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Assessing Consumer Preferences and Willingness to Pay for Safer Vegetables in Ouagadougou, Burkina Faso

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ABSTRACT

The willingness to pay (WTP) of customers in Ouagadougou, Burkina Faso, for safer vegetables is assessed in this study. A multi-stage selection process was used to choose 350 vegetable consumers (lettuce, tomatoes, and cabbage) from ten districts of Ouagadougou, the capital.While Ordered Probit was used to estimate the determinants of WTP, descriptive statistics were utilized to determine the mean Willingness to Pay (MWTP). The findings showed that the WTP for safer vegetables was extremely high (98.57%). The mean amounts of CFA 322, CFA 400, and CFA 265 for 1.5 kg of cabbage, 1 kg of a bundle of lettuce, and 0.5 kg (500g) of tomatoes, respectively, represented 63.5%, 100%, and 59% increments in the amount that consumers were willing to pay for all three of the chosen vegetables, if they were safer. Younger people, educated people, salaried workers, wealthy people, and health-conscious consumers all showed a strikingly high readiness to pay for safer vegetables.WTP was lower for risk-takers, information-rich people, and people who bought vegetables based on their looks, which was the opposite of what we had assumed. Policy should focus on the former set of consumers. This encourages the business sector in general and farmers in particular to start producing safer vegetables. To increase consumers' trust in safer vegetables, the government, through the ministry of food and agriculture, is also urged to start the certification process.

Draft Statement: *This work is an objective draft of a thesis I submitted to the University for Development Studies (UDS) for the MPhil in Agricultural Economics.*

Keywords: *Contingent Valuation, Urban and Peri-Urban Agriculture, Ordered Probit, Mean Willingness to pay, Ouagadougou*

INTRODUCTION

The demand for vegetables has increased dramatically worldwide, in part because of urbanization (see, [29]) and the widespread perception that vegetables are an excellent source of vitamins and minerals that promote health and vitality [26]. For optimum health and vitality, 400g or more of vegetables should be consumed each day [27].

For the nutrition of both rural and urban residents in West Africa, consumption of wild and domestically cultivated vegetables is essential [26]. Therefore, eating vegetables, maintaining excellent health and vitality, and ensuring food safety are all crucial for human development. From a broader standpoint, the phrase "food safety" encompasses a broad range of problems that impact the food system, from the production and processing of basic commodities to retail marketing and international trade[2]. [2]noted that the use of inputs such as pesticides and fertilizers for crop production and feed and medications for animal husbandry raises concerns about food safety.

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He said, for example, that high concentrations of pesticides may be extremely harmful to human health and can have far-reaching consequences like cancer, which is why the issue is a major focus of public concern and governmental action. In a similar vein, [2] pointed out that food processing could potentially pose hazards to food safety. The nutritional value of food, a broader range of worries about the characteristics of unknown foods, and the likelihood of avoiding an illness as a result of eating a certain food are all closely related to the term "food safety" [20] [25]. [25] also highlighted the word as a quality attribute that is difficult to quantify and observe. Food is the antithesis of food safety. Major characteristics of urban and peri-urban agriculture (UPA), such as the high demand for vegetables in urban areas and the higher profits from growing them, as well as the fact that many vegetable consumers cannot tell the difference between vegetables grown with clean water and those produced with wastewater, have led farmers to turn to any "cheap or unsafe means of production" in order to profit [29]. Additionally, the ongoing use of agrochemicals and untreated wastewater has sparked serious concerns and the need to produce safer veggies. This implies that farmers could have to utilize clean water, adhere to stringent guidelines, or employ techniques that prevent food contamination. There is an additional expense involved, which the end users (consumers) must pay in full or in part. The purpose of this study was to investigate empirically whether or not consumers are prepared to pay for this extra cost. Finding out how much Ouagadougou, Burkina Faso, consumers were prepared to pay for safer veggies was the main objective of this study. In particular, the study sought to determine whether and to what extent consumers in Ouagadougou, Burkina Faso, were prepared to pay for safer veggies. In Ouagadougou, Burkina Faso, it also aimed to identify the variables affecting consumers' willingness to pay for safer veggies.

