

MARKETING MARGIN AND EFFICIENCY OF WATERMELON MARKETING IN NIGER DELTA AREA OF NIGERIA

ONYEMAUWA C.S.

Department of Agricultural Economics, Federal University of Technology, Owerri, Imo State, Nigeria

Abstract

The study analyzed the marketing efficiency and determinants of the net margin of marketers of watermelon in Niger Delta area of Nigeria. The study focused on Southern Ijaw, a major Niger Delta region of the country. Data for the study were collected from forty randomly selected watermelon marketers in the survey area with the aid of questionnaire as the data collection instrument. Data were analyzed using tables, percentages, mean, frequency distribution, gross margin and net return analysis as well as the percentage efficiency index and the ordinary least squares multiple regressions technique. The result shows that about 70% of the respondents are within their active age of life (21–40 years) and that an average respondent have had two and half years marketing experience while the mean number of years an average respondent spent in school was just 7 years. The study shows that watermelon marketing system in the area is inefficient while a net margin of about 42% prevails in the area. The statistically significant variables that influence the net marketing margin of the respondents were found to be marketing experience, depreciation cost of marketing equipment, cost of produce and marketing cost. The marketing enterprise is profitable in the area. The major problems encountered by the respondents include seasonality and limited supply, paucity of capital and spoilage of fruits. Improved marketing system and establishment of a microfinance bank in the area are necessary.

Key words: watermelon, marketing, efficiency, margin, determinants

INTRODUCTION

Watermelon (*citrullus lanatus*) is one of the most important fruits cultivated in the tropics. It is consumed throughout the world and is mainly cultivated in the tropical countries. Watermelon is good for all human consumption and livestock needs as it contains most of the basic daily nutritional requirements of the body and other essential nutrients that prevents human health problems like cancer, stroke, high blood pressure, heart attack and other cardiovascular disease. Watermelon could be eaten raw when it is fresh after being washed and sliced into bits. It has preferably nutritional values to it's consumers and supplied the body with low calories, lycopene which is an antioxidant that prevents cancer and other diseases, vitamin A, vitamin C, protein, carbohydrate, fibre, potassium, calcium, iron, fats and up to 92 mills of water. These are all necessary for good health and development of human and livestock needs. Hence, it is referred to as to "the chief of the world's luxuries and king over all fruit of the earth" (USDA, 1998). Watermelon can be cultivated best on sandy loam soil with good organic content having a pH range of 5.5–6.5. They are resistant to dry conditions and adapt to 25°–30°C temperature range. Ex-

cessive or high rainfall discourages flowering and high humidity tampers with its growth and development. It is usually planted in the dry season when the soil is warm and frost free which mostly results to larger fruits of watermelon. Seeds are directly sown in situ in holes or seedlings from nursery are transplanted in the farm. At early stage, pruning is done to encourage branching and regular watering is done especially during dry periods. Watermelon takes about 70–85 days range to mature and is harvested.

In Southern Ijaw area of Bayelsa State, most households are less dependent on watermelon as a constituent of their diets. This is mainly because it is seldom grown in the area due to the presence of rivers, swamps and other water bodies surrounding the area coupled with the excessive rainfall which inhibits watermelon production and which accounts for their engagement mainly in fishing as the main occupation of the people in the area.

Important research questions are needed to be answered concerning watermelon. For instance, what are the current sources of watermelon consumed in the area? Since the edaphic and climatic factors in the area are not favourable for the growth of the fruit crop, how does the product move from producers to consumers? What costs

are involved in the movement and to what extent do they affect the margins earned by both producers and traders so that the right incentives are provided to increase production and efficient marketing by traders? What are the determinants of the margin added to the value due to marketing? What are the major constraints to improved watermelon marketing? Answers to the above questions are necessary in order to effectively plan for improvements in watermelon production and marketing.

The quantity of watermelon available for consumption and the price paid by consumer depends on how efficient the marketing system for watermelon functions. Incidentally, marketing in Nigeria is ineffective and inefficient due to inadequate infrastructures and social amenities such as transportation facilities, communication system, good storage facilities and good pricing systems (FAO, 1997). The case of Southern Ijaw area of Bayelsa State is not likely to be different. Marketing of watermelon is the main source the product can get to the reach of consumers in the study area. This study therefore becomes relevant and timely.

