

Consumers' Perception and Willingness to Pay For Organic Leafy Vegetables in Akinyele Local Government Area of Oyo State

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ABSTRACT

The harmful effects of the use of agrochemicals and inorganic fertilizers on livestock, human beings among others have made developing countries including Nigeria to gradually move towards organic agriculture. Furthermore, food safety is steadily becoming an important issue the reason being that people desire to consume food free of chemical residues. This study was carried out to determine consumers' perception of organic leafy vegetables and their willingness to pay a premium for the organic leafy vegetables in Akinyele Local Government Area of Oyo State. Primary data was collected using a multistage sampling technique to collect data from 120 respondents using a structured questionnaire containing Contingency Valuation (CV) questions and other relevant variables. The Data were analyzed using descriptive statistics and logistic regression model. Result shows that 55 percent of the respondents were single, 43.3 percent were married. Most (83%) of the respondents were in their active working age. Logit model result showed that Bid price (1%) and household size (5%) significantly influence willingness to pay (WTP) for organic vegetable based on environmental benefit. Likewise, Bid price (1%), age (1%), years of formal education (5%), monthly income (5%) and being an artisan have significant effect on WTP for organic leafy vegetable based on health benefit. The estimates of mean WTP were ₦58.64 and ₦77.74 based on environmental and health benefits respectively. It was recommended that respondents' human capacity development should be enhanced while enlightenment programme to create proper awareness about organic leafy vegetables should be put in place.

Keywords: Organic vegetables, Willingness to pay, Environmental benefit, Health benefit

INTRODUCTION AND PROBLEM STATEMENT

Organic agriculture is a production system that sustains the health of soils, ecosystems and people. Organic agriculture relies on ecological processes, biodiversity and cycles adapted to local conditions to promote fair relationships and a good quality of life for all involved, rather than the use of inputs with adverse effects (IFOAM, 2009). Organic agriculture combines tradition, innovation and science to benefit the shared environment and recognition (Van Elzakker *et al.*, 2007). Organic farming is the form of agriculture that relies on methods such as crop rotation, green manures, animal manures, legumes, compost, biological pest control, crop residues, off farm organic wastes and a host of others that helps to maintain soil fertility and productivity, sustain ecosystems and reduce environmental pollution (Paull, 2011).

In Nigeria, about 70% of the population practices organic agriculture. A large number of small scale farmers in Nigeria practice organic

agriculture by default because of the prohibitive costs of chemical fertilisers and other agrochemicals. These farmers are not touched by government policies on input supply and other incentives to optimize agricultural productivity (Adeoye, 2011). Organic agriculture can contribute to meaningful socioeconomic and ecologically sustainable development. It is therefore an advantage for the country to fully embrace the practice of organic agriculture to maximize profits of its agricultural exports in the world market.

Vegetables are edible plants or parts of a plant, but usually exclude seeds and are mostly sweet. This typically means the leaves, stems, fruits, bulbs or root of a plant. Leaf vegetables, also called potherbs, greens, vegetable greens, leafy greens or salad greens, are plant leaves eaten as a vegetable, sometimes accompanied by tender petioles and shoots. Some vegetables can be consumed raw, some may be eaten cooked, and some must be cooked in order to be edible. In essence, vegetables are crop plants that requires

little processing before they are eaten. Leafy vegetables are typically low in calories, low in fat, high in protein per calorie, high in dietary fibre, high in iron and calcium, vitamin A, vitamin B6 and very high in phyto-chemicals such as vitamin C, carotenoids, lutein, folate as well as vitamin K (Gruda, 2005). Organic leafy vegetables include vegetables like celosia, corchorus, amaranthus and telfaria amongst others.

According to Stanlake and Grant (1999), leafy vegetables have a high content of water and abundance of cellulose. The cellulose though not digested serves as a useful purpose in the intestine as roughage, thus promoting normal elimination of waste products. Vegetables are very important amongst the different foods produced and consumed because of their contribution to good health by providing inexpensive sources of minerals and vitamins needed to supplement people's diet which are mainly carbohydrates (Adedoyin *et al.*, 1996).

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 (Golan and Kuchler, 1999). Alternatively, it can also be stated that WTP is the maximum amount of money an individual is willing to pay for a commodity; as such, WTP is an indicator of the value of the commodity to that individual. A theoretically correct measure of the value individuals attach to improvements in food safety is their 'WTP' for safer foods (Spencer, 1996). Willingness to pay (WTP) can also imply the maximum amount a person would be willing to pay, sacrifice or exchange in order to receive a good or to avoid something undesired, such as pollution, food contamination etc.

