enterprise profitability, marketers realized ₦ 19,579,000.00 after spending a total variable cost of ₦12, 986,740.00 and total cost of ₦ 13, 420,058.13. The enterprise generated a gross margin of ₦6, 592,260.00, net marketing income of ₦6, 158,941.87 and net return on investment of 0.45. The implication of the net return on investment is that the marketers return 55 kobo for every 1 Naira invested in the enterprise. The overall profitability indicators (gross margin, net marketing income and net return on investment) proved that dry maize marketing was a profitable enterprise in the study area. The result of the analysis of marketing efficiency indicated that the marketers' attained marketing efficiency level of 68.5% and there existed inefficiency in the marketing of dry maize in the study area. The result revealed a gini coefficient of 0.82, hence the existence of imperfect competition in the market. Government should address the issue of bad roads and provide a cheaper means of transportation from North to East in order to improve their income.

Keywords: *Dry Maize, Marketing, Structure, Efficiency*

INTRODUCTION

Maize (*Zea mays*) known in many English-speaking countries as corn, is a grain domesticated by indigenous peoples in Mesomari (Bulgaria) in prehistoric times. It is the most widely grown grain crop in the America with 322 million metric tonnes grown annually in USA alone (Raouf, 2011, Ozor, Nkamigbo and Chiekezie, 2019). Maize is a cereal crop that is grown throughout the world in a range of agro-ecological environments and was introduced into Africa in the 1500s and has become one of the Africa's dominant food crops (Visent and Asher, 2015). Like in many other regions, it is consumed as a vegetable, although it is a grain crop (Singh, Yadaw and Sharma 2012). Maize (*Zea mays*) is the third most important cereal crop (Chete, 2013) and due to its various domestic uses, the domestic demand for the crop raised to 7.5million metric tons which outstrip the supply by 0.5 million metric tons (Federal Ministry of Agriculture and Rural Development [FMARD], 2016). Maize is the third most widely domesticated grown crop in Nigeria after sorghum and millet. It is highly productive, cheap, and less rigorous to produce and adapts to wide range of agro-ecological zones (FAO, 2014). In 2013 Nigeria produced close to 8 million metric tons making it the largest producer in Africa (Adams, 2018). Output of maize has continued to increase, maize production in Nigeria was 7.1 million tonnes and that the contribution of maize to the Gross Domestic Product (GDP) is still low (Nkamigbo, Nwoye, Makwudo and Gbeghemobi. (2018). Maize production in Kano State rose to 5 million tons in 2010, as against the only 1.9 million tons in 2003 and has an average maize grain yield of 4.6 ton/ha which shows remarkable increase in productivity as against the national average yield of 3.825 ton/ha in 2012 (KNARDA, 2014). International Institute for Tropical Agriculture (IITA) (2010) Expressed that about 50 varieties of maize exist and are of different colours, textures, grain shapes and sizes. The white and yellow varieties are preferred by most people depending on the region. It is widely used as feed and food in the diet of both livestock and man respectively.

In Nigeria, maize is a very important staple food crops. It is predominantly used as a separate food in the diet of urban and rural inhabitants. It also has vast commercial and industrial uses by agro-based industries through its processing and transformation into corn flakes, flour, baby foods,

confectionaries, starch and livestock feeds and other products (Nkamigbo, Atiri, Gbughemobi and Obiekwe, 2015). Maize is equally useful in alternative medicine, chemicals, bio fuel, and ornamentals. It is a major source of cooking oil (Corn oil) and gluten. Maize starch can be hydrolyzed and enzymatically treated to produce syrups, particularly high fructose corn-syrup, a sweater, and also fermented and distilled to produce grain alcohol for whiskey production and as the starch source for beer. It is equally used for the production of dough ball and fish bait Nkamigbo *et al.* (2018). Maize grains are rich in vitamins A, C and E, carbohydrates, and essential minerals, contain 9% protein and also rich in dietary fibre and calories which are good source of energy (Mboyal, 2011 and Nkamigbo *et al.*, 2018). Maize is a vital food crop cultivated in most parts of the world, especially low- and middle-income countries (LMICs). Globally, it is the third most grown cereal crop that serves as the primary source of food to more than one billion people (International Institute of Tropical Agriculture (IITA), 2019). It provides a staple food, and being used as a source of income for many population in the developing countries. The way maize is processed and consumed greatly varies from country to country, with maize flour and meal being the most popular products. It is an important source of carbohydrate for human diets in developing countries and for animal feed in the developed world (Undie, Uwah and Attoe, 2012).

