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AWARENESS AND WILLINGNESS TO PAY FOR ORGANIC VEGETABLES AMONG FARMING HOUSEHOLDS IN ANAMBRA STATE, NIGERIA

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ABSTRACT

The aim of the study was to analyze awareness and willingness to pay (WTP) for organic vegetables among households in Anambra State, Nigeria. Analysis of data was done using descriptive statistics such as frequency and percentages, and Contingent Valuation Method. One hundred and forty (140) respondents were utilized for the study but with a valid response rate of 85.7 percent to give one hundred and twenty (120) respondents sampled from the study area using multistage sampling procedure. Data used for the research was obtained with the aid of a well-structured questionnaire. The most commonly consumed vegetables were pumpkin (59.17%), garden egg (28.33%), cucumber (8.33%) and amaranth (4.17%). The respondents were aware (95.83%) of the health benefits of organic vegetables and also aware (71.7%) of environmental effects of using inorganic fertilizer for vegetable production. In the WTP for organic vegetables, it was observed that 21.7% of the respondents were not WTP for organic garden egg, while 78.3% of the respondents were WTP a premium for a kg of organic garden egg. About 8.3% of the respondents were not WTP for organic pumpkin while 91.7% of them were WTP a premium for organic pumpkin. The analysis showed that in households WTP for organic garden egg, factors such as age, health, education, and awareness were significant, while WTP an amount was also significantly influenced by the same set of variables. Also, while willingness to pay for organic pumpkin was significantly influenced by health, education and awareness, WTP an amount was significantly influenced by health, education and awareness. There is need for public awareness by the media and organic Non-Government Organizations to create more programmes that will educate consumers on the health and environmental advantages of organic farming and consumption patterns over conventional practices. With this, more consumers will be willing to pay a premium for organic vegetables.

Key words: Anambra state, Awareness, Farming, Organic Vegetable, Willingness to pay

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INTRODUCTION

The process of farming vegetables with organic manure is known as organic vegetable farming. The International Federation of Organic Agriculture and Management [1], states that organic agriculture generally consists of mechanical, biological and cultural activities that involves biodiversity of biodiversity, resources recycling, promotion of ecological balance, and inorganic fertilizers and Synthetic pesticides are not permissible, even though some pesticides that are organically approved can be utilized under strict supervision. Organic farming entails an all-inclusive production management system promoting and enhancing the agricultural ecosystem which includes biological diversity, activity and cycle. Organic farming methods are built on concise production standards target at achieving optimal agro-ecosystems which are socially, ecologically and economically sustainable [1].

The organic manure farming industry is one of the fastest growing sectors of agriculture worldwide, with the goal of creating a balance between soil organisms, plants, animals, and humans [2]. A research on chili peppers suggests that this waste to wealth technology is not just geared towards private profit, but also towards environmental protection [3]. Organic foods are in high demand due to consumer perceptions of quality and safety, as well as environmental impact of organic agricultural practices in developing countries like Europe [4]. According to the report [4], pesticides and hormonal residues are lower in organically produced foods, and they store better than conventional foods. Lord Northbourne used the term organic for the first time in 1939 in his book “Look to the Land”. He defined an organic farm as a system that doesn't utilize chemicals and adopts an ecologically balanced approach. "Organic Vegetable" refers to vegetables grown without the use of inorganic fertilizers (OV). Compared to inorganic veggies, organic vegetables are more nutritious, secure, delicious, and even of higher quality.

In Nigeria, vegetables are a common crop that are farmed and eaten by a variety of people. Chemicals used in vegetable production have been identified as a significant health risk and a significant environmental hazard. According to Food and Agricultural Organization [5], food safety is a serious issue because modern vegetable growers improperly utilize hazardous pesticides before and after harvest, endangering their own and consumers' health as well as harming the environment. However, because chemical inputs are scarce and rarely used by farmers in Nigeria, organic agriculture has developed there by default [6]. Although organic vegetables are important for both human health and the environment, there is still a shortfall in consumption in the nation, which has decreased the

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availability of organic vegetables in regular stores and prevented the market from growing.

