



WILLINGNESS OF CONSUMERS IN SOUTHWEST, NIGERIA TO PAY FOR ORGANIC LEAFY VEGETABLES

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Abstract

Identification of consumer perceptiveness and estimates of willingness to pay (WTP) for safe food has become more important as the shift to organic agriculture, which has engulfed the developing world due to negative consequences of agrochemical use, has reached Southwest, Nigeria. Hence, this study analysed the willingness of consumers to pay for organic leafy vegetables in the region. Data were collected with the aid of pre-tested questionnaire from 360 respondents selected using multistage procedure and analysed using descriptive statistics and double hurdle regression model. Majority (56.9%) of respondents were female with average age, family size, monthly income and expenditures of 39 years, 5 persons, ₦110,507.73 (\$239.71) and ₦73,178 (\$158.74), respectively. The exchange rate used for this study is 1\$US = 461₦. More than half of the consumers were aware of, had positive perceptions of organic leafy vegetables and were willing to pay ₦331.19·kg⁻¹, on the average, for its regular supply. Willingness to pay for organic green leafy vegetables was found to increase with monthly income, education and awareness while it decreased with household size and monthly expenditures. Organically grown leafy vegetables are healthy foods, increasing awareness could increase consumers' willingness to pay. Access to different sources of income among consumers may have a favourable impact on the price they are willing to pay.

Keywords: African spinach; *Celosia argentea*; *Solanum macrocarpon*; Southwest; Nigeria

Introduction

Agrochemical use in food production has been identified as the primary source of health issues including asthma, blood and liver illnesses, skin irritation, eye inflammation and redness, headache, and dizziness (Ikpesu and Ariyo, 2013; Obayelu et al., 2014, Aminu et al., 2020). Chemical fertilizers and synthetic pesticides both have the potential to harm the environment and the fragile ecosystem (Aminu and Edun, 2019). As a result, there is a greater demand for environmentally

friendly and health-conscious organic food items (Akinwehinmiet et al., 2021).

In South-Western Nigeria, the production of leafy vegetables is a fantastic way to create jobs and earn money (Nwaiwuet et al., 2022). Leafy vegetables are also seen as a crucial component of a balanced diet since they nearly always provide all the nutrients required for optimum body function. They are vital for illness prevention since they are abundant in vitamins, minerals, antioxidants, and dietary fibre (Adeoye, 2022). However, leafy vegetables are

perishable crops with significant pest and disease susceptibility. In an effort to save costs and satisfy the rising demand for leafy vegetables, farmers have been found to have used synthetic pesticides and fertilizers improperly, endangering the health of both the farmers and the consumers as well as the environment (Dipeolu *et al.*, 2009; Obayelu *et al.*, 2014). Southwest Nigeria has seen a rise in the popularity of organic leafy vegetables because of consumers' growing concerns about their health and the safety of their food. These vegetables are healthy for humans and free of dangerous chemicals (Yesufuet *al.*, 2018). Despite growing consumer demand for organic leafy vegetables, their greater cost of production compared to conventional leafy vegetables makes them more expensive for consumers to purchase (Barkley 2002). According to Mgbenka and Ezeano (2015), the lack of, or inadequate development of local markets for organic products has deterred many farmers from growing organic food products. Additionally, the farmers in Southwest Nigeria are unable to easily identify potential customers who will be prepared to pay more for organic green vegetables.

The amount of money a person would be ready to spend on a commodity in exchange for a better degree of quality or satisfaction gained from it is known as willingness to pay (WTP). WTP is a gauge of how much money customers are prepared to part with in exchange for a lower chance of coming into contact with a risk to their environment or health (Abokiet *al.*, 2019). Consumer preferences and willingness to pay (WTP) for organic vegetables have been examined in several studies (Dipeolu *et al.*, 2009; Obayelu *et al.*, 2014; Yesufuet *al.*, 2018; Akinwehinmi *et al.*, 2021). Their findings showed that customers preferred organic vegetables to conventional ones and that price had a crucial role in determining whether they would pay more for organic vegetables. Age of customers, money, awareness, familiarity with organic products, and the health advantages of eating

organic vegetables are further considerations.