MATERIALS AND METHODS

This study was carried out in Southern Ijaw Local Government Area of Bayelsa State. Oporoma, Amasoma, Korokorosei, Olugbobiri, Otuan, Opuama, Ukubie and Ekowe were the towns purposively selected for the study due to significant watermelon marketing in the areas.

Southern Ijaw L.G.A. is situated about 10 km from the coast of the Atlantic Ocean. It is located on latitude 5°3' North and longitude 7°54' East of the equator. The study area has a population of 319 413 (NPC, 2006) and is divided into eight sub-local government areas or development centers. Southern Ijaw L.G.A is bounded on the north by Yenagoa L.G.A and Sagbama L.G.A, on the south by Brass L.G.A and the Atlantic Ocean, on the east by Ogbia L.G.A and on the west by Ekeremor L.G.A all in Bayelsa State. The area is almost entirely below sea level and is a riverine area. Most of the land is covered by water-bodies such as rivers, lakes, creeks, swamps etc. with several meandering network flowing to the Atlantic Ocean via River Nun and other rivers in the study area.

Southern Ijaw L.G.A is located within the sub-equatorial climate and the Atlantic Ocean influencing the area with warm humid air. There is also a seasonal dry air from the North-East mostly during hamattan period. The yearly rainfall of the area is at 3 484 mm and the annual temperature is at 29°C. The vegetation is that of moist low land forest and the vegetation sub-region of high forest. The soil type in the study area is mostly alluvial soil. The

major occupations of the people in the area are mostly fishing, farming (basically on subsistence level), lumbering and civil service and other minor occupations which includes palm wine, hunting, carving, weaving, oil palm cutting and trading. The area has thick forest with arable land for cultivation of various food crops such as plantain, cocoyam, cassava, Okro, sugar cane, pepper, water yam, potatoes etc and cash crop, such as oil palm, timber, coconut, cocoa etc. Livestock such as poultry, piggery, sheep and goat, are kept minimally. Some farmers also engage in local product processing, marketing, as well as distribution of farm products to agro-processing industries in their locality and as well to urban areas while others channel them to final consumers.

Eight markets were purposively selected. They include Oporoma market, Amasoma market, Korokorosei market, Olugbobiri market, Otuan market, Opuama market, Ukubie market and Ekowe market. A list of all the watermelon marketers in each of the eight selected markets was compiled by the researcher. From this list serving as the sampling frame, a simple random sampling technique was employed to select five (5) watermelon marketers in each of the eight towns, thereby, making a total sample size of forty (40) respondents used for the study.

Data for this study were collected by the researcher from primary data and secondary information. The main data collection instrument was questionnaire supplemented with oral interview schedule mostly for illiterate respondents. Field data collection exercise lasted for five months. The data include age, sex, marital status level of education, marketing experience in watermelon, source of income and amount needed to start watermelon trade. Costs and returns of respondents such as marketing costs (transportation cost, handling cost, fees and levies paid), depreciation cost of marketing equipment used, cost of produce, selling price (₦/fruit, ₦/slice), number of slices per fruit or ball, among others. Data on Marketing channel i.e. source of produce

Materials used such as table, basket, bag, knife, trays, bucket and basin, umbrella. marketing infrastructure such as electricity, pipe-borne water, market stalls, road network, stores, etc.; Source of information about watermelon such as from fellow traders, media (news paper, radio, television shows, pamphlets etc) and Problems encountered in watermelon marketing were also collected

Secondary information were also collected from the ministry of Agriculture and Natural Resources and other Agricultural Institutes such as FAO, ADP, Agricultural and Economics Journals, magazines, textbooks on marketing and the Internet.

Statistical tools such as tables, mean, frequency distribution, percentages as well as gross margin and net returns analysis, the ordinary least square multiple re-

gression technique and percentage efficiency index were used to analyze data collected.

