

National Root Crops Research Institute Umudike P.M.B. 7006 Umuahia Abia State, Nigeria

***Corresponding authors' Email: onyenobivincent@yahoo.co.uk Phone: 08069300055**

ABSTRACT

The study was conducted in Umuahia Agricultural Zone of Abia State, Nigeria, to determine the socio-economic characteristics of water yam (*Dioscorea alata*) traders and the profitability of the marketing enterprise. Multistage sampling techniques were used in the study. Data collected from 72 respondents (32 wholesalers and 40 retailers) were analyzed using descriptive statistics. The socio-economic characteristics of the traders were described using their age, sex, educational level, marketing experience, marital status, household size, membership of cooperative and source of fund for business. The profitability of the marketing enterprise was described using marketing income statement and profitability ratios including the input ratio, cost ratio, income ratio and capital ratio. The results of the study showed that there were more males than female traders in the marketing enterprise. Most of the traders were middle-aged, married, had formal education, good marketing experience, large household size, high cooperative society membership, and depended on informal sources of fund for business. The commodity input ratios were generally high at the retail than the wholesale level, while the cost ratios, the income ratios and the capital ratios were relatively high for the wholesalers than the retailers. The marketing system was more profitable at the wholesale than the retail marketing level, because of the relative risk evasiveness of the traders. The profitability and efficiency of the marketing system can be improved by lowering the production and marketing cost of the commodity in the study area.

Keywords: Profitability, water yam, profitability ratios, marketing efficiency

INTRODUCTION

In sub-sahara Africa, *Dioscorea alata* commonly known as water yam is of economic importance in staple food supply, youth employment and income generation. *Dioscorea alata* is the world's most popular yam after *Dioscorea rotundata* and *Dioscorea cayanensis* (Gooding, 1987). It is characterized by high flexibility for agronomic, soil and ecological diversity, early maturity, high yield and high nutritional values for human consumption and livestock feed. Water yam produces tubers that are white, brownish red in colour (Opata et al., 2007). The tubers are generally large and measure up to two meters in length (Riley et al., 2006), have high water content (70%), high nutritional content with crude protein (7.4%), starch (75-84%), vitamin C (13-24.7mg/100g (Osajie, 1992). Due to high starch content of the tubers, water yam provides a good source of dietary carbohydrate in the tropics and subtropical regions (Osajie, 1992). In Nigeria, water yam (*Dioscorea alata*) is not as highly regarded as *Dioscorea rotundata* and *Dioscorea cayanensis* in terms of food consumption (Opara, 1999; Brunnschweiler et al., 2004) because of its unsuitability for making fufu. However, it is usually eaten in various other value-added food forms in order to improve staple food supply.

In Nigeria, yam is associated with ethnocentrism, and thereby designated a "king crop" among other roots and tubers (Chukwu and Ikwelle, 2000). Yam is the most important energy staple food crop when compared with other root and tuber crops such as cassava, sweet

potato and cocoyam. In addition to providing food for the farmer's household, yam has attained substantial commercial importance (Acquah and Evange, 1991). The crop contributes significantly to national economy and rural income by providing employment to many rural dwellers (Asumugha *et al.*, 2010) and cheap carbohydrate staple food for over 80 percent of the populace (Nwachukwu, 2008), thereby reducing poverty level (Emokaro and Law-Ogbomo, 2008). Nigeria ranks as the largest producer of yam in the world with 36.72 million metric tonnes annually (FAO, 2008). In Nigeria, yam has a wide distribution network aimed at meeting consumer time, form and place utilities. The existence of producing and consuming areas of a food staple implies that the commodity has to flow from the point of production to the point of consumption so as to meet consumer utilities. Various types of marketing intermediaries and institutions are involved in the performance of the physical, exchange and facilitating functions of yam marketing. These functions or activities are performed at a cost called marketing cost (Kohls and Uhl, 1990). Marketing costs have been identified as a major factor responsible for the ultimate price consumers pay (Njoku, 1994; Anuebunwa, 2007). The bulkiness of agricultural commodities, high risks and uncertainty, price fluctuation, perishability, transportation cost, inadequate market information and facilities have been identified as responsible for high marketing cost in food marketing (Anuebunwa, 2007; Anumihe and Eze, 2002). The magnitude of these costs influences the profitability and competitiveness of the enterprise.

