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WILLINGNESS TO PAY FOR ORGANIC VEGETABLES IN ABEOKUTA, SOUTH WEST NIGERIA

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ABSTRACT

Recent developments of widely reported incidents of dangerous levels of pesticides in food, fertilizer contamination of ground water and the occurrence of livestock diseases attributable to the production methods of large scale agriculture has stimulated the demand for organic food. Food safety is also gaining prominence in developing countries. This study was carried out to determine consumer awareness of organic vegetables and the determinants of willingness to pay a premium for the vegetables in south west Nigeria. The choice of the study area was premised on the fact that it is the most exposed to the organic agriculture movement in Nigeria. Primary data was collected with the aid of structured questionnaire. One hundred and fifty-two (152) copies of the questionnaire were found suitable for analysis. Most of the respondents were literate (100%) married (90.8%) men (65.8%), between 30 and 59 years old. The result shows that majority (88.8%) of the respondents indicated that they had a prior knowledge of, had seen (72.4%) and had eaten (61.8%) organic vegetables before. The respondents' willingness to pay a premium for organic vegetables and the factors affecting this decision were investigated using a dichotomous response model (logit). In the model, willingness to pay was specified as 1 if willing and 0 otherwise. The results of the restricted model shows that the ethnic background of the respondents and the perception that organic vegetables are not harmful influences their willingness to pay a premium price for organic vegetables. Respondents' age, work experience and household size significantly explains the perception that organic vegetables are healthier than conventional, Similarly, age, ethnicity, work experience, religion and household size equally explains respondents' impression that organic vegetables are costlier while the variable tastier was significantly explained by age and household income. There are strong indications of a ready market in Abeokuta, South west Nigeria in the event of extensive cultivation of organic vegetables.

Key words: Consumer, awareness, willingness, determinants, organic

INTRODUCTION

Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. Organic production systems are based on specific and precise standards of production which aim at achieving optimal agro-ecosystems which are socially, ecologically and economically sustainable [1]. 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 [2].

Vegetable is a common crop in Nigeria, grown and consumed by different groups of farmers. According to existing literature, the system of production for sustainable vegetable production should increase the inherent productive capacity of natural and biological resources in line with demand [3].

The use of chemicals in vegetable production has been identified as a major source of health risk and a cause of extensive environmental damage [4]. There is growing demand for organic vegetables among other products, and farmers the world over are shifting their production practices to meet this challenge. In Nigeria however, organic agriculture had existed by default because of the scarcity and high cost of chemical fertilizer which makes it an inaccessible input for farmers. An alternative source of manure for other vegetable farmers in Nigeria is animal droppings [5, 6]. 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 [7].

On the demand side, there is limited information on the response to organic products in Nigeria, which (to a certain extent), are new products. Empirical evidence tends to suggest that there is a limited level of awareness among consumers that vegetable farmers in Nigeria use animal droppings as manure [5]. It also suggests that organic products are more expensive principally because the production, distribution, and marketing of organic products are costlier than conventional [8]. In addition, the proponents argue that organic produce is characterized by low yield (and consequently) more expensive than the conventional due to avoidance of pesticides, chemical fertilizers and other inorganic inputs that would have enhanced the output. There are no visual distinctions between organic and conventional food. However, there are regulations and standards for products that are labeled and sold as “organic”. Adherence to these regulations and the process of certification is expensive, leading to higher production costs for organic foods, and higher retail prices [9].

Willingness to pay (WTP)

Willingness to pay (WTP) for a commodity is the amount of money a person would be willing to pay for higher level of quality. Willingness to pay is a measure of the resources individuals are willing and able to give up (for example) for a reduction in the probability of encountering a hazard that compromises their health [10]. A theoretically correct measure of the value individuals attach to improvements in food safety is their 'WTP' for safer foods [11]. This, therefore, is the largest amount that an individual is willing to pay for a specific improvement in food safety. The notion of willingness to pay could be defined as the sum of money representing the difference between consumers' surplus before and after adding or improving a food product attribute [12]. Models that estimate consumers' willingness to pay when adding or enhancing a given quality attributes are based on earlier studies [13] that maintain that consumers directly derive utility from the attributes of goods.