Despite research showing that many customers like organic over conventional foods, price is frequently a significant issue that affects their choices because organic veggies are particularly price sensitive given their daily usage [7, 8]. The cost of organic goods may be up to twice as much as their conventional counterparts. As a result, the cost prevents low-income consumers from purchasing organic goods, and customers frequently complain about exorbitant costs. In a study by FAO [9], Consumers typically cite traditional and personal preferences, high pricing and erratic availability, as well as their quality, taste, and safety as reasons for not consuming more organic veggies. The production, distribution, and marketing of organic food are more expensive than conventional food due to the cost of segregating organic foodstuff, according to a study on certified organic field crop production [10]. Food that is sold as organic must meet the requirements for what the term "organic" refers to, be kept apart from food that is produced conventionally, and be certified by a regulatory body to ensure truth in advertising. There are no visual differences between organic and conventionally produced food. Each of these three problems is pricey, which raises the cost of production and the retail price of organic food. Although it's not always the case, extensive management and labor are frequently (but not always) more expensive than the common chemicals used on conventional farms. Farmers and dealers have possibilities to expand production, processing, and marketing of quality commodities because customers sense a lack of commodities and are prepared to pay higher prices for superior products [7]. Due to a lack of knowledge about consumers' willingness to pay, many Nigerian farmers are also still unwilling to adopt the production of organic vegetables on a broad scale. Hence this study is meant to bridge that knowledge gap.

Research has been carried out on willingness to pay for organic products. Researchers such as [8] worked on Consumers' Preference and Willingness to Pay for Organic Food in Osogbo Southwest, Nigeria. Research was conducted on consumer preferences for organic vegetables in Southwestern Nigeria: A choice experiment approach [11]. There was also research on Analysis of Consumers' Willingness to Pay for organic and local honey in Serbia [12] and lastly Nisha researched on Demand assessments of organic products and consumers' willingness to pay for organic food products [13]. This research assesses households' awareness and willingness to pay for organic vegetables and factors affecting them in Anambra State, Nigeria.

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METHODOLOGY

Anambra State is one of Nigeria's 36 states. It is situated between Latitudes 5° 32' and 6° 45'N and Longitudes 6° 43' and 7° 22'E in the South-Eastern region of the country. The State's estimated land area is 4,865 square kilometers, or 486,500 acres, and it has a diverse topography, population distribution, and regional development. It was founded in 1991 from the remnants of the former Anambra State, which has since been divided into the current Anambra, Enugu, and Ebonyi States. It contains 21 LGAs and roughly 177 communities [14]. A multi-stage sampling procedure was used to select 140 households for the study. However, from the total sample surveyed, 10 households provided a protest response and hence refused to respond to the questions, 10 households failed to complete the questionnaire. These households were all omitted from the analysis. Therefore, a total of 120 households fully completed the survey, with a valid response rate of 85.7 percent. A collection of standardized, pre-tested, and validated questionnaires were used to collect the study's data. The data were analyzed using frequency, mean, Likert scale, and Contingent Valuation Model.

The most popular psychometric scale in survey research is the Likert scale, which is frequently used in surveys. When responding to a Likert questionnaire item, participants rank their level of agreement or disagreement with a set of itemized statements on a symmetric agree-disagree scale. A 4-point rating scale was used in this study to determine the level of awareness of the households on organic vegetables. It included Highly Aware (HA), Aware (A), Unaware (U), and Highly Unaware (HU) with compounding values of 4, 3, 2, and 1 with a mean score of $\frac{4+3+2+1}{4} = \frac{10}{4}$ = 2.50 cut off point. Using the interval scale of 0.05, the upper limit cut-off point was 2.50 + 0.05=2.55, while the lower limit cut-off point was 2.50-0.05= 2.45. Based on this, any mean score below 2.45 (ms< 2.45) was taken as 'unaware', while those items with mean values between 2.45 and 2.55 were considered as 'aware' as the case may be (2.45< ms < 2.55). Finally, mean score greater than 2.55(ms > 2.55) was considered as 'highly aware'.

