



Willingness to Pay for Organic Vegetable in Ado-Ekiti Metropolis, Ekiti State, Nigeria

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Authors' contributions

This research work was carried out in collaboration between the three authors RSO, SOWT and ABS involved. Author RSO designed the study, wrote the protocol and the first draft of the manuscript. Authors SOWT and ABS reviewed the experimental design and all drafts of the manuscript. Author RSO managed and performed the analyses of the study. All the authors read and approved the final manuscript.

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ABSTRACT

This study was conducted to assess willingness to pay for organic vegetables in Ekiti State, Nigeria. Multi-stage sampling technique was used to collect data from 60 respondents that were purposively selected from 3 organizations within the State i.e. Ekiti State University, Ado-Ekiti, Federal Polytechnic, Ado-Ekiti and Ekiti State Government Secretariat, Ado-Ekiti. Descriptive statistics and Tobit regression model were used to analyze the collected data. Result of data analysis showed that 95% of the respondents had prior knowledge of organic vegetables. Also, 93.3% of the respondents agreed that organic vegetable was healthier than the conventional ones. The result also showed that out of the six organic vegetables the respondents were willing to pay for, cucumber recorded the highest premium (N49.33). The result from the tobit regression model showed that household size, educational level and monthly income were statistically significant at 5%, 1% and 1% respectively, implying that they were the variables influencing willingness to pay for organic vegetables in the study area. Independent variables with positive signs i.e. household size and

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awareness implied that the higher these variables, the more the willingness to pay for organic vegetables. It is therefore recommended that the three tiers of government, including the private sector, should mount serious awareness campaigns to sensitize Nigerian populace on numerous benefits of organic farming especially on health, finance and environment.

Keywords: Willingness; organic vegetable; Tobit regression.

1. INTRODUCTION

Food security remains an issue of growing concern in Sub-Saharan Africa (SSA), and in the drive to overcome this challenge, the tendency of government in the region has been to formulate policies and design programmes to draw farmers into high-input technology (United Nations Conference on Trade and Development) (UNCTAD) and (United Nations Environment Program) (UNEP) [1]. As a result of this, the use of agrochemicals is now becoming an obvious part of current agriculture production systems in SSA [2]. In Nigeria, for instance, an estimated 125,000 to 130,000 Mt of pesticides are applied annually for agricultural pest control, the highest in West Africa (United Nations Statistics Division) (3). The country's import bill on synthetic fertilizer totaled about USD 2 billion between 2006 and 2010 [3]. A wide array of agrochemicals exist, all of which are potentially harmful and have been linked to adverse human health conditions and environmental problems [4;5]. In developed countries, stringent laws and regulations on agrochemical use exists, and adherence is strictly enforced (e.g., European Union's Food Regulation EC/178 [6]; United States Environmental Protection Agency [7]. On other hand, in most SSA countries these laws are either non-existent or ineffective and, environmental pollution and other associated problems seem to continue unabated [2]. This is particularly true in the context of Nigeria, where the extent of pollution of the agrarian communities (which constitute over 60 percent of the population) by agrochemicals cannot be accurately estimated, as there are neither detailed research on the extent of environmental and health impact nor any effective monitoring process in place [8].

In light of these uncertainties, scholars and non-governmental organizations (NGOs) in Nigeria have been advocating for organic agriculture as a sustainable alternative farming system [9]. Organic agriculture is a holistic production management system that avoids the use of synthetic chemicals, growth hormones, antibiotics and gene manipulation, while promoting improved precise standards of

production that are socially and economically sustainable (International Federation of Organic Agriculture Movements [10]. It avoids the use of synthetic pesticides, herbicides, chemical fertilizers, growth hormones, antibiotics or gene manipulation. Instead, organic farmers use a range of techniques that help sustain ecosystems and reduce pollution. It dramatically reduces external inputs by refraining from the use of chemo-synthetic fertilizers, pesticides and pharmaceuticals. Instead, it allows the powerful laws of nature to increase both agricultural yields and disease resistance [11]. According to the [1], organic agriculture has the potential to offer a range of local and national sustainable development opportunities for Africa in that it integrates traditional farming methods, uses inexpensive locally available natural resources and has positive economic effects on farmers' productivity and income.