Marketing involves all processes in the movement of products that consumers need from the point of production to the point of purchase. Marketing is concerned with all stages of operation which facilitate the movement of commodities from the farm to the consumers (Isibor, Nkamigbo and Ekeke, 2021). Marketing has economic value because it gives form, time and place utility (Asogwa and Okwoche, 2012 and Nkamigbo, Ugwumba and Okeke, 2019). Efficient marketing plays a crucial role in an economy (Isibor *et al.*, 2021). This role becomes more evident in areas where there is high rate of urbanization. Agricultural marketing is a form of marketing that includes all goods and services related to agriculture. These products will absolutely or indirectly support the effort to produce and deliver agricultural products from the farm to the consumer. Dry maize marketing, is concerned with all the procedures that assist movement of the product from the producer to the final consumer.

MATERIALS AND METHOD

The study was carried out in Nnewi North local Government Area (LGA) of Anambra State. Nnewi is a metropolitan city that is made up of four

autonomous communities namely Otolo, Uruagu, Umudim and Nnewichi. It has a population of 391,227 (NPC, 2006), land square of 2789Km₂, latitude 6 000, 60,000N and longitude 60 54, 59.990E. Nnewi is the second largest city in Anambra State and it is referred to as Japan of Africa due to the presence of several Large and small scale industries, automobile production company, automobile and other markets. It is widely circulated that Nnewi metropolis houses over 2 million people and this has boost the economic and marketing activities of several agricultural produce especially dry maize (Nkamigbo, Chiekezie and Ozor, 2019 and Wikipedia, 2022). The population of the study was taken from the registered maize traders in Nnewi North, LGA of Anambra State. A two-stage sampling procedure was employed to select respondents for the study. In the first stage four (4) major daily markets were randomly selected which include Eke-Amaobi, Afor-Uruagu, Ori-Agbor and Afia – Okponoegbu. In the second stage (30) dry maize marketers were randomly selected from each of the four selected markets giving a total number of (120) respondents. Data for the study were collected from primary source. Primary data were obtained using a questionnaire administered to the marketers from the list of dry maize marketers complied that constituted the sampling frame for the study. Descriptive statistics such as mean, percentages and frequency, Enterprise Budgeting, gini coefficient and relative importance index were used for analysis.

Model specification

The model was used to measure the influence of socio-economic characteristics on net marketing income of farmers. Socioeconomic factors are as follows:

NMI=Net Marketing Income

AGE= Age in years

GEN = Gender (dummy: male =0; female = 1)

MRS = Marital status

EDU = Educational level

SOF = Source of finance

HOS = Household size (number of persons living together)

TOU = Membership of trade union (dummy: member =0, nonmember = 1)

EXP = Marketing experience

MKS = Marketing cost

PDP = Product price

e = Stochastic error term.

It is implicitly represented below as

$$NMI = \beta (AGE_1, GEN_2, MRS_3, EDU_4, SOF_5, HOS_6, TOU_7, EXP_8, MKS_9, PDP_{10}, \dots, e_1)$$

The budgetary technique was used to determine the profitability of the marketers

$$NER = \sum P_{y_i} Y_i - (\sum P_{x_{ij}} X_{ij} + \sum F_{ij})$$

Where \sum = sum

$P_{y_i} Y_i$ = unit price \times quantity of i^{th} respondents sales = Total revenue (TR) for i^{th} respondent.

$P_{x_{ij}} X_{ij}$ = Prices \times quantities of i^{th} respondents variable inputs = total variable cost (TVC) for j^{th} respondent.

F_{ij} = Depreciation values of equipment, annual rent for store, interest on loan, for j^{th} respondents = Total fixed cost (TFC) for j^{th} respondent.

TC = Total cost (TVC + TFC).

The marketing efficiency of marketers' was achieved using Sherpherd-Futrell technique.

The marketing efficiency

$$ME = \frac{TC}{TR} \times 100$$

where

ME = coefficient of marketing efficiency

TC = Total marketing cost incurred

TR = Total value of product sold

Gini-coefficient = $1 - \sum XY$

Where

X = the ratio of percentage of respondents

Y = the ratio of cumulative percentage

\sum = summation

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Dry Maize Marketers

The socio-economic Characteristics of the marketers in Table 1 shows that the majority of the respondents (58.33%) falls within the age bracket 41-50years. This implies that the enterprise is dominated by younger ones who are more active and stronger considering the bulky and heavy nature of the

bags of dry maize. There is a female dominance (70.83%) in the study area. This agrees with Jimoh, Akintude, Kehinde, Agboola and Alabi, (2021) who reported that female dominated maize marketing in their study area. The findings revealed that 70% of the marketers were married with household size of (4-6) at 58.33%. This agrees with Agbugba, Nweze, Achike and Obi (2013) who stated that the marketers are of child bearing age. This result of Educational level reveals that the marketers are literate. This agrees with (Nkamigbo, 2018; Nkamigbo and Isibor, 2019) who stated that educated people are more enlightened, well conversant with efficient marketing of their marketable surplus and are able to reduce marketable loss. The marketing experience reveals that the marketers were not new entrants and mostly source their finance from friends and relatives. Majority of the maize marketers were traders (91.83%) which belong to their own union.