Contingent valuation method is one of the stated preference methods of valuing positive externalities whose major concept is willingness to pay or willingness to accept [15]. There were two core questions in the part of "WTP" survey. The first question was that under the imaginary condition, whether respondents were willing to pay for Organic Vegetable (OV) or not. The question was "if Organic vegetables are made available with a clear distinction for purchase in the markets, would you be willing to pay an extra premium?

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"It was a yes or no question. If respondents answered "yes", then the survey moves to the second question, asking for the amount households were willing to pay for the organic vegetables.

From a pre-survey, the most commonly consumed vegetable in the study area is Pumpkin and Garden egg, hence the WTP of this study focused on organic pumpkin and garden egg.

Information from the pre-survey showed that conventionally it will cost ₦100 per kg ($0.28 at $1= ₦360) for garden egg and ₦300 ($0.83 at $1= ₦360) per bunch for pumpkin. Based on this, there were four alternative answers for the bid value, including:

How much are you willing to pay for a kg of organic garden egg? (a) ₦200 [ ] (b) ₦400 [ ] (c) ₦ 600 [ ] (d) Any other amount [ ]

How much are you willing to pay for an organic pumpkin? (a)₦500 [ ] (b) ₦ 700 [ ] (c) ₦ 1000 [ ] (d) Any other amount [ ]

Generally, based on parametric estimate, households surveyed are influenced by their characteristics in making their willingness choice. This study employed Heckman estimation for parametric estimation to avoid the sample selection bias. Heckman pointed out that sample selection bias existed and correction needed to be carried out in previous econometric analysis [16]. This econometric model has been applied to a large number of social science research.

In the first stage, this study used selection equation to investigate the determinant of households' WTP for Organic Vegetables (OV). In this regard, the study defines "households with WTP" as "Z=1", "households without WTP" as "Z = 0". "Z" could also be represented by "z*" and as Equation 1:

$$Z = \partial_0 + \partial_1 X_1 + \partial_2 X_2 + \partial_3 X_3 \ldots + \partial_8 X_8 + e \qquad \text{(Equation 1)}$$

Equation (1) is probit model which is the first-stage of Heckman model. Z is the dependent variable, which represents the probability of households' WTP. ∂_0 , ∂_1, ∂_2, $\partial_3 \ldots \partial_8$ are parameters to be estimated, while factors influencing their WTP, X_1, X_2, X_3 …X_8 are the explanatory variables and e is the residual term.
X_1 = Sex (Male = 1, Female =0)
X_2 = Age (years)
X_3 = Marital status (Married = 1, others = 0)

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X_4 = Household size (Number of persons)
X_5 = Health status (Absence of metabolic diseases = 1, otherwise = 0)
X_6 = Awareness (using the cut-off point in the likert scale: Aware =1, Others = 0)
X_7 = Household's income (₦)
X_8 = Years spent in school (years)
β_0 = Constant
β_1 to β_8 = Parameter estimates
e = error term

According to several researchers, respondents' personal traits and family economic circumstances had a significant impact on their WTP ([13]; [12]; [8]). Numerous academics have confirmed that environmental and psychological cognitive variables were relevant for this type of research and that they might enhance the model's interpretation and predictive power [17].

In the second stage, this study used the Ordinary Linear Least Square (OLS) regression model from Equation 2 to examine potential explanatory variables and the regression control variable to determine what factors might affect families' WTP values. The inverse Mills ratio discovered in the first stage served as the control variable.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots + \beta_9 X_9 + \delta\lambda + \mu \qquad \text{equation (2)}$$

Where Y is the dependent variable, which examines factors influencing the households' payment amount.
The Mills ratio, λ, was added to overcome the sample selection bias. β_0, β_1, β_2, β_3… β_9 and δ are the coefficients to be estimated. X_1, X_2, X_3 …X_9 are the explanatory variables and μ is the residual term.
X_i= factor of characteristics of the i^{th} individual and are independent variables which are defined as follows:
X_1 = Sex (Male = 1, Female =0)
X_2 = Age (years)
X_3 = Marital status (Married = 1, others = 0)
X_4 = Household size (Number of persons)
X_5 = Health status (Absence of metabolic diseases = 1, otherwise = 0)
X_6 = Awareness (Aware =1, Others = 0)
X_7 = Households' income per month (₦)
X_8 = Years of experience in farming (years)
X_9 = Years spent in school (years)
β_0 = Constant