2. REVIEW OF LITERATURE

2.1 Food Safety

According to the National Research Council (1993) and Steahr (1996a, 1996b), referenced in [2] food safety is a crucial idea in public health. It is especially important for vulnerable groups, including the elderly, expectant mothers, young children, and people with impaired immune systems. Food safety is a quality attribute that is difficult to observe and quantify, according to [25] According to [6], a definition of safer veggies should include qualities like freshness, size, color, firmness, and lack of damage. This understanding was previously emphasized by[7], who suggested that the term "green products" should be understood to refer to ecological or environmentally friendly products. [19] defines "green foods" as nutrient-dense, high-quality, and safe to consume foods that prioritize social, economic, and environmental efficiency as well as long-term environmental improvement.

2.2 The Method of Contingent Valuation (CVM)

Although there are different economic models for valuing nonmarket items, researchers mostly employ the Contingent Valuation Method (CVM), which is the best appropriate for evaluating food safety. In contrast to other methods that try to replicate real-world buying situations, such as experimental markets, the method is adaptable and fairly priced.Cost-benefit analysis provides the theoretical foundation for CVM's operation. Davis (1963) first introduced CVM, which is mostly utilized for non-market valuation [12]. A direct estimation of willingness to pay (WTP) using a variety of (direct) elicitation approaches is made possible by contingent valuation. When employing the CV technique, customers are expected to just indicate their WTP without actually purchasing the hypothetical (nonmarket) product.

The main issue with this approach is that customers might not know as much about the product and the risks or benefits it carries, which could lead them to calculate the reward of risk avoidance incorrectly. Educating customers about the dangers associated with the experiment or interview is one potential solution [3].

As a result, [5] divided a contingent value survey's content into the following three parts: 1. A detailed description of the commodity or goods being valued and the hypothetical circumstance in which they are given to the respondent, 2. Inquiries regarding respondents' readiness to pay for the good or goods they value; and 3. Inquiries about use of the good or goods, preferences for the good or goods being valued, and characteristics (e.g., sex, age, income, and education). This strategy is known as contingent valuation since the values elicited are dependent on a specific hypothetical market for the good (vegetable) that is discussed and described to the respondents[5] Averaging the values of the responders and extending them to the entire population yields the resource's overall worth. This format for contingent valuation is open-ended. However, it has been suggested that responders frequently struggle to determine the resource's proper value on their own. This frequently results in a survey with a diverse range of replies. The closed-ended format of contingent valuation differs from the open-ended model.Respondents are given a value in this discrete or dichotomous choice question, and they are asked to answer "yes" if they would pay that sum or "no" if they would not. This usually reflects the options that buyers have in a real commodity market, where the product has a price and they can either purchase it at the going rate (yes) or not (no).

2.3 Willingness to Pay (WTP) and Willingness to Accept (WTA)

Willingness to pay and willingness to accept are the two primary approaches used to estimate how much individuals are willing and able to pay for safer vegetables. The fundamental goal of giving products and services monetary prices, according to [12] is to improve people's comprehension of their willingness to pay (WTP) and accept (WTA) for those goods and services they currently receive for free or are losing. The greatest amount of money that a person is willing to forgo in order to obtain more of another good is indicated by their willingness to pay. Conversely, willingness to accept is the smallest sum of money that a person is prepared to take in exchange for a lesser quantity of another good. Another name for it is recompense

3.0 MATERIALS AND METHODS

3.1 Study Area

The investigation was conducted in Burkina Faso's Ouagadougou. Originating in France's Upper Volta area, which is referred to as the "land of the upright/honest people," Ouagadougou, the capital of Burkina Faso, is commonly shortened to Ouaga. Located in the middle of West Africa's "hump" is the landlocked country of Burkina Faso. Geographically speaking, Ouagadougou is situated on the central plateau (12.4° N 1.5° W). Ouagadougou's climate is classified as hot semi-arid (BSh) by Köppen-Geiger, which is closely connected to tropical wet and dry (Aw). The city is situated in the Sudano-Sahelian area and receives about 800 mm (31 in) of rainfall per year.