Despite consumer preferences for and the value of organic vegetables for both human health and the environment, the Southwest region of the country still falls short in terms of consumption. Additionally, a lack of knowledge on consumers' willingness to pay is another reason why many vegetable producers in the area are still hesitant to switch to the large-scale production of organic crops (Yesufuet *al.*, 2018). Analyzing the determinants of consumers' decisions to pay as well as the amount they are willing to pay for organic leafy vegetables was the goal of the study, which also aimed to describe the socioeconomic characteristics of the consumers of organic leafy vegetables, examine their perception of organic leafy vegetables and estimate the amount consumers are willing to pay,

Methodology

The study was conducted in the states of Lagos, Ekiti, Ondo, Osun, Ogun and Oyo in Southwestern Nigeria located between longitude 2°3' and 6°00' E and latitude 6°2' and 8°37'N. The region stretches along the Atlantic coastline from the western international border with the Benin Republic to the eastern border with South South and northern border with North Central. The region has a total land area of 77,818 km² and an estimated population of 32.5 million people (NBS, 2012). There are two distinct seasons in the region: wet season (April to October), and dry season (November-March). Humidity is high (77%) and the temperature fluctuates from 21 to 28 degree Celsius (0C). There are therefore little problems with the raising of animals and crops there.

Respondents were chosen using a multi-stage sampling procedure. Of the 6 states, 3 were chosen at random for the preliminary round. In the second phase, 2 Local Government Areas (LGAs) were randomly selected from the states totaling 6 LGAs;

Overall, there were 24 communities following the third phase, which required choosing four communities at random from each of the LGAs. Finally, 15 households from each of the 24 communities were chosen using a simple random sampling process, giving the study a total of 360 respondents. The respondents primarily ate African spinach (*Amaranthushybridus*), Lagos spinach (*Celosia argentea*), African egg plant leaf (*Solanum macrocarpon*) and fluted pumpkin (*Telfairia occidentalis*) as representatives of organic green leafy vegetables.

The core data for the study came from respondents who filled out pre-tested questionnaires in the study area. Data were gathered on the respondents' socioeconomic backgrounds, their knowledge of and opinions on organic leafy vegetables, their willingness to pay and the price they would be willing to pay.

Analytical Techniques

The study utilized frequency and percentage to analyze data on socioeconomic traits and awareness.

Consumer Knowledge of Organic Leafy Vegetables: Consumers were questioned about the availability, health advantages, and nutritional advantages of organic leafy vegetables in their respective localities. A value of 1 was assigned to a 'yes' response; otherwise, a value of 0 was assigned. By dividing the total number of questions asked by the total number of questions known, the awareness index was determined.

Consumer Perception of Organic Leafy Vegetables: Three points Consumer impression of organic leafy greens in the research area was examined using a Likert scale. According to the scale, "Agree" (A) receives three points, "Undecided" (U) receives two points, and "Disagree" (D) receives one point. The mean cutoff threshold $(3+2+1/3)$ is 2. Therefore, any item with a mean value of 2 or higher indicates agreement with the claims; otherwise, it indicates disagreement.

Double-hurdle regression model: The willingness-to-pay choice equation and the amount an individual is willing to pay equation are both included in the double-hurdle model, which was first proposed by Cragg in 1971 and further developed by Ogunmola and Adekanmbi (2020). This model was chosen for this investigation. The Cragg Model assumes that for a consumer to register a positive desire to pay (expenditure) for a good or service, two obstacles must be overcome. As stated in the willingness-to-pay choice equation:

Willingness-to-pay decision (probit) equation:

$$P_i^* = Q_i\delta + u_i \quad (1)$$

Whether a respondent would be willing to pay for organic leafy vegetables or not is determined by a latent variable P_i ; Q_i : list of external factors; δ : coefficients associated with the repressors (Q), including the constant term; u_i : error term assumed to be normally distributed (which means a zero mean and a unit variance). The latent willingness to pay P^* is connected to the observable willingness to pay (P) in the following way:

Table 1: Socio-economic Characteristics of the Organic Leafy Vegetable Consumers

Consumers				
Description	Ogun State	Osun State	Ondo State	Pooled sample
Sex				
Female	64(53.3%)	69(57.5%)	72(60.0%)	205(56.9%)
Male	56(46.7%)	51(42.5%)	48(40.0%)	155(43.1%)
Age				
Less or Equal to 30	15(12.5%)	41(34.2%)	48(40.0%)	104(28.9%)
31-40	27(22.5%)	47(39.2%)	44(36.7%)	118(32.8%)
41-50	40(33.3%)	19(15.8%)	15(12.5%)	74(20.6%)
51-60	23(19.2%)	9(7.5%)	10(8.3%)	42(11.7%)
Above 60	15(12.5%)	4(3.3%)	3(2.5%)	22(6.1%)
Mean (years)	46.58 years	36.22 years	35.35 years	39.38 years
Educational Level				
No formal Education	25(20.8%)	15(12.5%)	13(10.8%)	53(14.7%)
Primary	30(25.0%)	25(20.8%)	21(17.5%)	76(21.1%)
Secondary	44(36.7%)	38(31.7%)	40(33.3%)	122(33.9%)
Adult/vocational	10(8.3%)	19(15.8%)	14(11.7%)	43(11.9%)
Tertiary	11(9.2%)	23(19.2%)	32(26.7%)	66(18.3%)
Marital Status				
Single	14(11.7%)	37(30.8%)	39(32.5%)	90(25.0%)
Married	87(72.5%)	77(64.2%)	65(54.2%)	229(63.6%)
Divorced	9(7.5%)	6(5.0%)	10(8.3%)	25(6.9%)
Widowed	10(8.3%)	0(0.0%)	6(5.0%)	16(4.4%)
Family Size				
1-5	61(50.8%)	64(53.3%)	62(51.7%)	187(51.9%)
6-10	50(41.7%)	48(40.0%)	52(43.3%)	150(41.7%)
Above 10	9(7.5)	8(6.7%)	6(5.0%)	23(6.4%)
Mean (people)	6	5	6	5

Occupation				
Farming only	18(15.0%)	24(20.0%)	14(11.7%)	56(15.6%)
Paid Employment	40(33.3%)	45(37.5%)	38(31.7%)	123(34.2%)
Trading/Business	47(39.2%)	29(24.2%)	49(40.8%)	125(34.7%)
Artisan	15(12.5%)	22(18.3%)	19(15.8%)	56(15.6%)
Monthly Income				
...	22(18.3%)	35(29.2%)	19(15.8%)	76(21.1%)
50,001-100,000	44(36.7%)	52(43.3%)	50(41.7%)	146(40.6%)
>100,000	54(45.0%)	33(27.5%)	51(42.5%)	138(38.3%)
Mean	...	₦96,360	₦112,280	₦110,507
Monthly Expenditure				
≤50,000	28(23.3%)	22(18.3%)	26(21.7%)	76(21.1%)
50,001-70,000	35(29.2%)	66(55.0%)	40(33.3%)	141(39.2%)
>70,000	57(47.5%)	32(26.7%)	54(45.0%)	143(39.7%)
Mean	₦76,668	₦64,085	₦78,782	₦73,178

Source: Field Survey Data, 2022

1\$US = 461₦.

Osun, and Ondo were female, according to the socioeconomic characteristics of the respondents shown in Table 1. This suggests that organic green leafy vegetable consumption was higher among women than men. It makes sense that women in Southwest Nigeria who traditionally cook would be more concerned about the safety of their food and the health of their family members, and could even be prepared to pay extra for organic green vegetables in the research area. This finding supports Balogun *et al.*, (2020) who asserted that women are typically in charge of maintaining the home and making food

purchases in most African households. According to the results of the pooled sample, a higher percentage (33.8%) of the respondents were between the ages of 31 and 40. The respondents' aggregate mean age of 39.38 years suggests that they were still young and actively engaged in the economy, which may have favorable influence on their WTP for organic green veggies. This supports the findings of Ohen *et al.*, (2014) that consumers' tastes and preferences are strongly influenced by their young age, which may in turn affect how they consume fruits and vegetables. In the research area, secondary education was

held by the majority of respondents. This suggests that the respondents were literate, which may have positively influenced their choice and amount willing to pay. This supports the findings of Yesufu *et al.*, (2018), who found that educated people have a more favorable opinion of organic veggies than the uneducated do because they are better informed. The combined data also revealed that married individuals (63.6%) with households of 1–5 members (51.9%), on average, spent ₦73,178 a month on organic green vegetables. This shows that the research area has a sizable market for organic leafy greens.

Additionally, organic leafy vegetables were well-liked in the study area because they were consumed by people from a variety of occupations, but more so by those engaged in paid employment (34.2%) and trading or business (34.7%), whose sources of income are probably reliable. In Ogun and Ondo States, a larger percentage of consumers (45 and 42.5%) had monthly incomes of more than ₦100,000 (\$216.92), whereas in Osun State, 43% had incomes of between ₦50,000 (\$108.46) and ₦100,000

(\$216.92). The consumers' mean monthly income of ₦110,507 (\$239.71) suggests that they were middle-class earners, which should have a favorable impact on the WTP for organic green vegetables.