Vegetables are a common crop in Nigeria, grown and consumed by different groups of farmers. According to [12], the system for sustainable vegetable production should increase the inherent productive capacity of natural and biological resources in step with demand. The use of chemicals in vegetable production has been identified as a major source of health risk and a cause of extensive environmental damage. According to [13], food safety is a major concern as many of today's vegetable farmers inappropriately use toxic pesticides at pre- and post-harvest stages and this threatens the health of the farmer and consumers as well as contaminating the environment. Lumpkin argues that everyone (rich or poor), must have access to safe vegetables. The reduction of the use of chemical inputs through the adoption of organic agricultural production methods will help achieve these goals. In Nigeria however, organic agriculture had existed by default because of the unavailability and sparse use of chemical inputs by farmers. Others adopt the use of animal droppings as manure [14] and [15]. Indeed, [16] notes that non-certified organic systems (indigenous models that follow organic principles by intent or by default) of several million small farmers may represent at least an equivalent share in subsistence agriculture of developing

countries. The most significant motive for choosing organic food is the health factor followed by the environmental and animal welfare factors. Some consumers buy organic food as they perceive a difference in food quality.

Some recent studies suggest that many supplying countries and farmers of organic produce face huge challenges in entering and benefitting from organic exports in a sustainable way (e.g. [17;18], hence this study is aimed at examining the extent of awareness of the respondents about organic vegetables, analyzing the factors affecting consumers' willingness to pay for organic vegetables, ascertaining whether or not the respondents prefer organic over conventional vegetables, and determining the premium the respondents are willing to pay for organic vegetables.

2. RESEARCH METHOD

2.1 Study Area

The study was carried out in Ekiti State. Ekiti State is located in western Nigeria on coordinates 7°40'N 5°15'E / 7.667°N 5.250°E with a land area of 6,353 km² and population of 2,737,186 (NPC, 2006). Ekiti State has 16 Local Government Areas and enjoys tropical climate with two distinct seasons i.e. rainy and dry seasons. Temperature ranges between 21°C and 28°C with high humidity. The south westerly wind and the northeast trade winds blow in the rainy and dry (Harmattan) seasons respectively. Tropical forest exists in the south, while savannah occupies the northern peripheries.

2.2 Sampling Technique

A multi-stage sampling technique was employed in the survey. At the first stage, purposive sampling technique was used to select three organizations in Ekiti State i.e Ekiti State University Ado-Ekiti, Federal Polytechnic Ado-Ekiti, and Ekiti State Government Secretariat, Ado-Ekiti. At the second stage, simple random sampling technique was used to select 20 respondents from each organization mentioned above, making the sample size to be 60.

2.3 Data Source and Collection

Primary data were sourced through a well-structured questionnaire designed to obtain information on the socioeconomic indices, information on consumer awareness, past

experiences on organic products, buying preferences and willingness to pay premiums for selected organic vegetables. In addition, certain questions were designed to obtain the respondents' perceptions of organic vegetables over the conventional ones.

2.4 Data Analysis

Descriptive statistics was used to analyze the socioeconomic characteristics of the respondents, the level of awareness of the consumers and preference of respondents regarding organic food using frequency tables and percentages. Since the data were censored on both sides (left and right), Tobit regression model was appropriate to estimate WTP. The left truncation is the starting bid, i.e, respondents who would indicate a zero WTP, while the right truncation is the highest bid that respondents were able to offer for organic vegetable.

Tobit regression model can be implicitly written as:

$$Y = \beta_0 + \beta_1 X_n + e_i$$

Where Y= willingness to pay (WTP)

β_0 = Intercept coefficient

β_1 = Slope coefficient

X_n = Independent variables

Explicitly:

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

Y = Willingness to pay (number of organic vegetables bought by respondents divided by numbers of probable organic vegetables available for individual respondents)

X_1 =Awareness (Yes = 1, No = 0)

X_2 =Age (Years)

X_3 =Gender (male = 1, female = 0)

X_4 =Educational level (Non formal = 0, primary school = 1, secondary school = 2, tertiary institution= 3)

X_5 =Working experience (years)

X_6 = Monthly income (₦)

X_7 = Household size (number)

$\beta_1 - \beta_7$ = Regression coefficient of $X_1 - X_7$

e_i = Error term

3. RESULTS AND DISCUSSION

3.1 Socioeconomic Characteristics of the Respondents

Table 1 revealed that majority (76.7%) of the respondents were male while 66.7% of them were married. Also, it showed that respondents with age between 31 – 35 and 25 – 30 accounted for 31.7% and 30.0% respectively. The result further disclosed that majority (81.7%) of the respondents had household size of 1 – 5 persons. Result on educational status of the respondents showed that 48.3% of them acquired B.Sc., 33.3% had Masters/PhD. Also, the table showed that 73.3% of the respondents earned less than ₦150,000 monthly while 56.7% of the respondents had between 1-5 years as working experience. The social group category was reported in multiple responses form where 70.0%, 53.3% and 50.0% belonged to cooperative society, religious association and professional association respectively.