Role of Profitability of Agricultural Marketing Enterprise

Profitability is one of the most important, yet underemphasized measures of business performance and financial situation. Although a business can operate in the short run on break-even or negative returns, profits are necessary in the long run to support the family, build equity, service debt, and ultimately sustain the business (*Northwest Farm Credit Services*, 2008). Analysis of profit is of vital concern to stockholders since they derive revenue in the form of dividends. Profits are also important to creditors because profits are one of the sources of funds for debt coverage. Furthermore management uses profit as a performance measure (ICAP, 2006). Inadequate profits may result in repayment, liquidity, and solvency problems in the operation. Profitability compares business revenues against all economic costs and evaluates how productively a business is utilizing its resources, both capital and human (*Northwest Farm Credit Services*, 2008).

Profitability of a marketing enterprise provides the most direct indicator of the degree of competitiveness and the best means of assessing the static economic efficiency of price formation and transmission within the system (Scarborough and Kydds, 1992). Absolute net profit (Harriss, 1981) cannot be used to assess economic efficiency, or make comparisons between enterprises because of differences in resources invested in varying types and sizes of enterprises. Therefore, profitability of agricultural marketing enterprise is measured using an income statement. A business that is not profitable cannot survive. Conversely, a business that is highly profitable has the ability to reward its owners with a large return on their investment (Hofstrand, 2009).

Comparing the profitability of different enterprises can provide insights into the structure of trade, the focus of monopoly power and capital accumulation, and the implication for income distribution within the system. Similarly, profitability differences between enterprises differentiated by size (defined by capital investment or turnover), age and geographical location can also indicate whether there are barriers to upward mobility in marketing, in terms of scale of operation or in time or space (Scarborough and Kydds, 1992).

Role of Profitability Ratios of Agricultural Marketing Enterprise

Profitability ratios are designed to evaluate the firm's ability to generate earnings (ICAP, 2006). Other studies (Reddy *et al*, 2006; Scarborough and Kydds, 1992; Okoye and Anuebunwa, 2009; Anuebunwa, 2006, 2008) have shown that the profitability of a marketing enterprise can be expressed using the following profitability ratios:

Input ratio: This is the percentage of the cost of each input to the total cost of all inputs employed in a marketing enterprise. The variable and fixed input ratios used in agricultural marketing profitability analysis are expressed as follows:

$$\text{Variable Input Ratio} = \frac{\text{Individual Variable Input Cost (VC)}}{\text{Total Variable Cost (TVC)}} \times 100$$

while

$$\text{Fixed Input Ratio} = \frac{\text{Individual Fixed Input Cost (FC)}}{\text{Total Fixed Cost (TFC)}} \times 100$$

Low input ratios indicate high profitability of agricultural marketing enterprise and vice versa.

Cost Ratio: This is the percentage of total cost to selling price of a commodity. Low cost ratio indicates high profitability of a business. This means the business is capable or solvent enough to take care of its marketing activities and debt obligations. Operating ratio, fixed ratio and gross ratio are components of the total cost ratio used for evaluating the profitability of a business. These total cost ratios are expressed as follows:

$$\text{Operating Ratio} = \frac{\text{Total Variable Cost (TVC)}}{\text{Selling Price (SP)}} \times 100$$

Operating ratio indicates the proportion of the selling price of a commodity used for the payment of the total variable (or operating) cost (Olukosi and Erhabor, 2008) of a business. Low operating ratio is a good measure of profitability of a business because it leaves a business with sufficient amount of operating income to pay for interest, dividends, etc.

$$\text{Fixed Ratio} = \frac{\text{Total Fixed Cost (TFC)}}{\text{Selling Price (SP)}} \times 100$$

Fixed ratio indicates the proportion of the selling price of a commodity used to pay for the total fixed inputs employed in the business. Low fixed ratio is also a good measure of profitability of a business. This implies that much of the income from sales of a business is not tied-up in fixed assets.

$$\begin{aligned} \text{Gross Ratio} &= \frac{\text{Total Cost (TC)}}{\text{Selling Price (SP)}} \times 100 \\ &= \frac{\text{TVC} + \text{TFC}}{\text{SP}} \times 100 \end{aligned}$$

This indicates the proportion of the selling price of a commodity used for the payment of the total marketing cost of a product. Low gross ratio is a good measure of profitability of a business, because it reflects the high profitability indices arising from the low operating ratio and the low fixed ratio of a business.