Tools for measuring WTP (which include the contingent valuation, travel cost and hedonic pricing) can be used to answer questions such as how much consumers are willing to pay for a quality upgrade or what effect a particular government intervention might be [14]. In this regard, consumers' willingness to pay (WTP) for organic food products can be measured using a direct valuation method such as the contingent valuation (CV). The CV method employed in this study affords an accurate analysis of behaviour and motives since their use facilitates changing the information level by applying sub samples [15]. The procedure consists of a dichotomous choice (DC) question and a maximum WTP question. In the dichotomous choice question, consumers were asked whether or not they are willing to pay a premium, to buy an organic vegetable instead of a conventional one. The amount is a percentage over the price of the conventional product, and differs across consumers. Consumers' responses are YES if they are willing to pay more for an organic vegetable or NO otherwise. Consumers were then asked for the exact premium they were willing to pay.

This study was designed to determine consumer awareness and perceptions of organic vegetables in Abeokuta. In addition, the study investigated the willingness of consumers to pay a premium for organic vegetables and the factors that influences their decision.

Brief Review of Literature

There are indications in literature [16] regarding the need for further investigation of the attitude, motives and willingness to pay for a range of organic products. The author laid emphasis on markets and produce sales points because of their bearing on the growth of organic foods. In an attempt to determine the consumers WTP premium prices for various cereal characteristics, the researchers [17] used a binary Probit model and included age, income, presence of children, education and an indication of whether the respondent has ever seen an organic product before. The results show that consumers are willing to pay premium prices for organic foods even those with less than 100% organic ingredient. They also reported that families with children were willing to pay higher premiums for foods with greater than or equal to 70% organic ingredients relative to consumers without children.

In a similar study in Kathmandu Valley, [18] the researchers highlighted the crucial role of consumer demand and particularly the motives behind WTP more for organic foods. According to the study, such decisions are premised on the consumers' knowledge, attitudes and intentions. The study equally observed that there are no clear cut distinctions between organic and inorganic foods except the labels. It further revealed that about 58% of the consumers were willing to pay between 6 – 20% price premiums for organic products.

MATERIALS AND METHODS

The survey

The study was carried out in September 2008 in an area largely populated by the staff and students of the University of Agriculture, Abeokuta (UNAAB), Ogun State, Nigeria. The University of Agriculture Abeokuta, a federal tertiary institution, is one of the three specialized institutions of its kind in Nigeria, and has the south west of Nigeria as its mandate area for purposes of agricultural research, teaching and extension. UNAAB was the birth place for the organic agriculture movement in Nigeria, hence the choice of the location as the study area. Primary data was collected by means of a structured questionnaire. The questionnaire was designed to obtain socioeconomic information on consumer awareness, past experiences about organic products, buying preferences and willingness to pay premiums for selected organic vegetables. Aspects of the questionnaire sought to obtain the respondents' perceptions of organic vegetables over the conventional ones. The questionnaire was pre-tested and necessary corrections effected. The final version was administered using the simple random sampling technique. .

Data Analysis

The socio-economic characteristics of the respondents were described by such tools as frequency tables and percentages. Respondents' willingness to pay a premium for organic vegetables and the factors affecting this decision was investigated using a dichotomous response model namely, the logit model. In this model, willingness to pay (the dependent variable) was specified as 1 if willing and 0 otherwise. The estimates in the full and restricted forms were computed. The explanatory variables in the full model included age of respondent in years (AGE), gender of respondent (GENDER; male=1, female=0), ethnic background of respondent (ETHNIC; other ethnic groups=1, Yoruba=0), marital status (MARITAL; married=1, others=0), years of working (WORKEXP), years of formal schooling (SCHOOLIN), household size (HHSIZE), total income of household (TOTALINC), prior knowledge of organic vegetables (PRIOKNO; yes=1, no=0), prior seeing of organic vegetable (SEENORG; yes=1, no=0), have eaten organic vegetables before (EATORG; yes=1, no=0), and have bought organic vegetables before (BOTORG; yes=1, no=0).

In addition, a few perception variables were tested. These included 'organic vegetables are healthier' (HEALTHY); 'organic vegetables are superior in quality' (SUPQUAL); 'organic vegetables are more tasty' (TASTIER); 'organic vegetables are worse than conventional vegetables' (WOSDCON), 'organic vegetables are more

expensive' (COSTLIER), 'organic vegetables are attractive (MORATRAC) and 'organic vegetables have no harmful effects' (NOHARM). Responses to each of the perception variables were solicited on the scale in which strongly disagree=1, disagree=2, undecided=3, agree=4, strongly agree=5.