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β_1 to β_9 = Coefficients
e = error term

RESULTS AND DISCUSSION

Descriptive statistics of the respondents

As shown in Table 1, among 120 respondents, 84 were male whereas 36 were female. The eldest respondent was of 79 years whereas the youngest was of 29 years. The average age of respondents was 54 years. The maximum number of years spent in school was 19 years, while the least (minimum) was 6 years and the average years spent in school was 13 years. This showed that all the respondents were literate. Seventy-nine (79) respondents were married whereas 41 were unmarried. Also 66 respondents did not have metabolic disease while 54 had presence of a metabolic disease.

Similarly, the highest household size was 11 whereas lowest was 2. The average household size was 7. The highest monthly household income was ₦1,200,000, whereas, the lowest was ₦50,000. The average monthly household income was ₦170,000. The maximum number of years of experience in farming was 33 years and least was about 1 year. The average years of experience was 6.3 years.

Types of vegetables commonly consumed by respondents

There were different types of vegetables commonly consumed by the respondents. These vegetables included; garden egg (*Solannium*), pumpkin (*Telfairia occidentalis*), amaranth (*Amaranthus viridis*) and cucumber (*Cucumis sativus*). Frequency distribution of respondents according to types of vegetables consumed in Figure 1 indicated that 59.17% consumed pumpkin, 28.33% consumed garden egg, 4.17% consume amaranth while 8.33% consumed cucumber.

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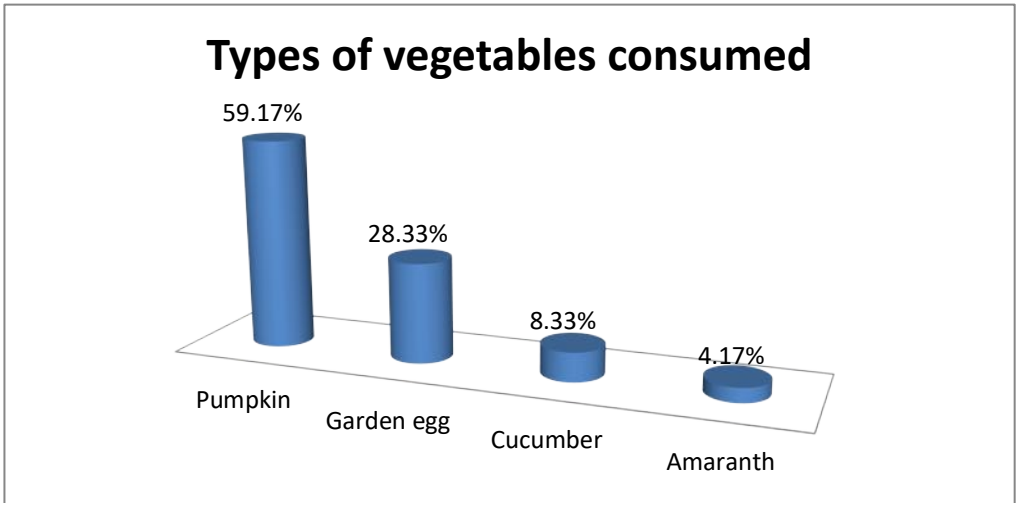

Source: Field Survey, 2019

Figure 1: Frequency distribution of respondents according to the types of vegetables consumed

Level of awareness of respondents on health and environmental benefits of organic vegetable production

Environmental awareness was very crucial in this study. It was expected that respondents who had a high awareness of the benefits of organic vegetables to health and environment and were more likely to pay for it than respondents with low/no awareness of the benefits to health and environment.

Frequency distribution of respondents according to their awareness on health benefits of organic vegetables in Table 2 showed that 4.2% of the respondents were not aware of the health benefits of organic vegetables which could be as a result of their low level of education, while 95.8% of the respondents were aware of the same.

The chart in Figure 2 showed that 28.3% of the respondents were not aware of the environmental effects of using inorganic fertilizer for vegetable production. Meanwhile, 71.7% of the respondents were aware of the negative effects of inorganic fertilizer for vegetable production.