Awareness and Perception of organic leafy vegetables

The results of the survey on consumer knowledge of organic leafy vegetables are shown in Table 2. In Ogun, Osun, and Ondo States, respectively, the majority of consumers (77.5%, 85%, and 76.7%) knew that organic leafy vegetables were available in their communities. On average, 79.7% of survey participants were aware of the availability, 68.6% of the nutritional advantages, and 65.6% of the health advantages of organic leafy vegetables. Organic leafy greens are readily available, and knowing about their advantages in terms of nutrition and health may directly affect consumers' willingness to pay for the good in the research location. Similar findings for greenhouse vegetables in Lagos State were reported by Aboaba *et al.*, (2020).

Table 2: Consumers' Awareness of organic leafy vegetables

Awareness Questions	Ogun	Osun	Ondo	Pooled
Are you aware that organic leafy vegetable is available in your community?				
No	27(22.5%)	18(15.0%)	28(23.3%)	73(20.3%)
Yes	93(77.5%)	102(85.0%)	92(76.7%)	287(79.7%)
Are you aware of the nutritional benefits of organic leafy vegetables?				
No	32 (26.7%)	43 (35.8%)	38 (31.7%)	113 (31.4%)
Yes	88 (73.3%)	77 (64.2%)	82 (68.3%)	247 (68.6%)
Are you aware of the health benefits of organic leafy vegetables?				
No	36 (30.0%)	46 (38.3%)	42 (35.0%)	124 (34.4%)
Yes	84 (70.0%)	74 (61.7%)	78 (65.0%)	236 (65.6%)
Source of information on Organic Leafy Vegetables				
Friends	47 (39.2%)	38 (31.7%)	44 (36.7%)	129 (35.8%)
Radio	41 (34.2)	63(52.5%)	58 (48.3%)	162 (45.0%)
Television	25 (20.8%)	10 (8.3%)	13 (10.8%)	48 (13.3%)
Internet	7(5.8%)	9(7.5%)	5 (4.2%)	21 (5.8%)

Table 2 also showed that radio (52.5%, 48.3%) and friends (49.3%) were the two main media for obtaining information on organic leafy vegetables in Ogun State, Ondo State and Osun State, respectively. In general, radio (45%), friends (35.6%) and television (13.3%) were main cradle of information for consumers about organic leafy greens.

Consumer perception of leafy vegetables

Table 3 displays the findings from the Likert scale, which reveal how customers feel about organic leafy vegetables. According to the cut-off point value of 2, the result indicates that consumers concur that organic green vegetables are more nutritious, healthier, tastier, and disease-free than conventional ones. This supports the research of Aboki *et al.*, (2019) that organic vegetables are healthier, better quality, tastier, and have no negative effects compared to conventional vegetables,

which frequently present a hazard to human health due to chemicals used in their production. Consumers agreed that organic leafy vegetables do not change color after cooking, in contrast to conventional leafy vegetables. This suggests that consumers had a favorable opinion of organic leafy vegetables, which may have resulted in higher consumption and WTP for these foods in the research location. This is consistent with research by Yesufuet *al.*, (2018) and Aboaba *et al.*, (2020), which found that consumers' positive perceptions of organic veggies may lead to higher consumption.

The claims that organic green vegetables were more affordable and widely available than conventional ones, however, were disputed by consumers. The pricey nature and erratic availability of organic leafy greens on the market may cause a decline in consumption and have a detrimental impact on WTP in the research area. This supports the findings of Ohenet *al.*,(2014) that despite consumer awareness and favorable perceptions of organic vegetables, consumption is still low as a result of their high cost and erratic availability.

Table 3: Consumer's perception of organic leafy vegetables over conventional ones

Perception	Ogun	Osun	Ondo	Pooled
Organic leafy vegetables are more nutritious	2.45 (0.63)	2.98 (0.14)	2.92 (0.39)	2.78 (0.49)
Organic leafy vegetables are healthier	2.63 (0.73)	2.97 (0.22)	2.92 (0.27)	2.84 (0.49)
Organic leafy vegetables are tastier	2.13 (0.71)	2.87 (0.42)	2.55 (0.52)	2.52 (0.65)
Organic leafy vegetables are more pest and diseases free	2.14 (0.55)	2.38 (0.87)	2.47 (0.54)	2.33 (0.71)
Organic leafy vegetables does not change colour after cooking	2.48 (0.63)	2.83 (0.45)	2.54 (0.61)	2.62 (0.59)
Organic leafy vegetables are cheaper than conventional ones	1.90 (0.70)	1.60 (0.79)	1.69 (0.68)	1.73 (0.72)
Organic leafy vegetables are readily available in the market	1.74 (0.69)	1.62 (0.75)	1.91 (1.88)	1.76 (1.77)

Willingness to Pay (WTP)