There is a growing demand for organic foods and more farmers are engaging in organic farming so as to meet the ever increasing demand. The growing demand may be because of consumer's belief that organic products are safe, superior in quality; taste better, has no harmful effects and a lot of other benefit unlike conventional products. However, in developing countries like Nigeria, consumers are less informed on the benefits of organic food as compared to other countries. Organic products can be said to be just emerging in the Nigerian market since only a few farmers are beginning to practice organic farming in Nigeria (Dipeolu *et al.*, 2009). On the other hand,

there are still a considerable number of farmers involved in the local production of leafy vegetables which is widely known for its excessive use of agro chemicals. Demand for organic food products in the United States, Europe, and in other countries is growing rapidly, yet market shares remain quite small (Piyasiri and Ariyawardana 2002).

People generally demand for leafy vegetables because of consumer's belief of the potential nutritional and health benefits of vegetables. According to Dipeolu and Akinbode (2005), only very few farmers in Nigeria practice organic farming which means that many farmers make use of agro-chemicals for their production. This has posed food safety concerns to Nigerians and people residing in Oyo State are not left out because the use of agro-chemicals acts as a major source of health risk and a cause of extensive environmental damage. According to Lumpkin (2005), food safety is a major concern as vegetable farmers inappropriately use toxic pesticides at pre and post-harvest stages which threatens the health of the farmer and consumers as well as contaminates the environment. The study further asserted that pesticides are toxic pollutants that can and are spread by water, air and the food chain all over the world. Some can get in the blood and skin up to a point where a mother's breast milk will contain toxic compounds, which then weakens the immune system of the baby and consequently affects health negatively. In addition, given today's extensive use of pesticides, it is almost impossible for an individual to avoid daily exposure to low levels of several different pesticide residues. Researchers have found that there are possible adverse effects on human health arising from continuous long-term, low-level pesticide exposure or chronic exposure (Piyasiri *et al.*, 2002). The London Food Commission conducted a toxicological survey on active ingredients currently permitted for use by the United Kingdom pesticide manufacturers. The result of the survey showed that out of the 426 chemicals listed, 68 were carcinogenic, 61 were mutagenic and 35 have various reproductive effects, ranging from impotency to a variety of birth defects. In total, 40 per cent of the pesticides currently in use were linked with at least one adverse effect which is hazardous to human beings (Agrochemical, 2001). Also, the environmental damage that can be caused by agro-chemicals includes; Soil damage which results from the use of synthetic fertilizers in soils without a balanced addition of

organic materials to help with the formation of humus leading to soil compaction, soil erosion, degradation of soil quality, reduction in soil biological activities etc.

According to Barkley (2002), the production, distribution, and marketing of organic products are more expensive than conventional products because of the costs incurred in the segregation of organic products. Also, there are no visual distinctions between organic and conventionally produced food. Any product that is labelled and sold as "organic" must firstly, adhere to the regulations and meet the standards for the term "organic". Secondly, be kept separate from conventionally-produced food, and lastly, be "Certified" by a regulatory agency to ensure "truth in advertising." Each of these three processes (steps) of certification is expensive, leading to higher production costs and higher retail prices for organic food and consequently, final consumers may not have the financial ability to purchase them. In addition, Barkley (2002) argued that organic produce is characterized by low yield (and consequently) more expensive than the conventional ones due to avoidance of pesticides, chemical fertilizers and other inorganic inputs that would have enhanced the output. In essence, the cost of organic leafy vegetable will be higher than that of conventional food. It is thus important to determine if consumers are willing to pay an extra amount of money for organic leafy vegetables. Similarly, Belicka and Bleidere (2005) also reported that the cost of organic food is usually higher than conventional ones. Prices for organic food include costs of growing, harvesting, transportation and storage. They further asserted that the intensive management and labour used in organic production are frequently (though not always) more expensive than the chemicals routinely used on conventional farms.

Indiscriminate use of chemicals by local farmers in vegetable production has been a source of decline in food safety in Nigeria (Dipeolu *et al.*, 2009). Most of the farmers do this so as to increase their income but this is usually at the detriment of consumers' health. Thus, to improve food safety in the country, farmers are being encouraged to participate in organic farming of leafy vegetables. Despite the efforts to improve food safety in the country through participation in organic farming of leafy vegetables, there is still a low perception about organic farming and its benefits amongst consumers, it is therefore imperative to find out consumer's perception and

willingness to pay for these organic leafy vegetables.

The objective of this study is in two folds: first, to determine consumers' level of awareness of the benefits of organic vegetables; and second, to determine the factors that influences consumers' willingness to pay for organic leafy vegetables and estimate consumers mean willingness to pay.