Income Ratio: This is the percentage of the selling price of a commodity that accrues to an economic agent (farmer or marketer) in an agricultural marketing system. Gross margin ratio,

net margin ratio and farmer share of consumer expenditure, are components of the income ratio used to determine how much of the value added by a marketing firm constitutes profit.

$$\text{Gross Margin Ratio} = \frac{\text{Gross Margin (GP)}}{\text{Selling Price (SP)}} \times 100$$

Gross margin equals selling price (SP) minus purchase price (PP) of a commodity traded. Gross margin ratio indicates the proportion of the selling price of a commodity that constitutes the total variable cost and gross profit of a marketer. Very high gross margin ratio indicates marketing inefficiency because high cost is incurred in the provision of marketing services (Ahmed and Rustagi, 1982; Ike and Chukwuji, 2005).

$$\text{Net Margin Ratio} = \frac{\text{Net Margin (NM)}}{\text{Selling Price (SP)}} \times 100$$

Net margin equals Gross margin (GM) minus total marketing cost (TC) of a commodity traded. Net margin ratio (or mark-up on sales) indicates the proportion of the selling price of a commodity that constitutes the total marketing cost and net profit of a marketer. Net margin ratio provides a good measure of inter-firm comparison of return on sales. It is calculated before income tax because tax rates and tax liabilities vary from one company to another for a wide variety of reasons, making comparisons after tax much more difficult.

$$\text{Farmer Share} = \frac{\text{Purchase Price (PP)}}{\text{Selling Price (SP)}} \times 100$$

This indicates the proportion of the selling price of a product that accrues to the farmers for producing the product. The higher the farmer share of the consumer expenditure, the higher the profitability of a marketing enterprise.

Capital ratio: This is the percentage of sales earning to total cost outlay (or investment) on a commodity traded. Benefit-cost ratio, return on capital ratio and marketing efficiency ratio are components of the capital ratio used to determine the rate of return on capital invested in a marketing enterprise.

$$\text{Benefit – cost ratio} = \frac{\sum \text{Selling price (SP)}}{\sum \text{Total cost outlay (TCO)}}$$

Benefit-cost ratio (BCR) indicates the number of times earnings from sales can offset the accumulated total cost of marketing.

Benefit-cost ratio with a value greater than 1 indicates that the marketing enterprise is profitable, otherwise it is not profitable.

$$\text{Return on capital ratio} = \frac{\text{gross margin (GM)}}{\text{total cost outlay (TCO)}} \times 100$$

Return on capital ratio tells the entrepreneur whether or not the effort put into the business has been worthwhile. If the return on capital is less than the rate of return on an alternative, risk-free investment such as bank saving account, the owner may be wiser to divest in a marketing enterprise and put the money in a bank saving account, and avoid the daily struggles of small business management.

$$\text{Marketing efficiency ratio} = \frac{\text{Net margin (NM)}}{\text{total cost outlay (TCO)}} \times 100$$

This is the percentage of net marketing margin from sales of a commodity to the total cost outlay on the commodity. It is a measure of performance of a business. High marketing efficiency ratio is a good measure of profitability and performance of a business, which

implies the ability of a business to effectively take care of its marketing activities and debt obligations.

Despite available information from previous marketing studies on yam in Nigeria (Anuebunwa, 2002; Eluagu, 1988; Anuebunwa, 2008), there was inadequate information on the marketing of water yam in staple food supply in Abia State, and this study tried to supply the information. The objectives of the study were to describe the socio-economic characteristics of water yam traders and the profitability of water yam marketing in Abia State.

RESEARCH METHODOLOGY

The study was conducted in Umuahia Agricultural Zone of Abia State, Nigeria. The Agricultural Zone has five Local Government Areas and situates within the geographical locations of latitudes $5^{\circ} 6^1\text{N}$ - $5^{\circ} 24^1\text{N}$ of the equator and longitudes $7^{\circ} 18^1\text{E}$ – $7^{\circ} 54^1\text{E}$ of the Greenwich (NPC, 2006).