According to Table 4, 83.9% of consumers were willing to pay more for organic leafy vegetables, while 16.1% were not. This demonstrates that consumers are willing to pay for a consistent supply of organic leafy vegetables because they are aware of their nutritional and health benefits. For a kilogram of organic leafy vegetables, the majority of consumers (51.7%) were willing to pay ₦200 or less (\$0.43) as opposed to

₦100 (\$0.22) for conventional ones. The average price that customers in Ogun State were ready to pay for a kilogram of organic leafy vegetables was ₦251.43 (\$0.54), whereas the average prices in Osun and Ondo States were ₦355.45 (\$0.77) and ₦386.88 (\$0.84), respectively. The discrepancies in the mean WTP could be attributed to how easily accessible and available organic green vegetables are in the various states.

Table 4: Willingness to Pay for Organic Leafy Vegetables

Variable	Ogun State	Osun State	Ondo State	Pooled sample
Willingness to pay				
No	35(29.2%)	15(12.5%)	8(6.7%)	58(16.1%)
Yes	85(70.8%)	105(87.5%)	112(93.3%)	302(83.9%)
Premium willing to pay (₦/kg)				
≤200	69 (57.5%)	56 (46.7%)	61 (50.8%)	186 (51.7)
201-300	37 (30.8%)	45 (37.5%)	50 (41.7%)	132 (36.7%)
>300	14 (11.7%)	19 (15.8%)	9 (7.5%)	42(11.6%)
Mean WTP	251.23	355.45	386.88	331.19

Factors Influencing Consumers' WTP for Organic Leafy Vegetables

Tables 5 - 8 presents result of the double hurdle regression model of determinants of willingness to pay and price consumers were willing to pay for organic leafy vegetables in Southwest, Nigeria. The diagnostic tests (Sigma, Wald χ^2 , and $\text{prob} > \chi^2$) of the model provides a good fit, implying a high correlation of the first and second hurdle residuals.

Factors Influencing Consumers' WTP for Organic Leafy Vegetables in Ogun State

Result of the double hurdle regression for Ogun State shows that factors impacting consumers' decisions to pay for organic leafy vegetables included age, marital status,

other income sources, monthly income, and awareness through friends (Table 5). Age reveals a significant positive connection with WTP at the 10% level of significance. According to this, the likelihood that consumers in the state will pay more for organic green vegetables increases as they get older. The WTP a premium of the consumers rises by 0.23% as they age. This outcome is consistent with Angulo *et al.*, (2005) findings indicating older customers were more willing to pay for food safety. Significant and favorably skewed coefficients were found for marital status, monthly income, additional sources of income, and friend-based awareness. This suggests that having additional sources of income, getting married, making more

money, and learning about organic green vegetables from friends in the state all raise

the likelihood that customers will be prepared to pay more for them.

Table 5: Double hurdle estimates of willingness to pay for organic leafy vegetables in Ogun State.

Variable	Hurdle 1(Decision to pay)			Hurdle 2 (amount willing to pay)		
	Coeff.	Std. Err.	p> z	Coeff.	Std. Err.	p> z
Sex	-0.579	0.500	0.247	0.140	0.092	0.134
Age	0.230*	0.026	0.057	0.003	0.004	0.537
Education	-0.097	0.204	0.634	0.074**	0.036	0.046
Marital status	0.674*	0.505	0.072	0.003	0.081	0.967
Household size	-0.016	0.131	0.902	-1.05**	0.022	0.041
Other income sources	0.465**	0.274	0.021	0.033	0.046	0.470
Monthly income	0.000***	0.000	0.003	0.00	0.000	0.131
Monthly expenditure	-0.194	0.216	0.368	-0.00**	0.000	0.011
Availability	-0.356	0.629	0.072	-0.168	0.115	0.145
Awareness (friend)	1.103**	0.011	0.024	0.061	0.002	0.245
Awareness (radio)	0.021	0.023	0.681	0.172	0.152	0.301
Constant	1.962	1.472	0.083	0.614	0.236	0.011
Diagnostic test						
—	8.718***		0.003			
Prob>chi ²	0.000					
Log Likelihood	-118.684					

The amount consumers will be willing to pay for a kilogram of organic leafy vegetables at 5% alpha level in the state was positively influenced by the coefficient of education at the second hurdle. As a result, it follows that consumers with more education will be willing to spend more than those with less education. This result is consistent with the findings of Wang *et al.*, (2018), that educated consumers were more likely to pay more for organic fruits. A 5% level of probability test revealed that the household size coefficient was adverse and significant. This suggests that if customers' households grow by one person, their willingness to pay for a kilogram will drop by approximately ₦1.05. This supports the findings of Ogunmola and Adekanbi (2020), who found that, in Oyo State, consumer willingness to pay decreases with household size. In a similar vein, monthly consumer spending had a detrimentally considerable impact on willingness to pay for a kilogram of organic leafy vegetables. This suggests that, the higher the monthly expenditure of the consumers, the less the amount they will be willing to pay in the state.