METHODOLOGY

The study was carried out in Akinyele Local Government Area of Oyo state. Akinyele Local Government Area has its administrative headquarters located at Moniya, Ibadan. A multi-stage sampling technique was employed in selecting the respondents from the study area. The first stage involved the purposive selection of Akinyele Local Government based on high concentration of vegetable farmers who supply major markets and make use of organic farming techniques coupled with highly diversified consumers living in the local government. The second stage involved the use of random sampling technique to select three wards out of the total twelve wards in the local government area which represent the high, middle and low income groups. Respondents varied from government worker, trader, artisans, housewives, retiree to students. For the third stage, simple random sampling technique was used to select 120 respondents from the three selected wards. A structured questionnaire was used to collect the data from the respondents.

Contingent valuation question format proposed by Hanemann and Kanninen (1999) was adopted in this study. The respondents were asked if they were willing to pay a specific amount for the quality attributes of organic leafy vegetables. According to their answers, a follow up question was asked.

TECHNIQUES OF DATA ANALYSIS

Descriptive statistics such as percentages, mean, frequency distribution tables, standard deviations, minimum and maximum value were used to analyse socioeconomic characteristics and awareness of the benefits of organic leafy vegetables of the respondents. Likewise, contingent valuation method analyzed using logit model was used to determine the factors that influence consumers' willingness to pay for organic leafy vegetables. The logit model postulates the probability (P_i) that a consumer is either aware / willing to pay or not by predicting a

binary outcome (YES or NO). In this model, willingness to pay (the dependent variable) was specified as 1 if willing and 0 otherwise.

The logit model is specified following the one used to estimate willingness to pay for improved

$$P_i = E(Y = 1 / X_i) = \frac{1}{1 + e^{-Z}} \dots\dots\dots 1$$

Where P_i is a probability that $Y_i = 1$. Its value ranges from 0 to 1, and it is assumed to be non-linearly related to Z .

Z which is assumed has values from $-\infty$ to $+\infty$, include linearly specified independent variables given by:
 $Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots\dots\dots \beta_n X_n + U_t \dots\dots\dots 2$

Y_i is dependent variable –Willingness to pay by respondents.

X_i is a set of independent variables

β_0 is the intercept which is a constant.

$\beta_1, \beta_2, \beta_3, \dots\dots\dots \beta_n$ is the coefficient of the selected variables that affects willingness to pay for organic leafy vegetables.

U_t is the error or disturbance term.

Where:

Y = Responses of consumers' willingness to pay (WTP) which is either "YES" or "NO"

X_1 = Bid (₦50, ₦80 and ₦100)

X_2 = Age of respondent (Years)

X_3 = Sex of respondent (Male = 1, Female = 0)

X_4 = Marital Status of respondents (Married =1, otherwise = 0)

X_5 = Household size of respondent (Headcount)

X_6 = Members of Family Working (Headcount)

X_7 = Number of years of Formal Education

X_8 = Monthly Income of respondents (₦)

X_9 = Amount Spent on Vegetables Monthly (₦)

X_{10} = Major occupation of respondents (Artisan = 1, otherwise =0)

X_{11} = Major occupation of respondents (Government Worker =1, otherwise = 0)

X_{12} = Major occupation of respondents (Trader = 1, otherwise = 0)

X_{13} = Major occupation of respondent (Unemployed = 1, otherwise = 0).

X_{14} = Perception about organic leafy vegetables (Yes =1, otherwise = 0)

RESULT AND DISCUSSION

The socioeconomic characteristics give the background information on the sampled respondents. The distribution of age of the respondents as shown in Table 1 reveals that most of the respondents (60%) were less than or equal to the age 30 years, 23.3 percent were between the age range of 31 – 45 years, 13.3 percent were within the age range of 46 – 60 years, while the remaining 3.3 percent were above or equal to 61 years of age. The mean age was 32.17 years. Similarly, Dipeolu *et al.*, (2009) study also showed the mean age of the respondents to be 40 years. The implication of these findings is that majority of the respondents are in their active working age.

More than half of the respondents (62.5%) were male, whereas 37.5 percent were female. About 75.8 percent of the respondents were native

conservation of environmental species (Branka and Kelly, 2001). The coefficients estimated from this model were used to calculate the mean willingness to pay. Hence, the cumulative logistic distribution function is given by:

of Oyo State while 24.2 percent were non-native. This implies that majority of the respondents dwelling in the study area are indigenes of Oyo State. This is in line with the study of Dipeolu *et al.*, (2009) where majority of the respondents are mainly indigenes.