The following models were used in achieving the major objectives of the study;

The straight line method of depreciation was used to compute the depreciation of marketing equipment used. It is estimated as follows:

$$Dp = \frac{Co - Sv}{UL}$$

Where:

Dp = Value of depreciation

Co = Total cost price of equipment

Sv = Salvage value

UL = Useful life (number of years the equipment is used in marketing)

Note: Salvage value was assigned zero in this work.

Factors that affect the marketing margin of the respondents was achieved using the ordinary least square multiple regression technique, specified as follows,

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, e)$$

Where:

Y = Marketing margin (₦)

X₁ = Age (years)

X₂ = Marketing experience (years)

X₃ = Number of years spent in school

X₄ = Household size (number of persons)

X₅ = depreciation of marketing equipment (₦)

X₆ = Cost of product (₦)

X₇ = Marketing cost (₦)

e = random error term

Marketing margin and marketing efficiency were achieved using percentage marketing margin and efficiency index specified as follows:

$$\% MM = \frac{P_r - P_f}{P_r} \times \frac{100}{1}$$

Where:

% MM = percentage marketing margin

P_r = retail price (consumer price)

P_f = farm gate price

Marketing efficiency was computed using the formula given by Olukosi and Isitor (1990). The formula is:

$$\% M.E. = \frac{\text{Net marketing margin}}{\text{Total marketing cost}} \times \frac{100}{1}$$

Where:

% M.E. = percentage marketing efficiency.

Note: If M.E. = 1, marketing is efficient

If M.E. < 1, marketing is inefficient

If M.E. > 1, marketing is highly efficient

RESULTS AND DISCUSSION

Results of the socioeconomic features of the respondents as presented in Table 1 is consistent with the findings of various researchers (Kisekka, 1981; Nonyelu, 1990; Saito and Spurling, 1992; Uwadie, 1993; Onyemauwa et al., 2007) that women has continued to dominate various agricultural production and marketing activities in recent time. The table shows that 75% of watermelon marketers in the areas are women and that about 68% of the respondents are married. The sampled crop is a food crop and in African society food has continued to occupy an important position among the womenfolk in many households. Most of the respondents are new entrants as 55% of them have had no more than 2 years marketing experience as shown in Table 1. Significant percentage of the respondents have acquired good level of education as about 55% of them have spent at least 7 years to obtain formal education; while 80% of them are still in their active stage of life (21–40 years) as Table 1 shows.

The marketing process of watermelon involves several costs incurred by the marketers in the process of performing their functions as middlemen who direct the flow of watermelon from producers to ultimate consumers. The major costs incurred by marketers are depreciation costs of equipment used, marketing costs such as transportation and handling cost. These contribute to the overall costs of the traders in adding values or creating form, time, place and possession utilities to watermelons.

Tab. 1: Socioeconomic features of the respondents

Variable	Frequency	Percentage
Gender		
Male	10	25
Female	30	75
Level of Education (yrs)		
1–6	18	45
7–12	20	50
13–18	2	5
Household size (persons)		
1–4	26	65
5–8	11	27.50
9–12	3	7.50
Marketing experience (yrs)		
1–2	22	55
3–4	16	40
5–6	2	5
Age (yrs)		
21–30	20	50
31–40	12	30
41–50	8	20
Marital status:		
Single	13	32.50
Married	27	67.50

Source: Field Survey Data (2008)

Tab. 2: Determination of costs and returns per unit of fruit

Item	Value (₦ per fruit)
Cost of watermelon ball	419.68
Marketing cost	10.74
Total variable cost	482.10
Total fixed cost	0.62
Total cost	482.72
Total revenue	688.56
Gross revenue	206.46
Net revenue	205.84

Source: Field survey data (2008)

A study was conducted on the costs incurred by the survey traders in order to ascertain the quantities and naira per fruit of watermelon bought and sold by different watermelon marketers with their regards to economic implications. The researcher observed that depreciation cost is the main fixed cost of traders and they do not pay rent but stores their products in their homes, and do not belong to associations and pay levies because they display products on roadside near their homes.

Table 2 shows the mean quantity of watermelon bought and sold during the survey period, variable costs, total cost, total returns, gross return and net returns per unit of watermelon.