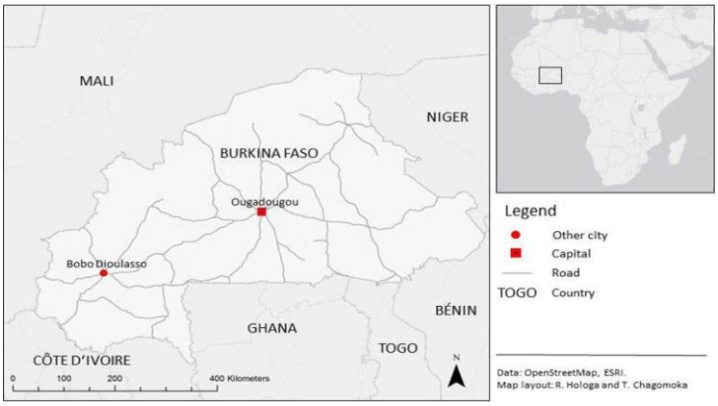

Figure 1: A Map of Burkina Faso showing the capital city (Ouagadougou)
Source:[8]

The research was cross-sectional, and a multi-stage sampling technique was used to collect data. The study's sample size consisted of 350 vegetable users. The following formula was used to calculate the sample size:

$$n = \frac{t^2 * p(1-p)}{m^2} \qquad [1]$$

The required sample size, the 95% confidence level (standard value of 1.96), the estimated population percentage (35%) under research [14], and the 5% margin of error (standard value of 0.005) are all included in this equation. A multi-stage sampling technique was used to identify responders. Ten (10) Districts in the capital city of Ouagadougou's primary tomato, cabbage, and lettuce-growing regions were selected at random for the first phase. Using stratified sampling based on income level and housing structure, one (1) sector was selected from each District for the second stage (2). In the third step, thirty-five (35) households were selected from each stratum using the systematic sampling technique.

The final step, stage four (4), involved choosing a response from each family who is responsible for making purchases, preparing meals, or acting as the head of the household.

3.2 Analytical Framework

The socioeconomic traits of the respondents and WTP were examined using descriptive statistics like frequency, mean, and standard deviation. The Ordered Probit regression model was used to calculate the mean willingness to pay for safer vegetables.

Empirically, in estimating WTP, the utility function and the commodity attributes are essential factors to consider [9]. From the utility theory, in equation 2 below, a consumer aims at maximizing utility derived from consuming a safer vegetable given the quantity of the safer vegetable.

$$U = u^*(q_1, q_2, q_3 ----q_n) \qquad [2]$$

One's utility function is the taste and preference for a given commodity subject to a budget constraint.[18] indicated that an individual's utility (U*) maximization is achieved by seeking to minimize his or her expenditure. Therefore, the expenditure function for the consumer when the quantity (q_0) of safer vegetables is delivered by a seller without charging a fee is given as:

$$e = e(p_0, q_0 u^*) \qquad [3]$$

If a consumer is willing to pay for the required quantity and quality of safer vegetables(q_1) to meet his or her own desire in consumption, then the consumer should be prepared to increase his or her expenditure. The WTP is then derived as the difference in the consumers' expenditures, thus:

$$WTP = e(p_0, q_0, u^*) - e(p_0, q_1, u^*) \qquad [4]$$

Where $q_1 > q_0$ [5]

The empirical model was stated as:

$$\text{Mean (WTP)} \quad \frac{\sum_{i=1}^{n} WTP}{N} \qquad [6]$$

The Ordered probit model was employed to determine the factors influencing consumers' willingness to pay for safer vegetables in Ouagadougou, Burkina Faso.