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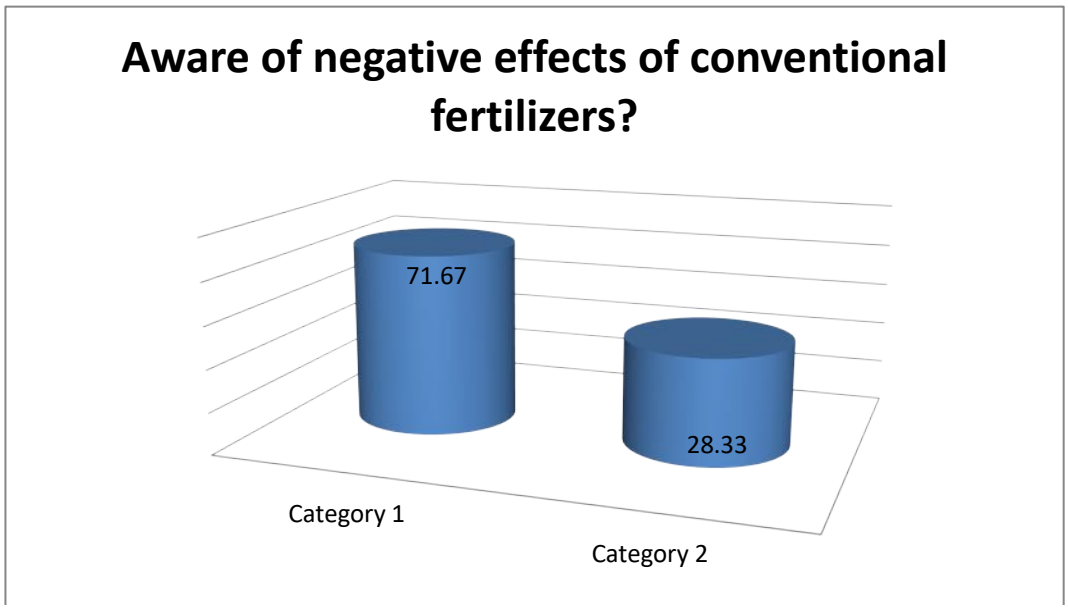

Source: Field Survey, 2019

Figure 2: Distribution of respondents according to environmental effects of inorganic fertilizer awareness

Willingness to pay for organic vegetables

Willingness to pay is defined as a ratio of the variable of interest whereas the price is a monetary variable which press the value of the variable of interest for different attributes level [18]. In the WTP analysis, we considered organic pumpkin and garden egg because they were the mostly consumed vegetable by the respondents.

Table 2 indicated that 21.7% of the respondents were not willing to pay for organic garden egg while 78.3% of the respondents were willing to pay for organic garden egg.

The maximum amount which the respondents accepted to pay as shown in Table 4 was ₦600 ($1.67 at $1= ₦360) and ₦200 ($0.56 at $1= ₦360) as the minimum amount for a kg of organic garden egg at the mean of ₦217.02.

The frequency distribution of the respondents according to their willingness to pay for organic pumpkin in Table 3 showed that 8.3% of the respondents were not willing to pay for organic pumpkin while 91.7% of the respondents were willing to pay.

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Respondents were willing to pay a maximum amount of ₦1000 ($2.78 at $1= ₦360) and a minimum amount of ₦500 at the mean of ₦515.45 as shown in Table 4.

Factors that influence household willingness to pay for organic vegetables

Result for the first stage of the Heckman regression analysis is presented in Table 5. From Table 5, the Wald statistics showed the significance of the whole regression. As its p-value equals 0.0000 (that is less than 0.01), it is concluded that the whole regression was statistically significant and provided good level of explanation. The rho estimation in the Heckman model was -0.0875, therefore, the Heckman model provided consistent and efficient estimates for a given set of parameters.

The result in the Table 5 showed that age of a household head was significant with a positive coefficient. This means that age is also an important determinant of household willingness to pay for organic garden egg. Older household heads were probably more willing to pay for organic garden egg for health benefits. This therefore, confirms [19] who reported that consumers are usually more health conscious as they advance in age.