Table 1 Socioeconomic characteristics of the marketers

Variables	Frequency	Percentages
Age		
20 – 30	15	12.5
31-40	25	20.83
41-50	70	58.33
51-60	10	8.33
Gender		
Male	35	29.17
Female	85	70.83
Marital Status		
Single	16	13.33
Married	84	70.00
Widow/Divorce	20	16.66
Educational Status		
Primary	32	26.66
Secondary	73	60.83
Tertiary/OND	15	12.5
No Formal	0	0
Household		
1-3	30	25
4-6	70	58.33
7-9	15	12.5
10 and above	5	4.17
Marking Experience		
1-3	14	11.6
4-6	30	25
7-9	66	55
10 and above	10	8.33
Occupation		

Trading	91	75.83
Farming	9	7.5
Civil Service	15	12.5
Artisan	5	4.17
Source of Fund		
Personal Saving	25	20.83
Friends and Relatives	85	70.83
Corporative/Isusu	10	8.3
Commercial	0	0
Trade Union		
Members	110	91.66
Non members	10	8.33

Source, Field Survey, 2022.

Estimated monthly profitability of dry maize marketing

The enterprise budgeting analysis was used to determine the monthly profitability of dry maize marketing in Nnewi. The result of the analysis indicates the total cost (TC), total revenue (TR), total variable cost (TVC), total fixed cost (TFC), gross margin (GM), net marketing income (NMI), mean net marketing income (MNMI), and net return on investment (NROI), is presented in Table 2. The analysis revealed that out of the total cost of ₦13, 420,058 spent by the marketers, stock purchase constituted (91.50%) while the least expense was nylon bag (0.13%). On enterprise profitability, marketers realized ₦19, 579,000.00 after spending a total variable cost of ₦12, 986,740.00 and total cost of ₦13, 420,058. The enterprise generated a gross margin of ₦6, 592,260.00, net marketing income of ₦6, 158,941.87 and net return on investment of 0.45. The implication of the net return on investment is that the marketers return 55 kobo for every 1 Naira invested in the enterprise. The overall profitability indicators (gross margin, net marketing income and net return on investment) proved that dry maize marketing was a profitable enterprise in the study area.

Table 2 Estimated monthly profitability of dry maize marketing

Variables	Frequency(₦)	Percentage
Total Revenue TR	19,579,000	
Variable Cost (VC)		
Purchase	11,885,000	91.50
Transportation	960,000	7.39

Loading	51,200	0.39
Off-Loading	32,000	0.23
Recharge Card	42,000	0.32
Nylon	16,540	0.13
Total Variable Cost TVC	12,986,740.00	100
Fixed Cost (FC)		
Monthly Shop Rent	300,000.00	69.23
Storage Expenses	23,500.00	5.42
Association Dues	11,500.00	2.65
Depreciation on equipment, Table, wheel barrow, basket, painter, and sieve	7818.13	1.80
Interest on Loan	29,500.00	6.80
L.G.A Charges	61,000.00	14.077
Total Fixed Cost (TFC)	433,318.13	
Total cost (TC) = (TVC+TFC)	13,420,058.13	
Gross Margin = TR –TVC	6,592,260.00	
Net Marketing Income (NMI) GM-TFC	6,158,941.87	
Return on Investment TR/TC	1.45	
Net Return on Investment NMI/TC	0.45	
Gross Ration= TC/TR	0.685	
Marketing Efficiency = TC/TR*100/1	68.5%	

Source, Field Survey, 2022.

Marketing Efficiency.

The Shepherd-Futrell technique was used to determine the co-efficient of marketing efficiency of dry maize in the study area. If calculated marketing efficiency value is equal to one, marketing is efficient, if the marketing efficiency is less than one, it implies inefficient marketing while if the marketing efficiency is more than one it implies that marketing is highly efficient. The result of the analysis of marketing efficiency indicated that the marketers' attained marketing efficiency level of 68.5%. The implication is that there existed inefficiency in the marketing of dry maize in the study area. This could be as a result of far distance that dry maize travel before it gets to Southeast and the activities of herdsmen/farmers clash that destroys farm land making the product high and unnecessary scarcity.

