
Socio-economic and Institutional Determinants of Watermelon Marketing in Enugu State Nigeria

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Ukwuaba, Ikenna Charles

Department of Agricultural Economics

University of Nigeria, Nsukka, Enugu, Nigeria

E-mail: ikenna.ukwuaba@unn.edu.ng, ukwuabaikenna@gmail.com

Phone: +2347030362033

Agbo, Festus Ugwuoke

Department of Agricultural Economics

Michael Okpara University of Agriculture, Umudike, Abia, Nigeria

E-mail: fuagbo4real@yahoo.com

Phone: +2348066592181

Adeosun, Kehinde Paul

Department of Agricultural Economics

University of Nigeria, Nsukka, Enugu, Nigeria

E-mail: paul.adeosun@unn.edu.ng

Phone: +2348067359255

Abstract

The study analysed the socio-economic and institutional determinants of watermelon marketing in Enugu state, Nigeria. The specific objectives were to: describe the socio-economic characteristics of watermelon marketers (wholesalers and retailers) and determine the factors influencing the net marketing returns of the marketers. Multistage sampling technique was employed in selecting eight watermelon markets based on the volume of watermelon traded in the markets. Primary data were collected from 160 watermelon marketers comprising 96 retailers and 64 wholesalers with the aid of well-structured questionnaire. Data collected were analysed using descriptive statistics and multiple regression model. Results showed that watermelon marketing was dominated by the married (76.25%), literates (97.5%) and females (78.13%) with the mean age and marketing experience of 47 and seven years respectively. The result from regression shows that product price (0.581) and transportation cost (-2.609) were statistically and significantly influenced wholesalers' net marketing income, while product price (1.501), educational level (-0.584), storage cost (-0.131), packaging cost (-0.077) and market information (0.057) were statistically and significantly influenced retailer's net marketing income. There exist potentials in watermelon marketing contributing positively to poverty alleviation, hence, there is need as for market intermediaries to improve their technical knowledge and skills in marketing of watermelon and other perishables through training; this is to ensure that the marketing system becomes more responsive to consumers' demand.

Keywords: Socio-economic, institutional factors, watermelon, marketers, Enugu State

Introduction

The importance of the socioeconomic and institutional factors in the production and marketing of agricultural products cannot be over emphasized. Such factors like access to credit, access to market information, as well as the sex, age, farming or marketing experience and income of the farmers are pivotal to the overall efficiency or otherwise in the agricultural sector, especially in vegetable production and marketing.

Watermelon (*Citrullus lanatus*) is one of the world's most important vegetables, grown both for its fruit and the vegetative parts which are highly nutritious (Schippers, 2000). It belongs to the cucurbit family commonly known as *Cucurbitaceae*; it is an important horticultural crop, often known for its sweet and juicy fruit, grown commercially in areas with long frost-free warm climates all over the world (Prohens & Nuez, 2008). Watermelon global consumption is greater than that of any other cucurbit (Paris, 2016) China is the leading producer of watermelon in the world; it provides one third of the total watermelons in the world, followed by Iran, Turkey, Brazil, Egypt, United States, Uzekistan, Algeria, Russia and Vietnam completes the top ten producers in the world (FAOSTAT, 2017).

Ajewole (2015) reported that watermelon is highly relished as a fresh fruit worldwide due to its thirst-quenching attribute in addition to many other identified nutritional benefits. According to Oguntola (2006), watermelon is the most preferred among five other exotic vegetables such as cantaloupe, squash, cucumber and pumpkin examined in Ibadan Metropolis of Oyo State, Nigeria. The consumption of the commodity in the recent times has witnessed remarkable development as it cuts across all socio economic classes. It's potentials as a cash generating crop is significant for farmers as well as marketers especially those residing near the urban areas. Isibor and Ugwumba (2014) indicated that exotic vegetables production generally generate higher profit, provide more employment and income to the farmers than those of indigenous vegetables. Trevor (2008), in his study in Northern Ghana also noted that watermelon serves as an important source of revenue to farmers and marketers especially in times of unfavourable weather conditions since it is able to withstand harsh weather conditions as compared to other crops.