Health was a significant factor but showed a negative coefficient. This indicated that households' willingness to pay was dependent on their health status. As the health status increased, the probability of WTP decreases. This finding is supported by Bhattarai [20].

Education was significant and had a positive coefficient. The possible reason could be that the higher the educational status, the more the probability of having preferences for healthy living. They will be more willing to engage in any activity that encourages healthy living and more innovative. Education is used to instill knowledge, change attitude and develop skills to transform communities to a healthy lifestyle including organic garden egg consumption. Similar type of result was found by Bhattarai [20].

Level of awareness on the health and environmental implications of organic garden egg had positive influence on willingness to pay. Respondents knowledgeable about a practice will be more willing to participate and hence pay for their participation. Awareness increases sensitivity. This result is in line with Nandi et al [21].

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Households' income positively influences willingness to pay for organic garden egg. Organic vegetables are always at a higher price as corroborated by Yesufu *et al*. [8].

The second stage of socio-economic factors that influenced households' willingness to pay an amount presented in Table 6 showed that, coefficients of education, awareness and income were positive and significant. It therefore implies that educational qualification of a household determines the amount they are willing to pay. Educated and more aware household head have higher probability of WTP for the amount/price stated for the commodity.

Coefficients of age and health status were negative and significantly influencing to willingness to pay amount for organic garden egg. It implied that the older household heads had a probability of paying a lower amount for garden egg than a younger household. Unhealthy households will likely have less amount to pay than a healthy household. Poor heath can limit one's ability to work, reduce economic opportunities and lead to medical debt and bankruptcy [19].

The regression results for WTP for organic pumpkin fruit is presented in Table 6. From Table 6, the Wald statistics showed the significance of the whole regression of socio-economic determinants of willingness to pay for organic pumpkin. As its p-value equals 0.0000 (that is less than 0.01), we conclude that the whole regression was statistically significant and provided good level of explanation; therefore, there was a significant effect of socio-economic characteristics of the households on their willingness to pay for organic pumpkin. The rho estimation in the Heckman model was -0.0889210, therefore, the Heckman model provided consistent and efficient estimates for given set of parameters.

Table 6 showed that education, households' income and awareness of the respondents were significant and had positive coefficients. Educated households are probably more willing to engage in any activity that encourages healthy living and more innovative. Education was used to instill knowledge, change attitude and develop the probability of opting for a healthier living by the consumption of organic pumpkin. Households' awareness about the health and environmental implications of organic pumpkin increases the likelihood of paying a premium to consume the produce.

The health status of the respondents was negatively significant. Healthy households were less likely to care about health implications of consuming organic pumpkin.

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In addition, Table 6 indicated in the second stage that health, education, farmers income and awareness of the respondents were positively influencing willingness to pay an amount of money. Healthy household were more likely to pay a higher amount as they had more ability and opportunities to work and earn. The health of educated households was of utmost priority and are willing to pay a higher amount. Awareness of the environmental and health benefits of consuming organic pumpkin increased the probability of paying a higher amount for organic pumpkin. The income of the households was a major determining factor to whether they were willing to pay or not.

CONCLUSION

The study analyzed households' willingness to pay for organic vegetables in Anambra State, Nigeria. The findings showed that socio-economic factors had influence on household willingness to pay for organic vegetables and the amount they were willing to pay. These factors included: age, health status, education, and awareness of respondents. Age, education, household's income and awareness had positive influence, while health status had negative influence on willingness to pay for organic garden egg. Education and Awareness increased their likelihood of willingness to pay an amount of money. Age and health status decreased the likelihood of paying a higher amount of money for organic garden egg.

Also, factors such as education, households' income and awareness had positive and significant influence on willingness to pay for organic pumpkin, while health had negative influence on willingness to pay for the same. Meanwhile health status, education and awareness had positive influence on the amount they were willing to pay.

There is need for public awareness by the media and Civil Society Organizations (CSOs) to create more programmes that will educate consumers on the health and environmental advantages of organic farming and consumption patterns over conventional practices. With this, more consumers will be willing to pay a premium for organic vegetables.