Absence of firm accounting records (Scarborough and Kydds, 1992) is a limitation in the determination of marketing profitability of agricultural products. However, data for the study were collected from field survey conducted in the study area. Purposive and multistage random sampling techniques were used in the study. Out of the 5 Local Government Areas (LGAs) in Umuahia Agricultural Zone, 2 LGAs were purposively selected for the study. Four (4) markets were randomly selected for the study, such that 2 markets (1 rural market and 1 urban market) were randomly selected from each of the local government areas purposively selected for the study, based on the significance of the selected local government areas and markets in the production and distribution of water yam in the study area. From the list of registered water yam traders in the selected markets, 72 respondents were randomly selected for the study. These comprised 8 wholesalers and 10 retailers randomly selected from each of the 4 markets randomly selected for the study. Well structured questionnaires and market interviews were used to collect the cross-sectional primary data for the study. Data collection procedure was facilitated by the help of the Agricultural Extension Agents assigned to the communities studied.

The data collected for the study were analyzed using descriptive statistical technique. The socio-economic characteristics of the traders were described using their age, sex, educational level, marketing experience, marital status, household size, membership of cooperative and source of fund for business. The profitability of the marketing enterprise was determined using marketing profitability ratios including input ratios, cost ratios, income ratios and capital ratios, based on the field data on commodity purchase and selling prices and commodity variable and fixed input costs.

RESULTS AND DISCUSSION

The socio-economic characteristics of water yam traders in the study (Table 1) indicates that most of the wholesalers (46.9%) and retailers (37.5%) were middle-aged (36 – 44 years) and were strong enough to move around sourcing for product and going long distance to sell the product (Mafimisebi *et al*, 2006). This implies that age of trader may influence marketing decisions in areas of resource allocation, and adoption of new technologies (Rahman *et al*, 2002). All the traders (100%) depend on informal sources of fund for business. While a good proportion of the wholesalers (59.4%) and retailers (62.5%) were married, the trade was dominated by male wholesalers (90.6%) and retailers (77.5%), because in South-eastern Nigeria, yam is a status symbol for men (Chukwu and Ikwelle, 2000). Most of the wholesalers (96.9%) and retailers (97.5%) had formal education and good number of years of marketing experience (at least 6 years) which can positively influence profitability in

marketing, given adequate access to new marketing innovations that lead to efficiency in resource allocation and net benefit from trade. However, younger traders with a few (1 – 5) years of marketing experience were more likely to adopt new technologies than the older traders because of their better (secondary and tertiary) education and more exposure to new ideas and risks (Ogunlade *et al*, 2009). The large household size (6 – 10) of most of the wholesalers (50%) and retailers (57.5%) led to the use of cheap family labour in the yam marketing processes. High cooperative membership of wholesalers (81%) and retailers (67%) was aimed at cost saving by members through group buying and bulk transportation of product in the marketing system.

Table 1: Socio-Economic Characteristics of Water Yam (*Dioscorea alata*) Market Traders in Umuahia Agricultural Zone of Abia State, Nigeria.

Variables	Wholesalers		Retailers	
	Number	Percentage (%)	Number	Percentage (%)
Age (Years):				
18-26	0	0	2	5
27-35	6	18.8	7	17.5
36-44	15	46.9	15	37.5
45-53	9	28.1	11	27.5
Above 53	2	6.2	3	7.5
Total	32	100	40	100
Sex:				
Male	29	90.6	31	77.5
Female	3	9.4	9	22.5
Total	32	100	40	100
Educational Level:				
Informal	1	3.1	1	2.5
Formal: Primary	17	53.1	14	35
Secondary	12	37.5	21	52.5
Tertiary	2	6.3	4	10
Total	32	100	40	100
Marketing Experience (Years):				
1-5	3	9.4	7	17.5
6-10	7	21.9	16	40
11-15	12	37.5	13	32.5
Above 15	10	31.2	4	10
Total	32	100	40	100
Marital Status:				
Married	19	59.4	25	62.5
Single	3	9.4	8	20
Divorced	4	12.5	4	10
Widowed	6	18.7	3	7.5
Total	32	100	40	100
Household Size:				
1-5	9	28	10	25
6-10	16	50	23	57.5
11-15	5	16	5	12.5
Above 15	2	6	2	5
Total	32	100	100	100
Membership of Cooperative:				
Yes	26	81	27	67.5
No	6	19	13	32.5
Total	32	100	100	100
Source of Fund:				
Informal	32	100	40	100
Formal	0	0	0	0
Total	32	100	40	100

Source: Field Survey Data, 2010.