3.2 Respondents' Awareness of Organic Vegetables

Table 2 showed that majority (95.0%) of the respondents had prior knowledge of organic vegetables and had seen organic vegetables before. Also, 55.0% of the respondents revealed that they had seen organic vegetable for the first time between 2010 till date. The table further revealed that 91.7% of the respondents had eaten organic vegetables before and ate organic vegetables for the first time between 2010 till date. In addition, majority (90.0%) of the respondents had purchased organic vegetables before and 55.0% of them purchased it for the first time from 2010 till date. The table also revealed that 65.0% of the respondents first purchased organic vegetables in Ekiti State.

3.3 Perceptions on Organic Vegetables

Table 3 showed that 93.3% of the respondents agreed that organic vegetables were healthier than the conventional vegetables. It also showed that 83.3% supported that organic vegetables had higher nutritional value, 68.3% accepted that organic vegetables were tastier and 58.3% of the respondents said that organic vegetables were more expensive than conventional ones. In addition, 91.7% of the respondents agreed that organic vegetables were more beneficial to health and more environment friendly. The result further disclosed that 86.7% of the respondents said organic vegetables had longer shelf life

whereas 63.3% agreed that organic vegetables were more readily available and 93.3% of the respondents concluded that organic vegetables had less or no chemicals.

Table 1. Socioeconomic characteristics of respondents

Variables	Frequency	Percentage (%)
Gender		
Male	46	76.7
Female	14	23.3
Total	60	100.0
Age		
< 25	2	3.3
25 - 30	18	30.0
31 - 35	19	31.7
36 - 40	8	13.3
41 – Above	13	21.7
Total	60	100.0
Marital status		
Single	17	28.3
Married	40	66.7
Divorced	1	1.7
Widowed	2	3.3
Total	60	100.0
Household size		
1 – 5	49	81.7
6 – 10	8	13.3
11 – 15	3	5.0
Total	60	100.0
Educational level		
B.Sc	29	48.3
Masters/PhD	20	33.3
O.N.D	11	18.3
Total	60	100.0
Monthly income ('000₦)		
<150	44	73.3
150 - 300	10	16.7
301 - 450	6	10.0
Total	60	100.0
Working experience		
1 - 5	34	56.7
6 – 10	15	25.0
11 – 15	5	8.3
16 and above	6	10.0
Total	60	100.0
Social group		
Cooperative society	42	70.0
Religious association	32	53.3
Professional association	30	50.0
Social club	18	30.0
Political association	4	6.67

Source: Field Survey, 2017

Table 2. Awareness of the respondents about organic vegetables

Variables	Frequency	Percentage (%)
Prior knowledge		
Yes	57	95.0
No	3	5.0
Total	60	100.0
Seen organic vegetables before		
Yes	57	95.0
No	3	5.0
Total	60	100.0
Year first seen		
Not seen before	4	6.7
Before 1990	11	18.3
1990 - 1999	5	8.3
2000 – 2009	7	11.7
2010 till date	33	55.0
Total	60	100.0
Eaten organic vegetables before		
Yes	55	91.7
No	5	8.3
Total	60	100.0
First time eaten		
Not eaten	4	6.7
Before 1990	11	18.3
1990 – 1999	5	8.3
2000 – 2009	7	11.7
2010 till date	33	55.0
Total	60	100.0
Purchased organic vegetables before		
Yes	54	90.0
No	6	10.0
Total	60	100.0
First time purchased		
Not purchased	6	10.0
Before 1990	9	15.0
1990 – 1999	5	8.3
2000 – 2009	7	11.7
2010 till date	33	55.0
Where respondents first purchased organic vegetables		
Not purchased before	6	10.0
Ekiti	39	65.0
Others	15	25.0
Total	60	100.0

Source: Field Survey, 2017

3.4 Factors Influencing Willingness to Pay for Organic Vegetables

This section presents the results of Tobit model that showed how socio-economic characteristics of the farmers affected their willingness to pay for organic vegetables. Willingness was measured in terms of the number of organic vegetables bought by respondents divided by numbers of probable organic vegetables available for individual respondents. The likelihood estimates of the Tobit model indicated that chi-square (χ^2) statistic of 74 was highly significant ($P < 0.05$)

suggesting that the model has a strong explanatory power. The pseudo coefficient of multiple determination (R^2) showed that 65.38 percent variation in the dependent variable was explained by the included independent variables. This implies that the model showed a good fit to the data. The result revealed that household size, educational level and monthly income were statistically significant at 5%, 1% and 1% respectively, indicating that they were the variables determining willingness to pay for organic vegetables in the study area. The table also showed that household size and awareness