In Nigeria; watermelon is regarded as a minor crop, compared to other food and cash crops and thus, has attracted very insignificant marketing research attention. Nevertheless, watermelon reaches consumers through the marketing system. Marketing is concerned with all activities, which facilitate the movement of the commodities from the farms to the consumers. Therefore, increase in marketing activity of watermelon would enhance the provision of more and better produce at low price to increased number of consumers which would enable marketers to generate more income and increase welfare. Watermelon marketing has a large potential to enhance agribusiness development, generate income and employment opportunities that will lead to significant impact in the rural sector particularly for households in the minor producing areas like Enugu State. More so, watermelon marketing in Enugu State, Nigeria is an intervention strategy for the poor to earn extra income and source of livelihood especially for those living in peri-urban areas. Several studies have been conducted with respect to watermelon production in Africa; some focused on the

economic analysis of its production system (Adeoye *et al.*, 2011), income and factor analysis of watermelon (Oladele, 2015), traditional knowledge with respect to the cultivation and uses of watermelon in Mozambique (Munisse, Andersen, Jensen & Christiansen, 2011). Though Onyemauwa (2010), Kainga (2013), Isibor & Ugwumba (2014) and Olumide (2015) concentrated on the marketing margins and marketing efficiencies of watermelon in their studies in urban areas of South-West and South-South of Nigeria, available literatures showed that limited researches were conducted along the key socio-economic and institutional factors that determine the level of net marketing income of watermelon in Enugu State, Nigeria.

There is considerable variability in watermelon prices within the year due mostly to seasonal changes in the volume of production as it is mostly rain fed. The distribution and availability of exotic vegetables, including watermelon in the South eastern part of Nigeria tends to be inadequate and inefficient (Osondu, Nwadike, Ijioma, Udah, & Ugboaja, 2014). The product is rarely produced in Enugu State and its external influx could pose high cost of marketing on the product and implicitly the price of watermelon very exorbitant. In view of the rising demand for watermelon in the study area amidst inefficient marketing (FAO, 1997), therefore, it is pertinent and relevant to analyse the key determinants of the watermelon marketing in Enugu State, Nigeria. The study specifically sought to describe the socio-economic characteristics of watermelon marketers and determine the factors influencing net income of watermelon marketing.

Methodology

The study was conducted in Enugu State, Nigeria. Enugu State is one of the 36 States in Nigeria, located at the Southeast geopolitical zone of the country. It lies between latitudes 5⁰56'N and 7⁰05'N of the Equator and longitudes 6⁰53'E and 7⁰55'E of the Greenwich meridian (Enugu State Agricultural Development Programme [ENADEP], 2009). Enugu State shares boundaries in the East with Ebonyi State, in the North with Benue and Kogi States, in the South with Abia State and in the West with Anambra State. The State occupies a land mass of approximately 8,022.95 km² with a population of about 3,257,298 (National Population Commission (NPC), 2006; ENADEP, 2012). It has a tropical climate and experiences distinct wet and dry seasons with a total annual rainfall of about 1,700mm (Enugu State Government Official Gazette, 1997). The rainy season starts from April to October and dry season from November to March (Okorie, 2012).

Farming is the major occupation of the people in the rural areas while trading and civil service dominate the economic activities in the urban areas. The people are warm highly enterprising and could be found engaged in trade all over the country; mostly engaged in small scale farming and marketing of many agricultural produces. It has several markets both in the rural and urban areas where agricultural goods are sold. The state consists of 17 Local Government Areas (LGAs) and it is divided into six agricultural zones (AZs) (ENADEP, 2012).

Multi-stage sampling technique was employed in selection of respondents for this study. The first stage involved a purposive selection of four AZs (Enugu, Nsukka, Agbani and Enugu Ezike) from the six AZs in the State. This was done so as to select AZs with substantial volume of watermelon markets. In stage two, one extension block was purposively selected from each of the four AZs, giving a total of four extension blocks. The selection was based on the concentration of vegetables and fruits markets in the extension blocks. Stage three also involved a purposive selection of two markets where watermelons are sold in relatively large quantities in the extension blocks selected, this gave a total of eight markets (New Relief market, Ogbete market, Orié Orba, Obollo Afor market, Ikpa commodity market, Ogige market, Eke Agbani and Orié Awgu). Subsequently, from each of the selected watermelon markets, having obtained the sampling frame, 50% of watermelon marketers were randomly selected in each market to give a total sample size of 160 marketers, consisting of 64 wholesalers and 96 retailers.

Primary data were used for the study. The primary data were collected using a set of semi-structured and pre-tested questionnaire. The questionnaires were administered to the respondents with the help of research assistant familiar with the selected markets. The data for this study were analyzed using descriptive and multiple regression models.