Moreover, 55 percent of the respondents were single, 43.3 percent were married, and 1.7 percent of the respondents were divorced. The result implies that both single and married are highly represented in the sample. This is contrary to the study of Dipeolu *et al.*, (2009) where 90.8 percent of the respondents were married. About 44.2 percent of the respondents had a household size of 5 or less, 50.8 percent had a household size within the range of 6 – 9, and 5 percent of the respondents had at least or more than 10 members in their households. The average household size is approximately 6 persons per household.

TABLE 1
Socioeconomic Profile of the Respondents

		Frequency	Percentage	Others
Age	≤ 30 years	72	60.0	
	31- 45 years	28	23.3	
	46 – 60 years	16	13.3	
	≥ 61 years	4	3.3	
	Average			32.2
	Standard Deviation			13.7
Sex	Male	75	62.5	
	Female	45	37.5	
Nativity	Native	91	75.8	
	Non native	29	24.2	
Marital Status	Single	66	55.0	
	Married	52	43.3	
	Divorced	2	1.7	
Household size	≤ 5	53	44.2	
	6 to 9	61	50.8	
	≥10	6	5.0	
	Average			5.9
	Standard Deviation			2.1
Years in School	≤ 6	2	1.7	
	07 to 12	40	33.3	
	13 to 16	61	50.8	
	17 and Above	17	14.2	
	Average			13.8
	Standard Deviation			3.2
Primary Occupation	Artisan	12	10.0	
	Government Worker	30	25.0	
	Trader	20	16.7	
	Student	29	24.2	
	Private Worker	10	8.3	
	Retiree	8	6.7	
	House wife	11	9.2	

Source: Field Survey, 2012.

Findings as shown in Table 1 reveals that majority (65 percent) of the respondents had more than secondary education. The occupation distribution shows that majority(25%) of the sampled respondents were government workers. More so, that the sample was largely encompassing with respect to occupation.

Consumption and awareness about the health and environmental benefits of organic leafy vegetables

The average household consumption expenditure on vegetables per month was ₦811.50, while the minimum and maximum amounts were ₦50 and ₦500 respectively. Likewise, majority, 40 percent, of the respondent preferred to eat *cochorus (ewedu)*, while fluted pumpkin (*Ugwu*)(11.7%) was least consumed leafy vegetable among the sampled respondents. This shows that majority of the respondents relish *cochorus (ewedu)* above other leafy vegetables.

TABLE 2
Consumption and Awareness Profile of Organic Vegetables

		Frequency	Percentage	Others
Amount (₦)	≤ 400	50	41.7	
	401 – 800	41	34.2	
	801 – 1200	12	10.0	
	≥ 1201	17	14.1	
	Total	120	100.0	
	Mean			811.5
	Standard Deviation			432.0
Leafy Vegetables	Celosia	35	29.2	
	Amaranthus/Tete	16	13.3	
	Cochorus/Ewedu	48	40.0	
	Fluted pumpkin/Ugwu	14	11.7	
	Others	7	5.8	
	Total	120	100	
Awareness of Health Benefit	Yes	98	81.7	
	No	22	18.3	
	Total	120	100	
Awareness of Environmental Benefit	Yes	89	74.2	
	No	31	25.8	
	Total	120	100.0	

Source: Field Survey, 2012.

From Table 2, it is evident that 81.7 percent of the respondents sampled were aware of the health benefits of consuming organic leafy vegetables while the remaining 18.3 percent were not aware of the health benefits of organic leafy vegetables. Basically, this means that majority of the respondents were aware of the health benefits associated with consuming organic leafy vegetables, however, there is a gap to fill as regards creating awareness in this regard. Furthermore, 74.2 percent of the respondents were aware of the environmental benefits of producing organic leafy vegetables while the remaining 25.8 percent were not aware at all. Comparatively, the respondents had more awareness of the health benefits of organic leafy vegetables than the environmental benefits.

Determinants of consumers' willingness to pay for organic leafy vegetables

Table 3 clearly presents the results of logit model for determinants of willingness to pay for organic leafy vegetables considering the environmental and health benefit attributes. The result of the diagnostic statistics of the two equations shows that with log likelihood ratio of

31.94 and 32.61 for health benefit and environmental benefit equations respectively, the model is significant and fit the economic situation under analysis.

Particularly, the result of the Logit model reveals that two and five coefficient estimates out of fourteen significantly influence respondents' willingness to pay for health and environmental benefit respectively. Specifically, Bids is significant at 1% and has a negative influence on the willingness to pay for organic leafy vegetables with respect to both benefits. That is as offer price for organic vegetable increases consumers' WTP decreases, hence their utility for organic leafy vegetables. However, the marginal estimate of the bids reveals that at the margin, likelihood of consumers' WTP decreases more for environmental benefit (1.3%) compared to health benefit (1%) with ₦1 increase in offer price of organic vegetable.