Factors Influencing Consumers' WTP for Organic Leafy Vegetables in Osun State

The data in Table 6 showed that in Osun State, willingness to pay for organic leafy vegetables is considerably influenced by sex, education, and availability. With sex, the likelihood of WTP declines. This

suggests that being a female consumer in the state enhances the likelihood that one will be prepared to spend more for organic green vegetables. This results conflicts with that of Obayelu *et al.*, (2014), who found that being the female head of the home lowers consumers' willingness to pay for organic vegetables. The likelihood of consumers' WTP was shown to rise with education as it was positive and significant at 5%. This suggests that WTP for organic leafy vegetables will increase with consumers' education level. This finding agrees with that of Yesufu *et al.*, (2018), that educated consumers have a more favorable opinion of organic vegetables than those who are less educated. With availability, there is a trend for customers to spend more for organic leafy greens. This suggests that increasing the market's regular supply of organic leafy vegetables will raise the likelihood of WTP in the state.

At the second hurdle, household size significantly decreased the amount that consumers were ready to pay at the 5% alpha level. This suggests that as households become larger, customers will be less inclined to pay for organic green vegetables. If consumers' households grow by one person, their willingness to pay will fall by ₦1.63. Additionally, alternative sources of income had a 10% positive impact on the price consumers were ready to pay. This suggests that in Osun State, consumers' willingness to pay rises as they have more than one source of income.

Table 6: Double hurdle estimates of household's willingness to pay for organic leafy vegetables in Osun State.

Variable	Hurdle 1(Decision to pay)			Hurdle 2 (amount willing to pay)		
	Coeff.	Std. Err.	p> z	Coeff.	Std. Err.	p> z
Sex	-0.663**	0.602	0.021	0.353	0.135	0.169
Age	0.004	0.037	0.915	0.022	0.185	0.175
Education	0.305*	0.234	0.093	0.010	0.010	0.920
Marital status	1.642	0.733	0.025	-0.195	-0.077	0.509
Household size	-0.179	0.169	0.287	1.63**	0.246	0.020
Other income sources	-0.010	0.302	0.975	0.210*	-0.158	0.066
Monthly income	0.000	0.000	0.224	-0.006	0.076	0.499
Monthly expenditure	-0.128	0.430	0.766	0.149	0.081	0.404
Availability	1.992*	1.889	0.092	0.353	0.135	0.169
Awareness (friend)	0.022	1.071	0.324	0.061	0.002	0.245
Awareness (radio)	0.015	0.012	0.116	0.172	0.152	0.301
Constant	1.147	0.338	0.001	1.649	0.770	0.035
Diagnostic test						
Wald χ^2	35.476***		0.001			
Prob>chi ²	0.000***					
Log Likelihood	-80.210					

Factors Influencing Consumers' WTP for Organic Leafy Vegetables in Ondo State

Age and marital status strongly affect consumers' willingness to pay for organic leafy vegetables, according to the results of a double hurdle regression study conducted in Ondo State (Table 7). Age was significant and positive at the 1% alpha level. This

suggests that the likelihood of consumers WTP in the research area increases with age. According to Yesufuet *al.*, (2018), customers tend to become more health concerned as they become older and are thus more willing to pay a premium for good health.

At the second hurdle, the price that

customers were willing to pay for organic leafy vegetables is highly influenced by household size, monthly income, and awareness (radio).

Table 7: Double hurdle estimates of household's willingness to pay for organic leafy vegetables in Ondo State.

Variable	Hurdle 1(Decision to pay)			Hurdle 2 (amount willing to pay)		
	Coeff.	Std. Err.	p> z	Coeff.	Std. Err.	p> z
Sex	0.645	1.007	0.716	0.074	0.259	0.776
Age	0.065***	0.078	0.007	0.008	0.017	0.651
Education	0.587	0.478	0.311	0.062	0.122	0.612
Marital status	0.916**	1.112	0.011	0.214	0.262	0.415
Household size	-0.975	0.356	0.301	-0.18**	0.087	0.043
Other income sources	0.403	0.653	0.647	0.026	0.167	0.875
Monthly income	0.000	0.000	0.563	0.05***	0.000	0.001
Monthly expenditure	7.605	1.657	0.421	-1.005	0.000	0.624
Availability	-0.378	1.013	0.746	0.046	0.285	0.871
Awareness (friend)	0.102	0.141	0.424	0.161	0.012	0.116
Awareness (radio)	0.061	0.013	0.812	0.27***	0.132	0.001
Constant	0.887	0.252	0.001	1.953	0.871	0.027
Diagnostic test						
Wald χ^2	43.903***		0.000			
Prob>chi2	0.000					
Log Likelihood	-40.614					