The Ordinary Least Square was explicitly specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e$$

Where:

Y = Net Returns from watermelon marketing (Naira)

β_0 = intercept of Y

X₁ = Number of years spent in School (years)

X₂ = Marketing experience (number of years in watermelon marketing)

X₃ = Cost of produce (Naira)

X₄ = Transport cost (Naira)

X₅ = Storage cost (Naira)

X₆ = Packaging cost (Naira)

X₇ = Handling cost (Naira)

X₈ = Access to Market information (access =1, otherwise 0)

X₉ = Access to credit (access =1, otherwise 0)

X₁₀ = Market Association (membership =1, otherwise 0)

e = Error term or random disturbance

The four functional forms of the model were fitted with the data. The lead equation was selected based on statistical and econometric criteria including number of significant variables, magnitude of the F-ratio and R-squared (coefficient of multiple determinations) estimates and the standard error as well as consistency with the *a priori* expectations.

Linear function

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e$$

Semi-log function

$$Y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \beta_6 \log X_6 + \beta_7 \log X_7 + \beta_8 \log X_8 + \beta_9 \log X_9 + \beta_{10} \log X_{10} + e$$

Double-log function

$$\log Y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \beta_6 \log X_6 + \beta_7 \log X_7 +$$

$$\beta_8 \log X_8 + \beta_9 \log X_9 + \beta_{10} \log X_{10} + e$$

Exponential function

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2^2 + \beta_3 X_3^3 + \beta_4 X_4^4 + \beta_5 X_5^5 + \beta_6 X_6^6 + \beta_7 X_7^7 + \beta_8 X_8^8 + \beta_9 X_9^9 + \beta_{10} X_{10}^{10} + e$$

Results and Discussion

Socio-economic Characteristics of the Watermelon Marketers

The distributions of marketers according to socio-economic characteristics are presented in Table 1. The Table shows that 51.6% of wholesalers were males while 97.9% of the retailers were females. This implied that males slightly dominated the wholesale level of the market while the females dominated the retail level. The result could be as a result of few females being willing to take the risks of long distance trips, theft, transportation stress. The result is in agreement with Isibor and Ugwumba (2014) who reported that males dominated the wholesale market level, while females dominated the retail level of watermelon in Nnewi metropolis, Anambra State.

However, the result contradicted the finding by Agbugba (2014) who reported that marketing of vegetables at wholesale level were dominated by females in Enugu State. Table 1 also showed that about 44.38% of the marketers were within the age range of 41 to 50 years. The mean age of the wholesalers was 50 years and that of the retailers was 44 years, implying that typical marketers of watermelon in the area were in the economically active age group. The results indicate that the marketers were young and energetic and are able to deal with the exigencies of travels; thus can bear the stress and take the risks involved in the enterprise especially at the wholesale level. The majority of the wholesalers (90.6%) and retailers (66.7%) were married. Ani (2015) opined that marriage has a direct relationship with family stability; therefore, the high percentages of married respondents suggest that the watermelon marketers are stable and able to make good business decisions.

Table 1: Socio-economic characteristics of watermelon marketers

Variables	Wholesalers	Retailers	Total Marketers
	Percentage(n=64)	Percentage(n=96)	Percentage(n=160)
Sex			
Male	51.6	2.1	21.89
Female	48.4	97.9	78.13
Age (years)			
≤20	-	3.1	1.88
21-30	1.6	16.7	10.63
31-40	3.1	13.5	9.38
41-50	56.2	36.5	44.38
51 &>	39.1	30.2	33.75
Mean	50.02	43.83	46.7
Marital status			
Married	90.6	66.7	76.5
Single	1.6	26.0	16.25
Widowed	7.8	7.3	7.50
Household size			
1-3	6.2	22.9	16.25
4-6	45.3	43.8	44.38
7-9	45.3	30.2	36.25
10 -11	3.1	3.1	31.88
Mean	6.16	5.44	5.8
Educational status			
No formal education	-	4.2	2.50
Primary education	40.6	41.7	41.25
Secondary school	46.9	49.0	48.13
Tertiary	12.5	5.2	8.13
Marketing Experience (years)			
2-4	15.6	32.3	25.63
5-7	50.0	42.7	45.63
8-10	25.0	16.7	20
11-13	1.6	4.2	3.13
14-16	7.8	4.2	5.63
Mean	7.05	6.11	6.58
Major Occupation			
Farming	-	5.2	3.13
Civil Service	6.2	5.2	5.63
Trading	93.8	74.0	81.88
Student	-	15.6	9.38