The result of the study presented in Table 2 shows that cost of produce was the major cost component of the respondents as it accounts for about ₦ 319 or 86.94% of the total cost per unit of fruit sold while fixed capital made the most insignificant contribution of ₦ 0.62 or 0.13%, to total cost per unit of fruit marketed in the area. The table shows that about ₦ 483 was spent in buying and marketing an average sized fruit in the area while the same fruit was sold for about ₦ 689. An average marketer made a net return of about ₦ 206 for each watermelon ball bought, marketed and sold.

Total returns represent the selling or retail price, the gross returns the difference between retail price and total variable cost. The Net Returns which is the profit and is obtained by Total Returns less Total cost or Gross Returns less fixed cost per fruit.

Ordinary least square multiple regression technique was used to isolate the factors that affect the marketing margin of the respondents. In order to compare and ac-

Tab. 3: Results of multiple regression analysis of marketing margin

Variable	Linear function	Semi-log function	Double-log function	Exponential function
Intercept (constants)	-343.013 (-0.2547)	-56828.3 (-9.0294)	1.6261 (3.3993)	7.5036 (35.5316)
X ₁	-40.0321 (-0.8776)	224.7994 (0.1200)	-0.0418 (-0.2942)	-0.0021 (0.2867)
X ₂	607.7416 (2.0040)	731.7057 (0.9169)	0.1139 (1.8771)*	0.0885 (1.8609)*
X ₃	215.6865 (0.7661)	458.4194 (1.3703)	0.0185 (0.7269)	0.0375 (0.8497)
X ₄	72.7209 (0.5280)	-503.225 (-0.7425)	0.0225 (0.4375)	0.0140 (0.6468)
X ₅	0.8259 (2.5221)*	-96.8733 (-0.1237)	0.0918 (1.5425)	0.0002 (3.2338)*
X ₆	0.3542 (8.7613)*	7 468.816 (10.4265)*	0.6868 (12.6153)*	1.94E.05 (3.0579)*
X ₇	0.6538 (1.3289)	-538.683 (-0.7056)	0.0275 (0.4736)	0.0002 (2.6776)*
N	40	40	40	40
R ²	0.9673	0.9427	0.9709	0.9293
F-value	135.0962	75.1446	152.4479	60.0595
DW				1.935
Standard error	1052.398	1393.013	0.1059	0.1650

Figure in parenthesis are the t-ratios; * = significant at 5% level of significance; Dw = Durbin Watson statistic
Source: Field Survey Data (2008)

cess in detail the necessary parameters, four functional forms viz; linear function, double-log function, semi-log function and exponential function were fitted to the data. The form that gave the best fit into the regression line following the statistical, econometric and economic criteria (Olayemi, 1998). The F-distribution table was used to test the significance of the coefficients of multiple determinations (R^2) while the students' distribution table was used to test the significance of coefficients of the explanatory variables. Out of the four functional forms, the exponential functional form was selected as the lead equation and used for further analysis.

The results presented in Table 3 shows that up to 93% of the variation in the marketing margin is explained by the explanatory variables included in the model. The variables such as marketing experience (X_2), depreciation cost (X_5), cost of produce (X_6) and marketing cost (X_7) are the statistically significant variables or factors influencing marketing margin among watermelon respondents sampled. They are all positively related to marketing margin. This is an indication that their increase brings about a higher marketing margin.

The mathematical formula for calculating marketing margin is as follows:

$$MM = P_r - P_f$$

Where:

MM = marketing margin

P_r = Retail or consumer price per unit of fruit

P_f = farm-gate price per unit of fruit

From Table 2, the cost price and selling price are ₦ 419.68 and ₦ 688.56 per unit of fruit respectively.

Therefore,

$$\begin{aligned} \text{marketing margin (MM)} &= P_r - P_f \\ &= ₦ (688.56 - 419.68) \\ &= ₦ 268.88/\text{fruit} \end{aligned}$$

Percentage marketing margin of watermelon would be

$$\begin{aligned} \% \text{ MM} &= \frac{P_r - P_f}{P_r} \times 100 \\ &= \frac{688.56 - 419.69}{688.56} \times 100 \\ &= \frac{268.88}{688.56} \times \frac{100}{1} \\ &= 39.05\% \end{aligned}$$

This implies that for every ₦ 100.00 paid by consumers, ₦ 39.05 covers marketing cost and profit while ₦ 60.95 or 60.95% of every ₦ 100 paid by consumers accrues to the watermelon marketers or suppliers.