$$ME = \frac{TC}{TR} \times 100$$

$$= \frac{13,4200,058.13}{19,579,000} \times \frac{100}{1}$$

$$= 68.5\%.$$

Market Structure of the Marketers

Marketing structure measures the relative degree of income distribution among sellers of dry maize in the study area. Gini coefficient was used to measure the market structure. The result of analysis of market structure using gini coefficient is shown in Table 3. The result revealed a gini coefficient of 0.82. This implies a high level of income distribution (sales margin) in the distribution of income among the marketers and high concentration of sales in the hand of few marketers, hence the existence of imperfect competition in the market. The result is an indication that some dry maize marketers will influence the price of dry maize in the study area. This is in agreement with Agbugba, Nweze, Achike and Obi (2013) who reported a gini coefficient of 0.79 for Okra retailers where powerful Okra retailers dominate the market, a sign of inefficiency in the market. The results contracts the findings of Jimoh, Akintude, Kehinde, Agboola and Alabi, (2021) who reported gini coefficient of 0.3190 and 0.312 for wholesalers and retailers of dry maize in their study area

Table 3. Market structure of dry maize marketers

Monthly sales	F	X _i	Cumulative	TMS	Y _i	X _i Y _i
30,000-98,500	32	0.266	0.266	4,568,433.33	0.233	0.061
98,600- 167,100	21	0.175	0.441	3,915,799.92	0.199	0.034
167,200- 235,600	22	0.183	0.624	5,234,217.86	0.267	0.048
235,700-304,100	19	0.158	0.782	1,960,826.06	0.100	0.015
304,200-372,600	11	0.091	0.873	1,017,347.9	0.051	0.004
372,600 and above	15	0.125	0.998	2,882,374.95	0.147	0.018
Total	120			19,579,000		0.18

Source: Field Survey, 2022. Gini-coefficient = $1 - \frac{\sum X_i Y_i}{TMS^2} = 1 - \frac{0.18}{0.233^2} = 0.82$

Constraints to dry maize marketing

The constraints associated with dry maize marketing in the study area were shown in Table 4. The findings revealed that the most perceived constraint among the marketers is price fluctuation with mean score of 3.01. This maybe as a result of high cost of materials in planting of dry maize and also the clash between the farmers and herders in most of the producing zones. Followed is inadequate capital with a mean score of 2.93 and delay in transportation (2.84). This agrees with Ozor, Nkamigbo and Chiekezie (2019) who reported that lack of capital and transportation problems affect

marketing of dry maize in their study area. The delay maybe as a result of high insecurity situation which has sabotaged the high ways of Northern part of the Country to the East. Another perceived constraint of importance is Irregularity in market days in most markets due to sit at home syndicates which the marketers complained that it affects their sales. Followed by High cost of transportation (2.49), Pests and disease infestation (2.40) and inadequate storage facilities (2.01). Other constraints are poor road network, low number of buyers, poor sales, goods adulteration many other buyers and bulkiness of goods which are less significant in the study area.

Table 4 Constraints to dry maize marketing

Parameter	Mean score	Rank
Irregularity in market days	2.60	4 th
High cost of transportation	2.49	5 th
Delay in transportation (Sit-at-home)	2.84	3 rd
Pests and disease infestation	2.40	6 th
Price fluctuation	3.01	1 st
Inadequate storage facilities	2.01	7 th
Inadequate capital	2.93	2 nd

Source, Field Survey, 2022.

SUMMARY AND CONCLUSION

The study examined analysis of dry maize (*zea mays*) marketing structure and profitability in Nnewi North local government area of Anambra State, Nigeria. It described the socio-economic characteristics of the marketers, determine the profitability of dry maize marketing, determine the marketing efficiency of dry maize marketing, determine the market structure of dry maize and identify the constraints faced by the dry maize marketing in the study area. Primary data were collected by means of structured questionnaire and data were analyzed using descriptive and inferential statistics (mean, frequency distribution, percentages, flow charts and mean ranking and ratio), Enterprise Budgeting, Sherpherd-Futrell technique and Gini coefficient. The findings of socio-economic characteristics revealed a female dominance. The enterprise generated a gross margin of ₦6, 592,260.00, net marketing income of ₦6, 158,941.87

and net return on investment of 0.45. The overall profitability indicators (gross margin, net marketing income and net return on investment) proved that dry maize marketing was a profitable enterprise in the study area. The result of the analysis of marketing efficiency indicated that the marketers' attained marketing efficiency level of 68.5%. The result revealed a gini coefficient of 0.82, hence the existence of imperfect competition in the market. Price fluctuation was the most perceived constraint.

CONCLUSION

Dry maize marketing in the study area proved a profitable enterprise looking at the overall profitability indicators (gross margin, net marketing income and net return on investment). Also the marketers returned 55 kobo on every #1 invested in the enterprise proving the business profitable. Addressing the most perceived constraints identified in the study area will also improve the welfare of the marketers.

RECOMMENDATION

- i. Government should of necessity address the issue of farmers/herders clash so as to reduce the price of the produce.
- ii. Government and relevant financial institutions should provide soft loans at a reduced interest to strengthen the enterprise.
- iii. Government should address the issue of bad roads and provide a cheaper means of transportation from North to East in other to improve their income.
- iv. Stakeholders in the Southeast should address the economic sabotage of sit at home.

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