Source: Field Survey, 2017

The mean household size of the wholesalers and retailers were six and five members, respectively. This implies that the two categories of marketers had available labour force to assist them in their respective businesses. The result was in consonance with the mean household size of six persons reported by Obetta, (2015) in a study of banana and plantain marketing in Enugu State. However, Osondu and Ijeoma (2015) reported that large household size could limit the net returns from marketing due to the diversion of potential investment funds as a result of increased household consumption expenses. Results on the educational status of the marketers showed

that 40.9% and 41.7% of the wholesalers and retailers, respectively had primary school education, while 46.9% and 49% of the wholesalers and retailers respectively had secondary school education only. The result indicated that the marketers are literate, an advantage which according to FAO (2006), could translate to higher business acumen in terms of level of profit. The result corroborates the finding of Ani (2015) who reported a similar educational status in Enugu State among soybeans marketers. 50%

The majority of the wholesalers and retailers (42.7%) had between five to seven years marketing experience. The mean years of marketing experience for wholesalers and retailers were seven and six respectively. This implied that most of the respondents were new entrants and watermelon marketing is a new and growing enterprise. Chukwuji (2006) noted that success and stability of any business depends on the skill and experience of the manager, while Ugwumba (2010) and Ijeoma (2012) opined that education and experience are veritable tools for acquiring new ideas and skills that reflect positively on scope of enterprising, income and profit. The majority of the (93%) wholesalers and retailers (74%) were full time traders. Results indicate that about 15.6% of retailers were students, while farmers and civil servants accounted for 5% each as retailers. The fact that the majority of the wholesalers were full time traders could be attributed to the tedious and stressful nature of the business especially at the wholesale level. This could be attributed to the fact that the majority of the watermelon marketed in the study area was purchased from Northern part of Nigeria.

Determinants of Net Marketing Income of Watermelon Wholesalers

The multiple regression estimates of factors influencing the net marketing income of watermelon wholesalers are presented in Table 2. The results show that 52% of the variations in the net marketing returns were explained by the variations in the independent variables. It also showed that cost of produce and transportation cost were statistically significant variables and thus exerted influence on wholesalers' net marketing returns. This implied that they were among the major determinants of marketers' net income in the study area.

The coefficient of cost of watermelon was positive (1.15) and statistically significant at 5% level of probability, indicating that the higher the cost of watermelon, the higher the net marketing returns of the wholesalers and vice versa. The result is in agreement with the findings of Onyemauwa (2010) and Kainga (2013) who reported a positive and significant effect of cost of watermelon on the net marketing returns. The result is also consistent with the finding of Osondu *et al.* (2014) in the determinants of net marketing returns of Cabbage in Abia State. Conversely, transportation cost was negative (-2.60) and statistically significant at 5% level of probability. The negative sign associated with the variable indicates an inverse relationship with the net marketing returns. This implies that a unit increase in transportation decreased the income of the wholesaler by 2.60 units as shown in Table 2.

Table 2: Regression result showing the factors influencing net marketing income of watermelon for wholesalers

Variables	Linear **	Semi- Log	Double Log	Exponential
Constant	-876040.6 (-0.64)	5.429553 (12.56)	0.5711547 (0.17)	964386.3 (2.32)
Educational level	2722.978 (0.06)	0.002304 (0.46)	0.1502004 (0.46)	26300.91 (0.64)
Marketing Experience	14238.43 (0.39)	0.0052675 (0.45)	0.1424239 (0.69)	1330.893 (0.70)
Cost of watermelon	1.151256** (2.28)	1.47E-07 (1.41)	0.947282 (1.46)	-1.71E-15 (-0.14)
Transportation cost	-2.609858** (-2.10)	-1.00E-06** (-2.53)	-1.136455 (-1.88)	-1.35E-18** (-2.14)
Storage cost	-46.9208 (-1.32)	-0.0000161 (-1.42)	-0.1450067 (-1.39)	-8.58E-15 (-1.18)
Handling cost	114.6615 (1.28)	0.000428 (1.50)	1.466591 (0.87)	3.61E-21** (2.15)
Market information	-26271.42 (320102.6)	-0.007757 (-0.08)	-0.0388155 (0.0995)	-454485.66 (-0.14)
Formal credit	310745.9 (1.13)	0.1045023 (1.19)	0.0865954 (1.01)	379014.7 (1.30)
Market association	-145236.2 (-0.47)	-0.0425023 (-0.80)	-0.0459539 (-0.36)	-93144.27 (-0.54)
R ²	0.523	0.388	0.392	0.487
Adjusted R ²	0.432	0.272	0.277	0.393
F- Ratio	5.79	3.36	3.42	5.09

** , denote significance at 5% Probabililty level

Figures in parentheses are t-values** : Lead equation

Source: Field Survey, 2017

Determinants of Net Marketing Income of Watermelon Retailers

The result shows that 98% of the variations in the net marketing returns of the retailers were explained by the variations in the independent variables. The result in Table 3 indicates that educational level, packaging cost, storage cost, cost of produce and market information affected the net marketing income of the retailers in the study area. Educational level attained was negative (-0.63) and statistically significant at 5% level of probability. The result implied that a unit increase in the educational level of the retailers decreased the net marketing income by 0.63 units.