The dependent variable willingness to pay (WTP), was measured as an indicator variable and constituted as follows: 4. Consumers who were willing to pay for high price bids "yes- yes", 3. Consumers who were willing to pay for moderate price bids "yes-no" 2.Consumers who were willing to pay for lower price bids "no-yes", 1. Consumers who said they were willing to pay extra for the safer vegetable but were not willing to pay any of the bids offered them "No-no" and 0 for consumers who were not willing to pay at all.

Ordinal values were assigned to each of the choice categories with ordinal meaning and show the ranking of the various bids. From Greene (2013) the ordered model is a framework for analyzing ordered dependent variables.

The model is built around unobserved latent variable functions as:

$$z_i = x'\beta + e \qquad [7]$$

So that the observed variable z_i is related to the unobserved variable z_i* as:

$$\begin{aligned} z_i &= 0 if z^* \le 0 \\ z_i &= 1 if\, 0 < z^* \le u_i \\ z_i &= 2 if u_i < z^* \le u_2 \\ z_i &= 3 if u_i < z^* \le u_3 : \\ z_i &= j if u_{j-1} \le z^* \end{aligned} \qquad [8]$$

Where u_1, u_2, u_3 and $u_{1\text{-}1}$ are the unknown parameters representing the thresholds to be estimated, with β and z^* measuring the tendency of preference toward the highest category in terms of ranks relative to the thresholds, which depends on certain measurable characteristics x and certain unobservable factors e [11]; [13]. The number of thresholds is one less than the number of categories. The intercept or constant term is not included in the ordered regression, otherwise, multicollinearity problems arise [13]

Assume that e_i is normally distributed across observations with mean zero and variance one, then the probabilities for the observed dependent variable y_i are formulated as:

$$\begin{aligned} prob(Y_i = 0 \mid x) &= \phi(-x\beta) \\ prob(Y_i = 1 \mid x) &= \phi(u_1 - x\beta) - \phi(-x\beta) \\ prob(Y_i = 2 \mid x) &= \phi(u_2 - x\beta) - \phi(u_1 - x\beta) \\ prob(Y_i = 3 \mid x) &= \phi(u_3 - x\beta) - \phi(u_2 - x\beta) \\ &\vdots \\ prob(Y_i = j \mid x) &= 1 - \phi(u_{j-1} - x\beta) \end{aligned} \qquad [9]$$

Where ϕ is the probability density function of the standard normal distribution of the error term. The threshold parameters u_1, u_2, u_3 and $u_{1\text{-}1}$ the index function parameter β are estimated by the maximum log-likelihood function using numerical methods [13]

For all the probabilities to be positive, we must have the threshold parameters as:

$$0 < u_1 < u_2 <_3 \ldots\ldots\ldots\ldots\ldots < u_{j-1}$$

Then the marginal effects x^s *are:*

$$\begin{aligned} \frac{\partial prob(Y_i = 0 \mid x)}{\partial x} &= \phi(x\beta)\beta \\ \frac{\partial prob(Y_i = 1 \mid x)}{\partial x} &= [\phi(x\beta) - \phi(u - x\beta)\beta \\ \frac{\partial prob(Y_i = 2 \mid x)}{\partial x} &= \phi(u - x\beta)\beta \end{aligned} \qquad [10]$$

Therefore, the sign of the parameter β is opposite the direction of the marginal effect for the lowest category, but it indicates the direction of the marginal effect for the highest category [13]. This implies that when β is positive *x,* the probability of the lowest category *prob* (y_i*=0|x)* will decline. In other words, the derivative of *prob* (y_i*=0|x)* has the opposite sign for β [11]. In totality, the signs of changes in the extreme upper and lower categories *prob* (y_i*=0|x) prob* (y_i*=3|x)* respectively are unequivocal and unambiguous, but the direction of the marginal effects for the middle categories goes one way or the other, depending on the sign of the difference in the bracket, rendering the direction ambiguous [11];[13].