Household size is significant at 5% level and has a negative influence on WTP for environmental benefit provided by organic leafy vegetable production system. This shows that as household size increases, their WTP for organic leafy vegetables at the premium decreases as well.

Hence, a large household size does not encourage respondents' willingness to pay for organic leafy vegetables.

Also, age is significant at 1% and has a positive effect on willingness to pay for health benefit provided by organic leafy vegetables. This shows that an increase in the age of consumers encourage their willingness to pay for organic leafy vegetables and that the older the consumers are the more conscious they are of their health, hence their utility for organic leafy vegetables.

Years of formal education is significant at 5% and has a positive influence on the respondents' willingness to pay for health benefit in organic leafy vegetables. This implies that the more educated a respondent is, the more their willingness to pay for organic leafy vegetables because they easily understand the health benefits of organic leafy vegetables.

Monthly income is significant at 5% and has a negative relationship with WTP for organic leafy vegetables. This indicates that respondent's

willingness to pay for organic leafy vegetables decreases as monthly income increases.

Lastly, having artisan as occupation is significant at 1% and has a positive relationship with willingness to pay for organic leafy vegetables. This implies that being an artisan encourages their WTP for organic leafy vegetables.

Following Krinsky and Robb (1986) procedure with 10,000 draw, we estimated mean willingness to pay (WTP) with respect to environmental and health benefits as shown in Table 3. The table reveals that consumers are willing to pay on the average ₦58.64 per kg of organic vegetable because of the environmental benefits and they are willing to pay on the average ₦77.74 per kg of organic vegetable because of the health benefits to be enjoyed. This implies that consumers have more preference for health benefit of organic vegetable than for environmental benefits.

TABLE 3
Logit model of respondents' willingness to pay for organic leafy vegetables

Variables	Environmental Benefit			Health Benefit		
	Coefficient	Std. Error	Marginal Effect	Coefficient	Std. Error	Marginal Effect
Bids (₦100 per Kg)	- 0.0443***	0.0132	-0.0109	- 0.0556***	0.0153	-0.0131
Age of Respondents	- 0.0244	0.0313	-0.0006	0.1040***	0.0369	0.0247
Sex	0.4660	0.5037	0.1128	- 0.7506	0.5126	-0.1724
Marital Status (Married)	- 0.5769	0.7509	-0.1397	-1.0995	0.7327	-0.2591
Household Size	- 0.3120**	0.1566	0.0765	0.07197	0.1526	0.0171
Members of Family Working	- 0.2966	0.2037	-0.0727	- 0.0739	0.2033	-0.0175
Years of formal education	0.0225	0.0838	0.0055	0.1762**	0.0949	0.0418
Monthly Income (₦'000)	- 0.0047	0.0100	- 0.0012	- 0.0401**	0.0158	- 0.0095
Expenditure on vegetables monthly (₦'000)	- 0.0200	0.2400	- 0.0061	0.2373	0.2518	0.0563
Artisan	0.6726	0.7913	0.1666	2.9401***	1.0561	0.4159
Government Worker	0.6849	0.7413	0.1691	- 0.1810	0.7761	-0.0433
Trader	0.9126	0.6752	0.2242	- 0.3951	0.6511	-0.0959
Unemployed	- 0.1353	0.8950	-0.0326	1.1292	0.8413	0.2264
Perception	- 0.0892	0.0582	-0.0219	- 0.0598	0.0580	-0.0142
Constant	2.6810	1.9708		0.9775	1.9939	
Mean WTP (₦)	58.64			77.74		
Number of Observations	120			120		
LR Chi ² (14)	32.610			40.460		
Prob. > Chi ²	0.003			0.000		
Pseudo R ²	0.199			0.244		
Log Likelihood	- 65.516			- 62.799		

CONCLUSION

The results emanating from this study make two key contributions to economics of organic leafy vegetable marketing. First, it identifies that offer price, age, household size, years of formal

education, monthly income and occupation of consumers are key determinants of consumers' willingness to pay for organic vegetables. Second, estimates of mean willingness to pay from the contingent valuation show that consumers are

willing to pay and are willing to pay as much as ₦77.74 per kg for the health benefits and ₦58.64 per kg for the environmental benefits. It can be adduced from the study therefore that there is a need to promote technology for organic vegetable production that will reduce its average cost of production per unit output. This is necessary since findings shows that the higher the price of organic leafy vegetables the lower the willingness to pay for it on the part of the respondents.

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