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Marketing Efficiency and Determinants of Marketable Surplus in Vegetable Production in Kwara State, Nigeria

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ABSTRACT

Marketing of vegetables is a complex phenomenon due to their perishable nature, seasonality and bulkiness, and as such, vegetable production requires an efficient marketing system. This study was therefore carried out to examine the marketing efficiency and determinants of marketable surplus in vegetables production in Kwara state, Nigeria. Data were collected using a well structured questionnaire from 75 respondents comprising 35 vegetable farmers and 40 vegetable marketers from 6 vegetable producing communities and 4 popular vegetable markets in the state. Descriptive statistics, multiple regression analysis and marketing efficiency measure were the major analytical tools employed for the study. Result of the multiple regression analysis revealed that, educational level of the household head, farming experience, spoilage at farm and household were the significant determinants of marketable surplus in vegetable production in the study area. Based on the study findings, it is recommended that daily local markets with small processing units and motor able roads be established near the vegetable farms to minimize marketing loss. The government should come up with Adult literacy programmes to educate the farmers and raise their efficiency in vegetable marketing.

Key words: Marketing Efficiency; Marketable Surplus; Multiple Regression Analysis; Vegetable; Kwara State

INTRODUCTION

With more than 160 million inhabitants, Nigeria is one of Africa's most populous countries constituting about half of West Africa's population. The country is endowed with large expanse of agricultural lands and favourable climate for the production of food crops and other agricultural raw materials for exports and her domestic industrial use. The country's total land area is about 98.3 hectares out of

which about 71.2 million hectares are cultivable (Federal Ministry of Agriculture & Rural Development, 2001:3). Agricultural production remains the mainstay of the Nation's economy in that it is a major source of raw materials for the agro-allied industries and a potent source of the much needed foreign exchange. It is a major contributor to Nigeria's GDP and small-scale farmers play a dominant role in this contribution (Rahji and Fakayode 2009:91). However, over the years, the sector has witnessed a tremendous decline in its contribution to national development.

While research has shown that increased production is possible, it has however been discovered that the increase in crop yield brought about by the advances in technologies during the last decade did not make any significant impact on the economy of the small-scale farmers. This is because the increase is lost due in part to poor postharvest handling of the crops produced such that only very little is available to the small scale farmer for sale in the market (Arowojolu, 2000: 8). Losses in agricultural production are estimated at 20 to 40% in developing countries depending on the crop and the season (Kader, 2005; Garnett, 2006; Ogunleye and Adefemi, 2007). It is estimated that as much as 40% vegetables are wasted after harvest (Mrema and Rolle, 2002). The consequence of which is poor marketable surplus of vegetables resulting in lower per capita availability of the product.

The term 'vegetable' applies to those plants and plant parts that are edible, especially leafy or fleshy parts that are usually eaten with staples as main courses or supplementary foods in cooked or raw forms. It is estimated that there are at least ten thousand (10,000) plant species used as vegetables worldwide although only about

fifty (50) are of great commercial value (Shing-Jy & Hsiao-Feng, 2003). Vegetables play a very significant role in human nutrition; they contain vitamins, minerals and chemical compounds that are essential for human health. For instance, vitamin A maintains eye health and strengthens the immune system, vitamin B help convert food to energy, folate reduces the risk of some birth effects and helps prevent heart diseases. Vitamin C increases absorption of calcium and iron from other food, Vitamin E is a powerful antioxidant that protects cell from cancer causing agents. Dietary fibre helps move food through the digestive tract and lower blood cholesterol levels (FAO, 2006). The world health organization (WHO) places low vegetable intake sixth among its twenty risk factors of global human mortality, just behind better known killers as tobacco use and high cholesterol (FAO, 2006). It is to this end, that a minimum level of 400g per head a day is recommended for the consumption of vegetables by the WHO. However, according to FAO, (2010) vegetable consumption per head per day in Nigeria is as low as 179g compared to the recommended rate. Apart from its nutritional benefits, Vegetables also serve as a source of employment for both the rural and urban dwellers directly or indirectly providing small holder farmers with much higher income and more jobs per hectare than staple crops (AVRDC, 2006).