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Table 2 shows the descriptive analysis of the profitability of water yam marketing in the study area using the income statement (Hofstrand, 2009) as a measure of business performance (ICAP, 2006; *Northwest Farm Credit Services*, 2008) of the marketers in the study area. Table 2 shows that for each metric tonne of water yam traded in the study area, the wholesalers spent N75000.00 in stock purchase price (PP) paid to producers, N5800.00 in total variable cost (TVC), N480.00 in total fixed cost (TFC), N6280.00 in total marketing cost (TC) and N8120.00 in total cost outlay (TCO = PP + TC) on the commodity, and in return, the wholesalers received N90000.00 in stock selling price (SP), N15000.00 in gross marketing margin (GM) and N8700.00 in net marketing margin (NM). Similarly, Table 2 shows that for each metric tonne of water yam traded in the study area, the retailers spent N90000.00 in stock purchase price (PP) paid to wholesalers and producers, N2650.00 in total variable cost (TVC), N200.00 in total fixed cost (TFC), N2850 in total marketing cost (TC) and N92850.00 in total cost outlay (TCO = PP + TC) on the commodity, and in return, the retailers received N96500.00 in stock selling price (SP), N6500.00 in gross marketing margin (GM) and N3650.00 in net marketing margin (NM).

Table 2: Profitability of Water Yam (*Dioscorea alata*) Marketing in Umuahia Agricultural Zone of Abia State, Nigeria.

Parameter/Metric Tonne	Wholesaler		Retailer	
	Amount (₦)	Contribution %	Amount (₦)	Contribution (%)
Purchase Price (PP)	75000		90000	
Variable Input Ratios (%):				
Transportation	4000	68.97	800	30.19
Loading/off loading	1000	17.24	1000	37.34
Commodity Inspection Fee	300	5.17	300	11.32
Processing (sorting, grading, standardization)	200	3.45	100	3.77
Packaging Material (twine)	-	-	50	1.87
Commission Agents Fee	50	0.86	-	-
Market Maintenance Fee	50	0.86	50	1.87
Feeding	200	3.45	350	13.21
Total Variable Cost (TVC)	5800		2650	
Fixed Input Ratios (%):				
Storage fee	250	52.08	70	35
Sanitation Fee	30	6.25	30	15
Security Fee	200	41.67	100	50
Total Fixed Cost (TFC)	480		200	
Total Marketing Cost (TC)	6280		2850	
Total Cost Outlay (TCO)	81280		92850	
Selling Price (SP)	90000		96500	
Gross Marketing Margin (GM)	15000		6500	
Net Marketing Margin (NM)	8720		3650	
Cost Ratios (%):				
Operating Ratio (TVC/SP)		6.44		2.74
Fixed Ratios (TFC/SP)		0.53		0.21
Gross Ratios(TC/SP)		6.97		2.95
Income Ratios (%):				
Gross Margin Ratio (GM/SP)		16.67		6.73
Mark-up (NM/SP)		9.69		3.78
Farmer's Share (PP/SP)		83.33		93.26
Capital Ratios (%):				
B-C Ratio (SP/TCO)		1.11:1		1.04:1
Return on Capital (GM/TCO)		18.45		7.00
Marketing Efficiency (NM/TCO)		10.73		3.93

Source: *Field Survey Data 2010*

Table 2 indicated that for each metric tonne of water yam traded in the study area, the wholesalers spent N81280.00 on total cost outlay (TCO) on trade, and earned N15000.00 in gross marketing margin (GM) and N8700.00 in net marketing margin (NM). Comparatively, for each metric tonne of water yam traded in the study area (Table 2), the retailers spent N92850.00 on total cost outlay (TCO) on trade, and earned N6500.00 in gross marketing margin (GM) and N3650.00 in net marketing margin (NM). These imply that the marketing of water yam in the study area was relatively more profitable at the wholesale than the retail marketing level for effective use of marketing resources in the movement of water yam from the farmer to the consumer in the study area.