Organic vegetable producers should target the aged, unhealthy and educated segment of the society in the course of advertisement as their market *niche* before reaching out to the whole society in general.

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Development partners and CSOs should create more campaign among the youths, healthy and uneducated populace about the health and environmental implications of organic vegetables consumption.

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Table 1: Descriptive statistics of the respondents

Variables	Frequency
Sex	
No. of male respondents	84
No. of female respondents	36
Age	
Average age	54.08
Maximum age	79
Minimum age	29
Years spent in school	
Average	13
Maximum	19
Minimum	6
Marital status	
Married	79
Unmarried	41
Monthly household income (₦)	
Average	170,000
Maximum	1,200,000
Minimum	50,000
Years of experience in farming	
Average	6.3
Maximum	33
Minimum	1
Household size	
Average	7
Maximum	11
Minimum	2
Perceived health status	
Absence of metabolic disease (Healthy)	66
Presence of metabolic disease (Unhealthy)	54

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Table 2: Distribution of the respondents according to the health benefit awareness

Awareness	Frequency	Percent
Aware of health benefits		
No	5	4.17
Yes	115	95.83
Total	120	100.00

Source: Field Survey, 2019

Table 3: Frequency distribution of respondents according to their willingness to pay for organic garden egg and pumpkin

WTP	Frequency	Percent
WTP for garden egg		
No	26	21.67
Yes	94	78.33
Total	120	100.00
WTP for pumpkin		
No	10	8.33
Yes	110	91.67
Total	120	100.00

Source: Field Survey, 2019

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Table 4: Frequency distribution of amount of payment by household heads

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Garden egg amount	120	217.02	63.31	200	600
Pumpkin amount	120	515.45	65.23	500	1000

Source: Field Survey, 2019

Table 5: Parameter Estimates of factors influencing and determine both willingness to pay and amount to pay organic garden egg

Variables	First Stage		Second Stage	
	Coefficient	Standard Error	Coefficient	Standard Error
Gender	0.0495	0.4782	0.686	0.237
Age	0.0280***	0.0103	-1.591***	0.574
Marital Status	0.0131	0.0243	0.741	1.375
Health status	-0.0835*	0.0503	-4.738*	2.848
Duration of formal Education	1.786***	0.452	101.343***	24.732
Awareness	1.629***	0.478	92.476***	26.348
Household size	0.0486	0.577	0.578	0.423
Farmer's income	1.519***	0.467	95.587***	25.643
Years of experience in farming			2.93e-08	0.0001992
_CONS	-.0215	1.0168	-43127.13	167133.10
rho = Inverse Mills ratio	-0.0875	0.652		
Wald chi2(7) =	71.48			
Prob > chi2 =	0.0000			
LR test of indep.eqns (rho = 0):				
chi2(1) =	0.01			
Prob > chi2 =	0.9256			
Number of obs. =	120			
Selected =	94			
Nonselected =	26			
***, ** and *	1%, 5% and 10%			

Source: Field Survey, 2019

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Table 6: Parameter Estimates of factors influencing and determine both willingness to pay and amount to pay organic pumpkin

Variables	First stage		Second stage	
	Coefficient	Standard Error	Coefficient	Standard Error
Gender	0.0557	0.0367	0.889	1.327
Age	0.0703	0.0691	-0.158	2.809
Marital Status	0.0459	0.0599	-1.204	2.681
Health status	-0.0319***	0.0104	-1.271***	0.589
Years spent in school	1.0859*	0.619	106.523***	28.0682
Household size	0.08003	0.0443	0.771	1.405
Awareness	1.346**	0.559	117.203***	26.814
Farmer's income	1.106**	0.549	110.412***	27.179
Years of experience in farming			0.532	0.381
_CONS	-.0223	1.0243	-43110.02	176123.20
rho = Inverse Mills ratio	-0.0889	0.672		
Wald chi2(7) =	72.59			
Prob > chi^2 =	0.0000			
LR test of indep.eqns (rho = 0):				
chi2(1) =	0.01			
Prob > chi^2 =	0.9317			
Number of obs. =	120			
Selected =	110			
Nonselected =	10			
***, ** and *	1%, 5% and 10%			

Source: Field Survey, 2019

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