Table 1: Measurement of Variables

Explanatory variables	Description of variables	Measurement
Age	Age of Respondents'	Year
Education	Respondents' educational level	1 if educated, 0 otherwise
Occupation	Respondents' occupation	1 if a salary worker, 0 otherwise
HH size	Total number of people eating from the same pot in a household	Number
Number-of children	Number of children in a household	Number
Income	Consumers' earnings	Amount (CFA)
Appearance of vegetables	Whether or not consumers consider the appearance of vegetables when purchasing them (colour,size texture)	1 if considers appearance 0 otherwise
Trust in government	Consumers' potential trust in government's institutions for vegetable certification	1 if trust, 0 otherwise
Financial risk	Consumers' willingness to risk their finances	1 if ready to risk, 0 otherwise
Health Concern	Consumers' concern about their health	1 if concern 0 otherwise
Access to information	Consumers' access to information on vegetables	1 if getting access 0 otherwise

Source : Authors Construction

4. Results and Discussions

4.1 Demographic Statistics

Table 2's findings indicate that, of the respondents, 96.57% are women and the remaining 3.43% are men.This finding could be attributed to the fact that females are at the center stage of decision-making with respect to food/vegetable purchases even though they make such decisions with their husbands based on the household income [16]**.** The majority of responses were in the age range of 21 to 40 years, and the mean age of 36.67 years places them in the youthful age range. Additionally, the sample interviewed had a mean household size of five individuals, although the sample household's minimum and highest sizes were one and thirteen members, respectively. This is marginally less than the average of 6.2 members in a household [15]

In terms of educational level, the highest percentage of the respondents have primary education (30.57%), followed by those who have no formal education (20.57%). Those who completed Junior high school constitute the third highest percentage. (19.97%). The rest are as indicated in the table. Finally, the dominating ethnic group in the study area is Mossi (62.00%) while the least is the Senufo (2.29%).

Table 2: Socio-demographic Characteristics of Vegetable Consumers in Ouagadougou

Variable	Category/Description	Frequency (n=350) (%)
Sex		
	Female	338 (96.57)
	Male	12 (3.43)
Age		
	Less/equal 20	21 (6.00)
	21 – 40	217 (62.00)
	41 – 60	90 (25.71)
	60+	22 (6.29)
HH Size		
	Less/equal 5 people	205 (58.57)
	6-10 people	144 (41.14)
	More than 10 people	1 (0.29)
Educational Level		
	None	79 (22.57)
	Arabic school	11 (3.14)
	Non formal	1 (0.29)
	Primary	107 (30.57)
	Junior High School	69 (19.71)
	S.H.S/Vocational/Technical	58 (16.57)
	Tertiary	25 (7.14)
Ethnic Affiliation		
	Mossi	217 (62.00)
	Peul	25 (7.14)
	Lobi	13 (3.71)
	Bobo	28 (8.00)
	Senufo	8 (2.29)
	Gurunsi	24 (6.86)
	Others	35 (10.00)

Source: Computed from Household Survey Data, 2016.

4.2 Consumers' Willingness to pay for safer vegetables

The main objective of the study was to investigate whether or not consumers were willing to pay for safer vegetables and if yes, how much they were willing to pay. To achieve this, a hypothetical market where vegetables are produced with clean irrigated water, agro-chemical free, and soil testing was created, respondents' were asked to indicate their willingness to pay more for the safer vegetables, those who were willing to pay were then asked to indicate the premium price or amount they were prepared to pay. From the survey results 98.57% of the respondents were willing to pay for safer vegetables. The rest (1.43%) were unwilling to do so.

4.3 Mean Willingness to Pay amount (MWTP) for safer vegetables in Ouagadougou

The study revealed that an average-sized cabbage of 1.5kg was being sold at CFA 250 from the various selected districts in Ouagadougou, if safer and not harmful to consumers' health; consumers were willing to pay a mean amount of CFA 322 which is about 63.50% higher than the current market prices. Similarly, on average, consumers were willing to pay CFA 400 for 1kg of a bundle of safer lettuce which is currently sold at CFA 200 on average from the markets of the selected districts, representing about a 100% increase in the current average market price from the selected districts. Finally, the average amount the sampled consumers were willing to pay for 0.5kg (500g)of tomatoes if safer was 265 representing about a 59% increase in the current price of CFA 200. Table 3 shows the average premium prices that respondents were willing to pay for the three vegetables that rise in current market prices from the selected districts markets of the chosen districts.