Consumers' willingness to pay diminishes with household size, just like in the other states. Consumers' willingness to pay in the state decreases as household size increases. It was discovered that the amount willing to pay was positively influenced by monthly income. This suggests that consumers' willingness to pay for organic leafy vegetables will increase with their level of income. Additionally, radio advertising for organic leafy vegetables has a positive impact on how much state residents are willing to pay for them. This shows that raising consumer willingness to pay in the state will likely occur when customers become more aware of the health and nutritional advantages of organic leafy vegetables through radio (a means of information distribution).

Factors Influencing Consumers' WTP for Organic Leafy Vegetables for the Pooled Data

Result of the double hurdle regression for the pooled data reveals that factors impacting consumers' decisions to pay for organic leafy vegetables in Southwest, Nigeria were

monthly income, monthly expenditure, and awareness through friends (Table 8). The coefficients of monthly income and awareness through friends were positive and significant at 5% alpha levels respectively while monthly expenditure was negative and significant at 10%. This implies that the probability that consumers will be willing to pay for organic leafy vegetables increases with their monthly income and awareness through friends while it decreases with their monthly expenditures.

At the second hurdle, the price that customers are willing to pay for organic leafy vegetables increases with education, income from other sources and monthly expenditure. A year increase in the consumers' educational level will increase the amount consumers are willing to pay by ₦0.253, a naira increase in income earned from sources other than farming will increase amount willing to pay by ₦0.088 while a naira increase in monthly expenditure will decrease amount willing to pay by ₦0.15

Table 8: Double hurdle estimates of household's willingness to pay for organic leafy vegetables for pooled data.

Variable	Hurdle 1(Decision to pay)			Hurdle 2 (amount willing to pay)		
	Coeff.	Std. Err.	p> z	Coeff.	Std. Err.	p> z
Sex	-0.406	0.328	0.215	0.248	0.127	0.052
Age	-0.007	0.019	0.695	0.006	0.007	0.424
Education	0.087	0.128	0.493	0.253**	0.049	0.045
Marital status	-0.057	0.323	0.859	0.092	0.123	0.454
Household size	-0.016	0.079	0.835	0.052	0.030	0.081
Other income sources	-0.116	0.170	0.494	0.088*	0.006	0.066

Monthly income	0.000**	0.000	0.028	0.000	0.000	0.241
Monthly expenditure	-0.211*	0.112	0.059	-0.15**	0.000	0.033
Availability	-0.154	0.300	0.609	0.193	0.112	0.084
Awareness (friend)	0.022**	0.135	0.021	0.046	0.102	0.271
Awareness (radio)	0.132	0.055	0.727	0.064	0.023	0.442
Constant	1.819	0.984	0.065	1.192	0.371	0.001
Diagnostic test						
Wald χ^2	27.896***		0.000			
Prob>chi2	0.000					
Log Likelihood	-272.345					

Conclusion

The research analysed the willingness of consumers in Southwest, Nigeria, to pay for organic leafy vegetables. Findings revealed that majority of the respondents were female with average age of about 39 years and household size of 5 persons. On average, 79.7% of survey participants were aware of the availability, 68.6% of the nutritional advantages, and 65.6% of the health advantages of organic leafy vegetables. There is positive perception of organic vegetable among the respondents as being more nutritious, healthier, tastier and disease-free than conventional ones. Respondents were willing to pay an average of ₦331.19·kg⁻¹. Result of the double hurdle regression model revealed that willingness to pay for organic green leafy vegetables increased with monthly income, education and awareness while it decreased with household size and monthly expenditures. These therefore show that there is a strong potential market for organic vegetables in southwest Nigeria. Implementing price and promotional strategies that could increase respondents' general acceptance of organically grown green leafy vegetables requires an understanding of respondents' awareness, perceptions of, and willingness to pay.