Detailed and systematic empirical studies on the performance of vegetables farmers and the determinants of marketable surplus in Nigeria are scarce or non-existent. Moreover, despite the huge production potential due to favorable weather conditions and the availability of irrigation sources, and dire demand at export markets, marketable surplus of vegetables in Nigeria is very low. An improvement in

marketing efficiency of vegetable farmers and analysis of the determinants of marketable surplus in vegetable production would bring about an improvement in the livelihood of the farmers and improves the performance of markets and consequently increase vegetable production. It will results in lower cost of distribution and lower prices to consumers and probably brings about an increase in the national income. It will guarantee the farmers' better prices for their products and induces them to invest their surpluses in the purchase of modern inputs so that productivity may increase. It will also contribute towards new employment opportunities and stabilizes export earnings. Results of the study will also serve as a guide to agricultural key players on vegetable crops investment decisions in Nigeria. This study was therefore carried out to describe the socioeconomic characteristics of the vegetable farmers, analyse the determinants of marketable surplus and estimate the marketing efficiency of the vegetable farmers.

METHODOLOGY

Area of Study

The study was conducted in Kwara state, Nigeria. The State lies midway between the Northern and Southern parts of the Country. It has a population of about 2,371,089 with a total landmass of 32,500 Square Kilometres, most of which is arable (NPC, 2010). The state comprises of sixteen local government areas namely Asa, Baruten, Edu, Ekiti, Ifelodun, Ilorin East, Ilorin West, Ilorin South, Irepodun, Isin, Kaiama, Moro, Offa, Oke-Ero, Oyun, Pategi. The main ethnic groups are Yoruba, Hausa, Fulani and Nupe (Kwara state 2011). About 1,094,232 people of the state are

engaged in direct farming out of which 26,865 are vegetable farmers. Common vegetables cultivated include; amaranthus, okro, pepper, lettuce, rosette, tomato, carrot, cucumber, cabbage and jute mallow (Kwara state farmers' census, 2010).

Sampling Technique

The respondents for this study comprises of two groups; the vegetable producers and the vegetable marketers. For each group, a two stage random sampling technique was adopted to select respondents for the study. For the vegetable farmers, the first stage was a purposive selection of six (6) communities namely: Lasoju, Afon, Otte, Oke-Ose, Oke-Oyi and Ganmo popular for vegetable production, in the state (Kwara state farmers' census, 2010). The second stage involved a random selection of thirty-five vegetable farmers across the six communities making use of proportional sampling. For the marketers' group, the first stage was a purposive selection of four popular vegetable markets in the state namely; Oja-Oba, Ipata, Yoruba road and mandate market followed by a random selection of forty vegetable marketers across the markets also making use of proportional sampling.

Method of Data Analysis

To achieve the study stated objectives, descriptive statistics such as mean, frequency distribution, percentage, and coefficient of variation was used to describe the socio-economic characteristics of the respondents while the ordinary least square regression was used to analyse the determinants of market surplus of vegetables in the study area. The regression model is given by:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4 X_4 + b_5X_5 + b_6X_6 + U$$

Where,

Y = Marketable surplus of vegetables (kg/farm),

X₁ = Vegetable production (kg/farm),

X₂ = Total consumption of vegetables (kg/farm),

X₃ = Spoilage at farm (kg/farm),

X₄ = Educational status of the respondent (years)

X₅ = Farming experience (years)

X₆ = Household size

b₀ = Constant,

b_i = Regression coefficient of the i-th exogenous variable (i = 1,2,.....,6), and

U = Error-term.