Tables 3: Regression result showing the factors influencing net marketing income of watermelon for retailers

Variables	Linear	Semi- Log	Double Log**	Exponential
Constant	1200.364 (0.23)	3.786765 (54.32)	-2.175516 (-14.45)	22264.45 (5.77)
Educational level	-132.0308 (-0.44)	-0.0068396 (-1.70)	-0.629421** (-3.756)	-556.4781 (-1.73)
Marketing Experience	-938.8823** (-2.54)	0.0067432 (1.31)	-0.0037787 (-0.12)	-40.42709 (-1.66)
Cost of watermelon	0.3720588** (7.54)	6.24E-06** (9.29)	1.500678** (25.31)	1.07E-11** (10.99)
Transportation cost	-1.078308 (-0.86)	-4.70E-06 (-0.28)	-0.403419 (-1.34)	-7.37E-12 (-0.87)
Storage cost	-1.769488 (-1.70)	-0.000040** (-2.89)	-0.1307497** (-6.90)	-1.10E-16 (-0.01)
Packaging cost	1.759902 (0.77)	-3.11E-06 (-0.10)	-1.1120245** (-2.64)	-2.57E-17 (-1.90)
Handling cost	2.037569 (0.83)	-0.0000106 (-0.32)	-0.0203562 (-0.63)	-1.24E-20** (-2.77)
Market information	-40.92864 (-0.01)	0.1332461** (3.18)	0.0574413** (3.10)	-1699.433 (-0.84)
Formal credit	-1241.543 (-0.28)	-0.0034576 (-0.06)	-0.0218774 (-0.84)	-143.8888 (-0.03)
Market association	2824.709 (0.92)	0.0277328 (0.67)	0.0009056 (0.05)	3263.29 (0.88)
R ²	0.869	0.900	0.981	0.804
Adjusted R ²	0.852	0.887	0.978	0.781
F- Ratio	50.88	67.97	375.85	34.95

** denote significance at 5% Probability level

Figures in parenthesis are t-values** Lead equation

Source: Field Survey, 2017

The result could be attributed to the fact that little or no special skills were required in the marketing of watermelon. It could also be that as one becomes more educated, the attention and seriousness given to the watermelon enterprise would reduce, thereby leading to loss of customers and consequently, reduction in income level from the enterprise. This is justifiable as more educated people are involved in white collar jobs, and thus would pay less attention to the trade. This result disagreed with that of Nwankwo (1999), that the level of educational attainment is likely to affect the degree of one's business alertness and ability to seize business initiatives and advantages, hence increased income. Also, the result contradicts the findings of Agbo and Usoroh (2015) who reported that education is positively related to the net market income of shrimp marketers in Akwaibom State, Nigeria.

Packaging costs had a negative (-1.11) effect on retailers' income and was statistically significant at 5% probability level. The sign implied that the greater the

packaging cost in the marketing process, the less the net marketing income and vice-versa.

Table 3 shows that the storage cost was negative (-0.13) and statistically significant at 1% level of probability. The result implied that as the storage cost increased the net marketing returns of the retailers decreased and vice versa. The result corroborates the findings by Kainga (2013) who reported a negative relationship between net marketing income and storage cost. However, the result contradicts the findings of Osondu *et al.* (2014) who found a positive influence of storage cost on the net marketing returns of cabbage marketers in Abia State.

Conversely, cost of produce and market information were positive and statistically significant at 5% probability level. The sign of the variables implied that significant to the net marketing income of the retailers. Cost of produce (1.50) was increased, the net marketing income of the retailers increased. Market information was statistically significant at 1% level of probability. The positive sign indicates that an increase in market information increased the net marketing income of the retailers by 0.05. Marketers with adequate market information tend to be knowledgeable, flexible and easily make good marketing decisions that enhanced the net marketing income.

Conclusion and Recommendation

There exist potentials in watermelon marketing contributing positively to poverty alleviation especially in this period of economic recession in Nigeria. The net marketing income of watermelon was driven by the cost of produce, transportation cost, packaging cost, storage cost, market information as well as the educational status of the marketers. There is need as for market intermediaries to improve their technical knowledge and skills in marketing of watermelon and other perishables through training; this is to ensure that the marketing system becomes more responsive to consumers' demand.

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