References

- Aboaba, K.O., R. A. Sanusi, A. A. Akamo, and B. Bello. 2020. Double hurdle approach to consumer awareness, perception of, and willingness to pay for greenhouse vegetables. *International Journal of Vegetable Science*. <https://doi.org/10.1080/19315260.2020.1819929>
- Aboki, E., A.S. Saheed and D.T. Rukwe. 2019. Consumer perception and willingness to pay for organic vegetables in Ardo Kola and Lau Local Government Area of Taraba State, Nigeria. *South Asian Res J Agri Fish. 1(1): 23-28*
- Adeoye, I.B. 2022. Factors Affecting Efficiency of Vegetable Production in Nigeria: A Review. DOI: <http://dx.doi.org/10.5772/intechopen.92702>
- Akinwehinmi, J.O., T.T Amos and K. Ogundari. 2021. Consumer preferences for organic vegetables in

- southwestern Nigeria: A choice experiment approach. *AfJARE*. 16(1): 1-13
- Aminu, F.O. and T.A. Edun. 2019. Environmental effect of pesticide use by cocoa farmers in Nigeria. *Journal of Research in Forestry, Wildlife & Environment*. 11(4): 153-163
- Aminu, F.O., E.O.S. Balogun and T.A. Edun. 2020. Health cost of pesticide use by cocoa farmers in Nigeria. *AFRREV*. 14 (2): 222-233. DOI: <http://dx.doi.org/10.4314/afrev.v14i2.20>
- Balogun, O.L., M.D. Olamide, O.O. Gbaiye, T.A. Ayo-Bello, O.T. Akinwale and K. Ayantoye. 2020. Consumers' willingness to pay for packaged chicken eggs in Lagos State, Nigeria. *AIMS Agriculture and Food*, 5(2): 204 – 217 . DOI : 10.3934/agrfood.2020.2.204
- Barkley, A. 2002. Organic Food Growth: Producer Profits and Corporate Farming. Presentation at the Risk and Profit Conference, Dept. of Agricultural Economics, Kansas State University, Manhattan, Kansas, Aug 15-16, 2002.
- Cragg, J. G. 1971. Some statistical models for limited dependent variables with application to the demand for durable goods. *Econometrica*. (pre-1986), 39(5): 829.
- Dipeolu, A.O., B.B. Philip, I.O.O. Aiyelaagbe, S.O. Akindode and TA Adedokun. 2009. Consumer awareness and willingness to pay for organic vegetables in SW Nigeria. *As. J. Food Ag-Ind. Special Issue*, S57-S65S57-S65.
- Ikpesu T.O. and A.B. Ariyo. 2013. Health implication of excessive use and abuse of pesticides by the rural dwellers in developing countries: the need for awareness. A review. *Greener Journal of Environment and Public Safety*. 2(5):180-188.
- Mgbenka, R.N. and C.I. Ezeano. 2015. Contributions of organic farming environmental sustenance and food security in West Africa: Policy Recommendations. *WJAS*. 11(6): 356-362
- Nwaiwu J.C., N.S. Esiobu, G.C.E. Onyeike and P.C. Ndinechi. 2020. Analysis of vegetable production among rural women farmers in Imo State, Nigeria. *GPH Int. J. Agriculture & Research*. 05(05): 01-09 . DOI : <https://doi.org/10.5281/zenodo.6778478>
- Obayelu, O.A., O.M. Agboyinu and B.A. Awotide. 2014. Consumers' perception and willingness to pay for organic leafy vegetables in urban Oyo State, Nigeria. *Eur J Nutr Food Saf*. 4: 127-136.
- Ohen, S.B., G.E. Umeze and E.O. Inyang. 2014. Consumer purchasing behaviour for fruits and vegetables among civil servants in Essien Udim Local Government Area, Akwalbom State, Nigeria. *Journal of Food Science and Quality Management*.
- Ogunmola, O.O and A.A. Adekanmbi 2020. Awareness, perceptions and willingness to pay for pro vitamin a garri: Evidence from Ido Local Government of Oyo State, Nigeria. *J. Agribus. Rural Dev*. 1 (5 5) : 6 1 – 7 2 . <http://dx.doi.org/10.17306/J.JARD.2020.01234>
- Wang, L., J. Wang and X. Huo. 2018. Consumer's willingness to pay a

premium for organic fruits in China:
A double-hurdle analysis. *Int. J.
Environ. Res. Public Health*.16(126):
1-14 doi:10.3390/ijerph16010126

Yesufu, O.A., F.J. Aremu, R.Kassali and
A.A. Adebayo. 2018. Consumer's

preference and willingness to pay for
organic foods in Osogbo Southwest,
Nigeria. *CurrInvesAgriCurrRes*.
2 (4) : 2 2 6 - 2 3 1 . D O I :
10.32474/CIACR.2018.02.000141