Marketing efficiency:

Marketing efficiency was computed using corrected marketing efficiency measure, given by Acharya and Agarwal (2001), as this method explicitly incorporates Marketing loss in the existing marketing ratio. It is given by

$$\text{Marketing efficiency} = \frac{NPF}{MC + MM + ML}$$

Where,

NPF = Net price received by farmer

MC = Total marketing cost

MM = Total marketing margin, and

ML = Marketing loss

The net returns to farmer and margins of intermediaries were estimated under two scenarios, accounting for post-harvest losses and ignoring them.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

The socio-economic characteristics of the respondents are as shown in Table 1

Table 1: Socio-Economic Characteristics of Respondents.

Characteristics	Vegetable Producer		Vegetable Marketer	
	Frequency	Percentage	Frequency	Percentage
Gender				
Male	11	31.4	14	35.0
Female	24	68.6	26	65.0
Total	35	100	40	100
Age (Years)				
20-30	8	22.9	11	27.5
31-40	11	31.4	15	37.5
41-50	9	25.7	7	17.5
51-60	7	20	5	12.5
61-70	-	-	2	5.0
Total	35	100	40	100
Marital status				
Single	4	11.4	8	20.0
Married	31	88.6	32	80.0
Total	35	100	40	100
Experience(years)				
1-10	12	34.3	15	37.5
11-20	14	40.0	20	50.0
21-30	6	17.1	3	7.5
31-40	3	8.6	2	5.0
Total	35	100	40	100
Educational Status				
No formal Education	5	14.3	4	10.0
Quranic	7	20.0	9	22.5
Primary	16	47.7	19	47.5
Secondary	5	14.3	7	17.5
Tertiary	2	5.7	1	2.5
Total	35	100	40	100
Household size				
0-5	12	34.3	9	22.5
6-10	20	57.1	24	60.0
11-15	3	8.6	7	17.5
Total	35	100	40	100
Cooperative society				
Yes	14	40.0	18	45.0
No	21	60.0	22	55.0
Total	35	100	40	100

As shown in table 1, most of the vegetable farmers and marketers were females

(68.6% and 65.0%) respectively when compared to their male counterparts (31.4%

and 35.0%) respectively. This may be as a result of the socio-cultural factors which gives women in the study area equal or greater opportunity to practice vegetable farming and marketing than their male counterparts. Most of the vegetable farmers and marketers were married (88.6% and 80.0%) respectively. Majority of the vegetable farmers and marketers falls within the age bracket of 31-40 years (31.4% and 37.5%) respectively. The average age of the vegetable farmers and marketers are 37.9 and 39.3 years respectively. This implies that both groups are relatively young. The average years of involvement in vegetable farming and marketing was found to be 16.7 years and 13.3 years respectively indicating that both the vegetable farmers and marketers are well experienced in their respective enterprises. For both groups, about 47% of the respondents have primary education with only a few 5.7% for the vegetable farmers and 2.5% for the vegetable marketers having tertiary education. The average household size for the vegetable farmers was 8 persons per household while for the vegetable marketers; it was 9 persons per household. The implication of this is that they are likely to make use of family labour. Only 40 and 45% respectively for the vegetable farmers and vegetable marketers are members of cooperative societies

Determinants of marketable surplus

Table 2 gives a summary of the determinants of marketable surplus among the vegetable farmers in the study area.

Table 2: Estimated coefficients of regression function

Variable	Coefficient	t-value
(Constant)	-7.622*	-0.317

Vegetable production (X_1)	0.952	16.193
Total consumption (X_2)	-0.684	-5.117
Spoilage at farm (X_3)	-1.139*	-6.018
Education of family-head (X_4)	1.416*	0.472
Farming experience (X_5)	0.588*	0.559
Household size (X_6)	-0.454*	-0.150
R^2	0.965	
Adjustment R^2	0.956	
F statistics	110.854*	

Note: * = significant at 10% level, ** = significant at 5% level, *** = significant at 1% level