On the basis of the results of the full model, the restricted model was ran using ETHNIC, WORKEXP, HEALTHY, SUPQUAL, and NOHARM as regressors. Selection between this and the full model was done using the likelihood ratio test, of which the relevant test statistic was compared to the table value at the 5% level.
Defining LLF(f) as the log likelihood function of the full, unrestricted model, and LLF(r) as the log likelihood function of the restricted model, then, for a large sample, it holds the - 2 [LLL(r) – LLF(f)] ~ X^2 (Chi square statistic) with q degrees of freedom, where q is the difference between the number of parameters in the full and restricted model.

As reported earlier, empirical works on the demand for organic products shows that consumers believe that organic products are healthier, costlier and tastier than the conventional. In this study, we attempted a modeling of the factors that enabled consumers to arrive as such conclusions. The dependent variables for the 3 equations were healthier choices, costlier choices and tastier. Total income (TOTALINC), age (AGE), gender (GENDER), household size (HHSIZE), marital status (MARITAL), religion (RELIGION), ethnicity (ETHCITY), years of formal education (SCHOOLIN) and work experience (WORKEXP) are the exploratory variables. In the models, the dependent variables in each case (HEALTHY, TASTIER and COSTLIER) assumed the value 1 and 0 otherwise. The binary variables in the models are AGE, GENDER, MARITAL, RELIGION and ETHNIC, while the remainder is continuous. A priori, income, age, years of formal education, work experience, marital status and household size are specified as positive functions of the dependent variables, while religion, ethnicity and gender could be either way.
We employed the statistical package SHAZAM version 9.0 of 2003 for the analysis.

RESULTS

The respondents were mostly married (90.8%) male (65.8%) and mainly of the Yoruba ethnic group (77%). About 55.3% of the respondents had between 10 and 19 years working experience. While majority (88.8%) of the respondents indicated that they had a prior knowledge of, had seen (72.4%) and had eaten (61.8%) organic vegetables before, less than 50 percent could say categorically when they had eaten (40%), purchased (29%) or seen (47%) organic vegetables before. The computed likelihood ratio test statistic is 14.3. The table value of Chi square at the 5% level and 14 degrees of freedom is 23.7 in the willingness to pay model. Estimates of the elasticity obtained in the model for these variables (at their means) are ETHNIC (-.336), WORKEXP (.025) and NOHARM (.169), respectively (Table 3). Other results as presented in tables 4 – 6 indicate that age, income and ethnicity positively and significantly influences consumer's perception of organic vegetables.

DISCUSSION

The gender and ethnic distribution of the respondents tends to reflect the overall distribution of the labour force in the University of Agriculture, Abeokuta. Most (65.8%) of them had post graduate degrees. This result compares favourably with similar preference studies [19] with high levels of literacy. The mean age was about 40 years. About 55.3% of the respondents had between 10 and 19 years working experience, with household sizes ranging from one to fifteen. This also compares favourably with household size in south west Nigeria (Table 1). In the vegetable market in Abeokuta there is no clear distinction between organic and inorganic produce. That is, there are no labels or signs to show the consumer whether his or her purchase was organic or conventionally grown. It was expedient therefore to ascertain that the respondent knew what organic vegetable was. While majority (88.8%) of the respondents indicated that they had a prior knowledge of, had seen (72.4%) and had eaten (61.8%) organic vegetables before, less than 50 percent could say categorically when they had eaten (40%), purchased (29%) or seen (47%) organic vegetables before, implying as was observed by a previous study in the same ecological zone [6], that the respondents' knowledge of organic vegetables was of non certified organic vegetables (Table 2). The findings is critical for the organic agriculture movement in Nigeria considering the level of education of the respondents, the fact that UNAAB hosted the first national conference in organic Agriculture in Nigeria in 2005 and a sub regional conference on organic Agriculture in 2008.

As indicated in the results, some of these variables were tested using the logit model and a summary of the estimates of the coefficients in the full and restricted models are presented in Table 3, along with a few goodness of fit statistics. The R square values in dichotomous response models are mostly intuitive and are usually not accorded the same rigorous interpretations as in general linear models with quantitative dependent variables [20]. Also, low R square values in human behavioral models are not uncommon [e.g. see 21]. The computed likelihood ratio test statistic is 14.3 for the willingness to pay model. The table value of Chi square at the 5% level and 14 degrees of freedom is 23.7. The conventional statement of the null hypothesis is that the restricted model is preferred to the full model. Thus, comparison of the table and computed Chi square values appears to favour the restricted model.