Table 2 also shows the descriptive analysis of the profitability of water yam marketing using profitability ratios, in order to evaluate the individual firm's ability to generate income (ICAP, 2006), as well as compare the wholesalers and retailers in the study area, following other studies (Reddy *et al*, 2006; Scarborough and Kydds, 1992; Okoye and Anuebunwa, 2009; Anuebunwa, 2006, 2008). The input ratios i.e. ratios of individual input costs to total input cost used by the traders (Table 2), indicated that for each metric tonne of water yam traded in the study area, the wholesalers had high variable input ratios for transportation fee (68.97%) and commission agents' fee (0.86%), and low variable input ratios for loading/offloading fee (17.24%), commodity inspection fee (5.17%), processing fee (3.45%), market maintenance fee (0.86%) and feeding fee (3.45%). The wholesalers also had high fixed input ratios for storage fee (52.08%) and low fixed input ratios for sanitation fee (6.25%) and security fee (41.67%). Comparatively, the input ratios (Table 2) indicated that for each metric tonne of water yam traded in the study area, the retailers had low variable input ratio for transportation fee (30.19%) and high variable input ratios for loading/offloading fee (37.34%), commodity inspection fee (11.32%), processing fee (3.77%), packaging fee (1.87%) market maintenance fee (1.87%) and feeding fee (13.21%). The retailers also had low fixed input ratio for storage fee (35%) and high fixed input ratios for sanitation fee (15%) and security fee (50%). The variable and fixed input ratios (Table 2) imply that the wholesalers relatively had high profitability indices compared to the retailers for efficient or cost-effective use of inputs in the marketing of water yam in the study area.

The cost ratios i.e. ratios of total cost to selling price of water yam indicated that for each metric tonne of water yam traded in the study area, the wholesalers had high operating ratio (6.44%), fixed ratio (0.53%) and gross ratio (6.97%), compared to the relatively low operating ratio (2.74%), fixed ratio (0.21%) and gross ratio (2.95%) respectively, at the retail marketing level. These imply that the retailers relatively had high profitability indices compared to the wholesalers for effective use of income from sales to pay for the marketing cost of water yam in the study area.

The income ratios i.e. ratios of income to selling price indicated that for each metric tonne of water yam traded in the study area, the wholesalers had high gross margin ratio (16.67%), mark-up on sales ratio (9.69%) and low farmer share of consumer expenditure (83.33%), compared to the relatively low gross margin ratio (6.73%), mark-up on sales ratio (3.78%) and high farmer share of consumer expenditure (93.26%) respectively, at the retail marketing level. These imply that the wholesalers generally had high profitability indices than the retailers in the use of income ratios for evaluation of the proportions of the selling price of water yam that constitute marketing cost, profit to marketers and farmer share of consumer expenditure in the study area.

The capital ratios i.e. ratios of income to total capital outlay on trade indicated that for each metric tonne of water yam traded in the study area, the wholesalers had high benefit-cost ratio (1.11:1), return on capital (18.45%) and marketing efficiency (10.73%), compared to the relatively low benefit-cost ratio (1.04:1), return on capital (7.00%) and marketing efficiency

(3.93%) respectively, at the retail marketing level. These imply that the wholesalers relatively had high profitability indices than the retailers in the use of capital ratios for the determination of the rate of return on capital invested in the marketing system.

Table 2 shows that the commodity input ratios were generally higher at the retail than the wholesale level, implying that the retailers relatively had low profitability indices than the wholesalers in the evaluation and use of income from sales to pay for the marketing cost of water yam in the study area. Comparatively, the cost ratios, the income ratios and the capital ratios were relatively high for the wholesalers than the retailers. These imply that the wholesalers relatively had high profitability indices than the retailers in the evaluation and use of income from sales, income from investment and return on capital for the payment of marketing cost of water yam and other debt obligations of the enterprise in the study area. The relative profitability of the marketing enterprise in each marketing level (Table 2) was in agreement with findings from previous studies (Anuebunwa, 2002; Okereke and Anthonio, 1988) attributed to the risk evasiveness of the traders, due to their different socio-economic characteristics (Table 1).

CONCLUSION

The commodity input ratios were generally high at the retail than the wholesale marketing level, while the cost ratios, the income ratios and the capital ratios were relatively high for the wholesalers than the retailers. These implied that the marketing of water yam in the study area was more profitable at the wholesale than the retail marketing level, because of the relative risk evasiveness of the traders, which can be attributed to their different socio-economic characteristics. The profitability and efficiency of the marketing system can be improved by lowering the production and marketing cost of the commodity. These will lead to reduction in the marketing chain and margin associated with the supply of the commodity. Provision of bulking centres and adequate storage facilities will mitigate the costs of transportation and storage of the commodity, and access to formal sources of fund and more female empowerment will increase the marketing efficiency of water yam the study area.

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