Table 3: Mean Willingness to Pay amount (MWTP) for Safer Vegetables

Safer vegetables	MWTP (CFA)	Current market prices(CFA)	Minimum Bid (CFA)	Maximum Bid (CFA)
cabbage	322.00	250.00	225.00	600.00
lettuce	400.00	200.00	220.00	700.00
tomatoes	265.00	200.00	150.00	440.00

Source: Compiled from Household Survey Data, 2016

Notes: The current market prices represent the average market price obtained from the ten (10) markets of the selected districts in Ouagadougou, Burkina Faso.

4.4 Determinants of Consumers' WTP for Safer Vegetables

The factors influencing consumers' WTP for safer vegetables cabbage, lettuce and tomatoes are reported in Table 4. Out of eleven (11) explanatory variables hypothesized to influence consumers' WTP for safer vegetables, nine (9) were statistically significant in the case of cabbage, five (5) for lettuce, and three (3) for tomatoes. From the Ordered Probit regression estimates, the Prob > chi2 is *0.0000*, which means that at least one of the explanatory variables is a significant determinant of WTP for safer vegetables. Also, though the Pseudo R^2 values of 0.1802 for cabbage, 0.1601 for lettuce, and 0.1634 for tomatoes are low their statistical significance, shows that the model is good assuming that all the Gauss Markov assumptions are binding. The Logpseudo likelihood of the models for the three vegetables are -425.79,-321.49 and -292.00 respectively.

From the results, the coefficient of age is negative and significant for all the safer vegetables. It can also be seen that the marginal effects are positive for lower bids but negative for higher bids. These imply that in general, the younger consumers had a higher probability of purchasing safer vegetables and offering higher prices than the relatively old consumers. This confirms the study of [21] who reported that younger consumers are more willing to pay higher price premiums than older consumers. The finding, however, contradicts that of [24],[1]; and[10] who found the old to be more willing to pay more than the young.

The coefficient of the education variable is however positive and significant for only cabbage. Again, the marginal effects are negative for bid one (1) but positive for bids 2, 3 and 4, indicating that educated consumers had a higher probability of purchasing safe vegetables than consumers with lower educational backgrounds. This finding concurs with the earlier works of [24];[19], but contradicts the findings of [4]. The coefficients for the other variables are insignificant.

Similarly, salaried workers had a higher probability of purchasing safer cabbages and lettuce than non-salaried workers, given that the occupation variable has positive and significant coefficients for the two vegetables.

The coefficient for safer tomatoes is not significant though it maintains the positive sign. Other variables with positive coefficients are household size, income, financial risks, health concerns (for safer cabbage and lettuce), and trust in government (for safer tomatoes). Variables with negative coefficients are the appearance of vegetables and access to information (for safer cabbages and lettuce).

The positive and significant coefficients of household size for safer cabbage and lettuce imply that larger households are more willing to buy safer vegetables than smaller households. This is confirmed by the negative marginal effects for lower bids but positive marginal effects for higher bids. This variable was expected to have a negative marginal effect because a larger household size means that the household may not be able to buy safer vegetables which are more expensive than the conventional ones. Larger households normally have many mouths to feed and so under normal circumstances, they would like to make do with the conventional ones which are relatively cheap. While our finding is in sync with that of [1]) and [22] it contradicts that of [17]

In the case of income, our *a priori* expectations were met in the sense that higher income means that households can afford safer vegetables that are more expensive than conventional ones. In other words, an increase in the income of respondents leads to increases in WTP for safer cabbage, the marginal effect estimates also show that, an increase in respondents' income by one CFA decreases the probability of willingness to pay for Bid1 and Bid3 of safer cabbage by 0.09 and 0.14 respectively. However,an increase in the income leads to an increase in WTP for Bid4 by 0.21. This is similar in the case of lettuce and tomatoes.[24] and [30] also found a positive relationship between consumers' income and their willingness to pay high for safer vegetables.