On the basis of the results of the restricted model, the ethnic background of the respondents (ETHNIC) influences their willingness to pay for organic vegetables. As defined in this study, the likelihood of paying more decreases towards the Yoruba ethnic group in Nigeria and vice versa. Perhaps some explanation for this is inherent in the socio-economic characteristics already presented. The years of working or working experience (WORKEXP) has been shown to positively influence the likelihood of paying for organic vegetables. This is probably explained by such intervening variables as accumulated experience or familiarity with organic vegetables, level of awareness, and increase in income over years of working. Finally

the perception that organic vegetables are not harmful (NOHARM) has positively influenced the likelihood of paying for the commodity.

The estimates of the elasticity obtained for these variables (at their means) are ETHNIC (-.336), WORKEXP (.025) and NOHARM (.169), respectively. These are all in the 'inelastic' range, suggesting that a unit increase in the values of the explanatory variables will lead to less than proportionate change in the likelihood of paying for organic vegetables in the study area.

The result of the analysis in the other models, that is HEALTHIER, COSTLIER and TASTIER, indicate that the coefficient of AGE was positive and significantly related to the perception of respondents that organic vegetables are healthier, costlier and tastier (Tables 4 – 6). The value of elasticity at the mean was 1.38, 2.62 and 1.60 for HEALTHIER, COSTLIER and TASTIER choices respectively. The result fits the a priori expectation about age as a factor in the analysis of consumer preferences for organic vegetables. The older an individual, the more conscious she is about eating healthy and (perhaps) tastier foods. Household size (HHSIZE), work experience (WORKEXP), religion (RELIGION), and ethnicity (ETHNIC) were factors that explained why respondents perceive that organic vegetables are costlier than the conventional (Table 5). In particular, the household size (HHSIZE) and work experience are negatively related to the dependent variable contrary to a priori expectation. By implication, as household size increases, there is the likelihood that the household will demand less of organic vegetables. The coefficient for total income (TOTALINC) was positive in the models specified for HEALTHIER and TASTIER choices. It was also statistically significant at P- value 0.15, though within the inelastic range of 0.11 and 0.29 for HEALTHIER and TASTIER choices respectfully (Table 6). An increase in income will increase organic vegetable consumption in Abeokuta, Nigeria. The results satisfied the a priori expectations for the functional relationship between total income, age, years of formal education and marital status and the dependent variables

CONCLUSION

The results obtained have shown that consumers in the study area are indeed aware that vegetables can be grown with organic inputs. They also agree that organic vegetables are healthier, tastier, and costlier, have no harmful effects and are of better quality than the conventional vegetables. They are also willing to pay mean premiums ranging from 23% for organic cucumber to 73% for organic *Telfairia occidentalis hook F (*fluted pumpkin). The estimate of the elasticity for ethnicity seems to suggest that in the event of extensive cultivation of organic vegetables, there is a potentially ready market in the south western part of the country.

The study has enriched our understanding of the demand for organic vegetables in general and in Abeokuta, South West Nigeria in particular.

Table 1: Socioeconomic Characteristics of Respondents

Variables	Frequency	Percentage
Age		
<30	12	7.9
30-39	57	37.5
40-49	65	42.8
50-59	18	11.8
Total	152	100
Gender		
Female	52	34.2
Male	100	65.8
Total	152	100
Marital Status		
Married	138	90.8
Others	14	9.2
Total	152	100
Educational level		
NCE/OND	8	5.3
HND/B.Sc	44	28.9
M.Sc./Ph.D	100	65.8
Total	152	100
Ethnicity		
Yoruba	117	77
Igbo	7	8.6
Others	28	18.4
Total	152	100
Household size		
<5	98	64.5
5-9	52	34.2
10+	2	1.3
Total	152	100