As shown in table 2, estimates of regression function reveal that education of household head and farming experience were significant and positive determinants of marketable surplus, while household size is also significant but a negative determinant of marketable surplus. The significance and positive relationship of the education of the household head and farming experience may be due to the fact that educated and experienced farmers are more enlightened and thereby they are well conversant with the efficient marketing of their marketable surplus and were able to reduce marketing loss. The coefficient of spoilage at the farm level clearly indicated that there was a dire need to prevent these losses to improve the marketable surplus of vegetables. The household size as well as the total vegetable consumption had negative impact on the marketable surplus because family with a large household size will most likely consume a higher proportion of the vegetables before reaching the market and this will consequently reduce their marketable surplus as compared with families with smaller household size.

The estimates of R^2 and F statistics revealed that the model was a best fit and the explanatory variables specified in it could collectively explain about 97 percent of the variations in the marketable surplus of vegetables

Marketing channels of Vegetables

Table 3: Identified marketing channels of vegetables in the study area

Channel	Channel no	Percentage (%)
Producer→ Consumer	I	53.3
Producer→ Retailer→ Consumer	II	40.0
Producer→ Agent→ Retailer→ Consumer	III	6.7
Total		100

It was showed in Table 4 that majority of the respondents in the study area belongs to Channel I; they sell vegetables directly to the consumers, while 40% belongs to Channel II and just 6.7% belongs to Channel III. This is as a result of the perishable nature of vegetables, as the vegetables have to reach the consumers early so as to retain its market and nutritional value. Post-harvest losses have an obvious negative contribution to their returns as was shown in Table 5.

Marketing efficiency of the vegetable farmers

Table 4: Marketing efficiency of selected vegetables in the identified channels

Crop	Tomato		Okra		Amaranthus		Cochorus		Others	
	Old	New	Old	New	Old	New	Old	New	Old	New
Channel-I										
Net price received by farmer (₦/100kg)	3928	3410	1223	1044	1305	1102	1274	1141	5620	5214
Marketing cost(₦/100kg)	362	362	232	232	245	245	243	243	402	402
Marketing loss (₦/100kg)	0	518	0	179	0	203	0	133	0	406
Total margin (₦/100kg)	0	0	0	0	0	0	0	0	0	0
Marketing efficiency	10.85	3.88	5.27	2.54	5.32	2.46	5.24	3.03	13.98	6.45
Channel-II										
Net price received by farmer(₦/100kg)	4023	3588	1482.3	1309.6	1236	1048	1218	1074	7213	6540
Marketing cost(₦/100kg)	697	697	321	321	279.6	279.6	280.4	280.4	787.2	787.2
Marketing loss (₦/100kg)	0	644	0	265.7	0	302	0	244.4	0	932.4
Total margin (₦/100kg)	483	276	287.7	196.3	402.1	286.1	408.1	310.1	517.3	258.2
Marketing efficiency	3.41	2.22	2.44	1.67	1.81	1.21	1.77	1.29	5.53	3.31
Channel-III										
Net price received by farmer(₦/100kg)	3,950	3625	1380	1290	2035	1885	1800	1680	6300	5850

g)										
Marketing cost(₹/100kg)	775	775	390	390	570	570	510	510	1075	1075
Marketing loss (₹/100kg)	0	550	0	210	0	250	0	240	0	815
Total margin (₹/100kg)	550	325	350	230	475	375	400	280	800	435
Marketing efficiency	2.98	2.20	1.86	1.55	1.95	1.58	1.98	1.63	3.36	2.52

Marketing efficiency and margins in different channels were estimated both with and without accounting for marketing loss at each level as presented in Table 4. It is clear from the results that farm spoilage of vegetables had effect on the marketing margins marketing efficiency of vegetable production. Farmer's net returns were higher when estimated without accounting for marketing loss. This indicated that their returns could be improved if proper measures are taken to prevent these losses. As regards the total marketing margins, these were higher in Channel-III than in Channel-II due to the existence of more intermediaries. Marketing efficiency was higher in Channels-I and II with respect to daily local market, indicating the efficient functioning of these markets. Channel-I turned out to be highly efficient, followed by Channel-II (except for Amaranthus and Cochorus). Channel-III was found to be less efficient for marketing of all the selected vegetables. The marketing efficiency was higher in tomato in all the three channels.