Table 3. Perceptions about organic vegetable over conventional vegetables

Variables	Frequency	Percentage (%)
Healthier		
Yes	56	93.3
No	4	6.7
Total	60	100.0
Higher nutritional value		
Yes	53	83.3
No	7	11.7
Total	60	100.0
Tastier		
Yes	41	68.3
No	19	31.7
Total	60	100
More expensive		
Yes	35	58.3
No	25	41.7
Total	60	100.0
More beneficial to health		
Yes	55	91.7
No	5	8.3
Total	60	100.0
More environments friendly		
Yes	55	91.7
No	5	8.3
Total	60	100.0
Longer shelf life		
Yes	52	86.7
No	8	13.3
Total	60	100.0
Readily available		
Yes	38	63.3
No	22	36.7
Total	60	100.0
Less or no chemicals		
Yes	56	93.3
No	4	6.7
Total	60	100.0

Source: Field Survey, 2017

Table 4. Tobit Estimate of Factors Affecting Consumers' Willingness to Pay for Organic Vegetables

Willingness to pay (WTP)	Coefficient	Standard Error	t	P> t
Sex	-0.0114	0.1193	0.10	0.924
Age	-0.0681	0.0546	-1.25	0.218
Household size	0.2229**	0.1003	2.22	0.031
Educational level	-0.0594***	0.0219	-2.71	0.001
Monthly income	-0.0821***	0.0247	-3.32	0.001
Working experience	-0.0651	0.0840	-0.77	0.442
Awareness	0.3364	0.2374	1.42	0.162
Constant	0.9200**	0.4281	2.15	0.036

Source: Data Analysis, 2017; *** = significant at 1%; ** = significant at 5%, LR $\chi^2 = 14.89$; Prob> $\chi^2 = 0.74$;
Log likelihood = -33.066216, Pseudo R² = 0.6538

of the respondents had a positive relationship with willingness to pay for organic vegetable, meaning that an increase in these positively signed variables would enhance willingness to pay for organic vegetables and vice-versa.

3.5 Summary Statistics of Premium Paid for Various Organic Vegetables

Table 5 revealed that the maximum premium respondents were willing to pay for okra and amaranthus was ₦100 while ₦150 was recorded for fluted pumpkin. The table also showed that the highest premiums respondents were willing to pay for tomato and pepper were ₦200 each while ₦500 for cucumber. The result further disclosed that the mean prices respondents were willing to pay for okra, amaranthus, fluted pumpkin, tomato, cucumber and pepper were ₦28.0, ₦28.83, ₦32.25, ₦45.25, ₦49.33 and ₦38.92 respectively.

Table 5. Premium for organic vegetables

Organic vegetable	Maximum (₦)	Minimum (₦)	Mean (₦)
Okra	100	0	28.0
Amaranthus	100	0	28.83
Fluted pumpkin	150	0	32.25
Tomato	200	0	45.25
Cucumber	500	0	49.33
Pepper	200	0	38.92

Source: Field Survey, 2017.

4. CONCLUSION AND RECOMMENDATIONS

The relevance of organic produce and consumer's WTP for the consumption of organic vegetable has been shown in this paper. Based on the findings of this study, it was concluded that; majority of the respondents were had prior knowledge of organic vegetables, and larger percent of them had married. It was also found that perceptions of consumers towards organic vegetable were positive revealing that organic vegetables were tastier, healthier, more environment friendly and had longer storability than the conventional vegetables which could be attributed to their high level of education. The study inferred that household size, educational level and monthly income were very influential in determining willingness to pay for organic vegetables in the study area. It is therefore recommended that; the three tiers of government including the private sector should mount serious awareness campaigns to sensitize Nigerian populace on numerous benefits of organic farming especially on health, finance and environment as well as emphasize on its contributions in mitigation of climate change, government should build on indigenous

knowledge in response and in partnership with farmers; and promote development of local and regional markets for organic products, organic food practices should be included in extension workers training programme curricula and researches on certified organic food should be included in the programmes of research institutes and universities in Nigeria, and organic agriculture should be promoted to meet export and domestic needs as this will lessen poverty and ensure food security in Nigeria. This requires formulation of agricultural policies to enhance the promotion of organic agriculture in Nigeria.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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