Source: Survey data in 2008

Table 2: Knowledge and Experiences with organic vegetables

Variables	Frequency	Percentage
Prior Knowledge		
Yes	17 135	88.8
No	17	11.2
Total	152	100
Seen organic vegetables before		
Yes	110	72.3
No	36	23.7
Don't know	6	4
Total	152	100
Year seen		
Less than 1980	9	5.9
1980-1989	17	11.1
1990-1999	15	9.8
2000-2008	31	20.3
Don't know	80	52.6
Total	152	100
Eaten organic vegetables before		
Yes	94	61.8
No	44	28.9
Don't know	14	9.2
Total	152	100
When eaten		
Less than 1980	11	7.2
1980-1989	10	6.5
1990-1999	10	6.5
2000-2008	30	19.7
Don't know	91	60
Total	152	100
Purchase of organic vegetables		
Yes	66	43.4
No	30	36.8
Don't know	56	19.7
Total	152	100
When purchased		
Less than 1980	1	0.7
1980-1989	6	3.9
1990-1999	5	3.2
2000-2008	32	21
Don't know	108	71
Total	152	100

Source: Survey data in 2008

Table 3: Determinants of Willingness to pay for Organic Vegetables

Variables	Full model		Restricted model++	
	Estimated coefficient	T-ratio	Estimated coefficient	T-ratio
AGE	-.0124	-.2925		
GENDER	-.5191	-1.1009		
ETHICITY	-.7114	-1.4216	-1.0032	-2.3358**
MARITAL	-.7791	-.9639		
WORKEXP	.1009	2.0453**	.07385	2.0999**
SCHOOLIN	.0233	.5298		
HHSIZE	.0743	.6679		
TOTALINC	-.0000015	-1.0916		
PRIOKNO	.8182	1.1447		
SEENORG	.6006	1.0795		
EATORG	-1.0980	-2.6493***		
BOTORG	.03408	.1170		
HEALTHY	.3686	1.0126	.2648	.8224
SUPQUAL	-.0129	-.0363	-.05407	-.1708
MOTASTY	-.0692	-.2517		
WOSDCON	.1875	.6449		
MOREXPS	.0592	.2911		
MORATRAC	-.0925	-.3769		
NOHARM	.6101	2.4007**	.5068	2.2687**
CONSTANT	-2.7068	-1.0480	-2.5188	-2.9175***
LLF(+)	-79.38		-86.51	
ESTRELLA R-SQ.	.256		.167	
CRAIG-UHLER R-SQ.	.318		.215	

*** Statistically significant at the 1% level
** Statistically significant at the 5% level
+ Log Likelihood function

Table 4: Logit Estimates for Healthier Choices

Variables	Estimated coefficient	T-ratio
AGE	.1017	2.2674**
GENDER	-.3535	-.8990
ETHNIC	-.6510	-1.4576
MARITAL	.4674	.7289
SCHOOLIN	-.008821	-.2450
WORKEXP	-.07457	-1.6884*
RELIGION	-.1217	.2421
HHSIZE	-.1672	-1.7318*
TOTALINC	.000002409	1.1806
CONSTANT	-1.6947	-1.0787
LLF(+)	-88.05	
CRAIG-UHLER R-SQ.	0.116	

** Statistically significant at the 5% level
* Statistically significant at the 10% level
+ Log Likelihood function

Table 5: Logit Estimates for Costlier Choices

Variables	Estimated coefficient	T-ratio
AGE	.08991	1.8658*
GENDER	.3029	.6892
ETHNIC	1.2859	2.7176***
MARITAL	.2905	.4339
SCHOOLIN	.02430	.6046
WORKEXP	-.1184	-2.2010**
RELIGION	1.0421	1.9574**
HHSIZE	-.3005	-2.5599**
TOTALINC	.0000004719	.3275
CONSTANT	-3.0254	-1.7175*
LLF(+)	-77.96	
CRAIG-UHLER R-SQUARE	0.205	

*** Statistically significant at the 1% level
** Statistically significant at the 5% level
* Statistically significant at the 10% level
+ Log Likelihood function

Table 6: Logit Estimates for Tastier Choices

Variables	Estimated coefficient	T-ratio
AGE	.07419	1.7531**
GENDER	-.1868	-.4862
ETHNIC	.2371	.5397
MARITAL	.6272	.1018E-01
SCHOOLIN	1.1781	.3154
WORKEXP	-.5427	-1.2904
RELIGION	.2372	.4951
HHSIZE	-.09375	-1.0004
TOTALINC	.000003609	1.6941*
CONSTANT	-3.0851	1.9934**
LLF(+)	-.93.50	
CRAIG-UHLER R-SQ.	0.110	

** Statistically significant at the 5% level
* Statistically significant at the 10% level
+ Log Likelihood function

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