Conclusion and Recommendations

The study analysed the marketing efficiency and determinants of marketable surplus in vegetable production in Kwara state, Nigeria. The marketable surplus was found to be about (60%) of the total vegetable production. Household size, spoilage at farm level, education of the household head and farming experience were the significant determinants of marketable surplus in vegetable production in the study area. Vegetable markets was mostly efficient in Channel-I while Channel-III was found to be least efficient (except for Amaranthus and Cochorus) which was more efficient than that of Channel-II. Based on the study's findings, it is recommended that, daily local regulated markets should be established near the vegetable farms and the government should come up with Adult literacy programmes to educate the farmers and raise their efficiency in vegetable marketing. Development of infrastructure like roads and efficient transport facilities and strengthening of the vegetable farmers cooperative societies may help in improving the efficiency of vegetable marketing in the state.

REFERENCES

- Acharya, S. S. and Agarwal, N. I. (2001): *Agricultural Marketing in India* (Third Edition), Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.
- Arowojolu, O. (2000): Analysis of rural women's use of cassava post-harvest technologies in Oyo state. M.Sc. project, Department of Agricultural Extension and Rural Development, University of Ibadan, 76pp
- Asian Vegetable Research Development Centre (AVRDC) (2006): *Vegetables Matter*, AVRDC – The World Vegetable Centre, Shanhua, Taiwan.
- Food and Agricultural Organization, FAO (2006): "More fruits and vegetables". Accessed online at www.unfao.com/spotlight/archive. July 24, 2009.

- Food and Agriculture Organization (FAO) (2006): Agricultural data FAOSTAT.
- Federal Ministry of Agriculture & Rural Development, 2001, *National Fadama Infrastructure Survey Report*, Sheda-Abuja: World Bank/Projects Coordinating Unit.
- Garnett T (2006). Fruit and vegetables and UK greenhouse gas emissions: exploring the relationship. UK: Food and Climate Research Network, University of Surrey. FCRN working paper 06-01 Rev. A: 1-134
- Kader AA (2005). Increasing food availability by reducing postharvest losses of fresh produce, *Acta Hort.*, 682: 2169-2175.
- Mrema, C.G. and S.R. Rolle, (2002): Status of the postharvest sector and its contribution to agricultural development and economic growth. Proceeding of the 9th JIRCAS International Symposium, (JIRCAS'08), Value-Addition to Agricultural Products, Ibaraki, Japan, pp: 13-20
- National Population Commission (NPC) (2010): Kwara state Population.
- Ogunleye R. F., and Adefemi S. O. (2007). Evaluation of the dust and methanol extracts of *Garcinia kolae* for the control of *Callosobruchus maculatus* (F.) and *Sitophilus zeamais* (Mots). *J. Zhejiang Univ. Sci. B.* 8(12): 912-916.
- Rahji, M.A.Y., and S. A. Fakayode, 2009. A multinomial logit analysis of agricultural credit rationing by commercial banks in Nigeria. *International Research Journal of Finance and Economics* 24, 90-100.
<http://www.eurojournals.com/finance.htm>.
- Shing-Jy, J. T., & Hsiao-Feng, L. (2003). *Handbook of Vegetable Preservation and Processing* Edited by Y . H . Hui , Sue Ghazala , Dee M . Graham , K . D . Murrell , and Wai-Kit Nip CRC Press
- Soludo, C.C. (2006): Can Nigeria be the China of Africa? Being a Lecture Delivered at the Founders' Day of the University of Benin, Benin City, Nigeria, 2006.