The formula for calculating marketing efficiency is given as:

$$M.E. = \frac{\text{Net marketing margin}}{\text{Total marketing cost}}$$

From Table 2,

$$\begin{aligned} \text{net marketing margin} &= 688.56 - 419.68 \\ &= 268.88 \end{aligned}$$

$$\text{Total marketing cost} = 482.72$$

Hence,

$$M.E. = \frac{268.88}{482.72} = 0.557$$

Therefore,

$$\% M.E. = 0.557 \times 100 = 55.7\%$$

A marketing efficiency of 0.557 is less than 1, the marketing system of watermelon in the study area is, therefore, not efficient.

CONCLUSION

The study shows that marketing is the only means through which the riverine Southern Ijaw in the Niger delta region of South – South Nigeria have access to those food items that are not supported by the climatic and edaphic factors in the area. Though the respondents have favourable socioeconomic features with respect to watermelon marketing, an inefficient marketing system prevails in the area. Though the suppliers receive about 58% of each unit of money paid by consumers for a unit of watermelon fruit, a percentage marketing margin of about 42%, in the mind of the researcher, is relatively high. The statistically significant factors that influence the marketing margin of watermelon in the area were identified as marketing experience, depreciation of marketing equipment, cost of product, and marketing cost. These factors should be emphasized in the marketing and nutritional policy framework of the area if significant success is to be recorded. Seasonality in supply, limited supply, and high cost of product and lack of capital were the major constraints of the marketers in the area. Effective transportation, storage and handling procedures; formation of cooperatives among the marketers and partnership with microfinance institutions will likely reduce these major marketing constraints in the area.

REFERENCES

- FAO (1997). Agriculture, Food and Nutrition for Africa: A Resources Book for Teachers of Agriculture. FAO Publishing Management Group, Rome.

- KISSEKA M. (1981): The Role of Women in Socioeconomic Indicators as Instruments of Social Analysis: The Case of Nigeria and Uganda. In: Women Development Indicators. UNESCO, Paris.
- NONYELU C. (1991): A report of study tours of three countries (Zimbabwe, Malawi and Kenya): Women in agriculture component. Presented at the Post Study Tour Workshop of Strengthening Agricultural Extension in Nigeria, 23–24 Jan., Moor Plantation, Ibadan, Nigeria.
- NPC (National Population Commission) (2006). Census Publication.
- OLAYEMI J.K. (1998): Elements of Applied Econometrics. El Shaddai Global Ventures Limited, Ibadan, Nigeria.
- OLUKOSI J.O., ISITOR S.V. (1990): Introduction to Market and Price; Principles and Applications. Agitab Publishers, Zaria.
- ONYEMAUWA C.S., EZE C.C., OGUOMA N.N.O., EHIRIM N.C., OSUGIRI I.I. (2007): Allocative efficiency and output elasticity of crop mixture farmers by gender in Nwangele, Imo State, Nigeria. *International Journal of Agriculture and Rural Development*, 10 (2): 50–55.
- SAITO K.A., SPURLING D. (1992): Developing Agricultural Extension for Women Farmers. Worldbank, Washington, D.C.
- USDA (United States Department for Agriculture) (1998). *Emperical Studies of the Organization and Performance of Industries*.
- UWADIE S.A. (1993): Mechanisms for Improving the Effectiveness of Tiv Womens' Participation in Agriculture through Farmer Education. (Ph.D Dissertation) University of Nigeria, Nsukka, Nigeria.

Received for publication on January 4, 2010

Accepted for publication on June 6, 2010

Corresponding author:

C.S. Onyemauwa

Department of Agricultural Economics

Federal University of Technology

P.M.B.1526, Owerri, Imo State

Nigeria

e-mail: csonyemauwa@yahoo.com