Similarly, the marginal effect of health concerns shows that those who were not concerned so much about their health had 0.01, 0.03 and 0.03 higher probabilities of paying more for safer lettuce than those concerned about their health.

However, at a very high price Bid4, those who were concerned about their health had 0.08 higher probability of paying more than those who were not too concerned about their health.

Furthermore, the marginal values of trust in government indicate that consumers who have trust in the government have a lower probability of being willing to pay for safer tomatoes at Bid1, Bid2 and Bid3 by 0.003, 0.03 and 0.02 respectively but have higher probability of 0.7 for Bid4 compared to consumers who do not trust in government. This suggests that, for tomatoes a trust in government means higher WTP for higher bids and lower WTP for lower bids.

Unlike other variables, financial risk was observed to influence only WTP for safer cabbage. The finding implies that loving respondents were willing to pay more for safer cabbage than their risk-averse counterparts.This is confirmed by the negative marginal effects at lower bids but positive ones at higher bids. For instance, while the marginal effects at bids 1 and 2 were 0.03 and 0.07, the marginal effect for bid 4 was 0.11. The finding is plausible in the sense that people who are not too particular about their purchases would not mind spending more on a new product like safer cabbage.

The negative coefficient of the variable ' appearance of vegetable' implies that consumers who do not consider the appearance when buying vegetables are rather prepared to pay more than those who are critical of the appearance. This is confirmed by the positive marginal effects at bids 1 and 2 but a negative one at bid 4. This is contrary to our *a priori* expectations. The finding is similar to that of information access where consumers with access to information about safe vegetables were rather willing to pay a lower price than those who did not have access to information.

Table 4: Estimated Coefficients and marginal effects of Determinants of WTP for safer vegetables

variables	CABBAGE						LETTUCE						Tomatoes					
	CoE	No WTP	WTP Bid 1	WTP Bid 2	WTP Bid 3	WTP Bid 4	CoE	No WTP	WTP Bid 1	WTP Bid 2	WTP Bid 3	WTP Bid 4	CoE	No WTP	WTP Bid 1	WTP Bid 2	WTP Bid 3	WTP Bid 4
Age	-0.3131**	0.0070	0.0340**	0.0749**	-0.0031	-0.1129***	-0.3159**	0.0089	0.0184*	0.0489**	0.0384**	-0.1146**	-0.3331**	0.0092	0.0067	0.0685**	0.0406**	-0.1249**
Education	0.3589***	-0.0086	-0.0402**	0.0852***	0.0058	0.1281***	0.0486	-0.0012	-0.0026	-0.0073	-0.0062	0.0172	0.0761	-0.0018	-0.0014	-0.0150	-0.0098	0.0280
Occupation	0.9729**	-0.0066	-0.0480***	-0.1983***	-0.1186	0.3716**	0.7383	-0.0079	-0.0214**	-0.0783**	-0.0945	0.2023*	0.6865	-0.0074	-0.0065	-0.0960*	-0.0949	0.2049
HH size	0.0658*	-0.0012	-0.0064	-0.0161	-0.0008	0.0245*	0.0816*	-0.0019	-0.0042*	-0.0121*	-0.0105*	0.0286*	0.0109	-0.0002	-0.0002	-0.0021	-0.0014	0.0039
Number of children(H)	-0.1220	0.0022	0.0119	0.0298	0.0016	-0.0456	-0.1864	0.0043	0.0096	0.0276	0.0239	0.0654	-0.0689	-0.0015	0.0012	0.0133	0.0091	-0.0252
Income	0.6677***	-0.0262	-0.0935**	-0.1388***	0.0469	0.2117***	0.7331***	-0.0038	-0.0593*	-0.1210***	-0.0636***	0.2817***	0.9369***	0.0576	-0.0314	-0.2132***	-0.0583***	0.3605***
Appearance of veg	-0.8481*	0.0063	0.0452***	0.1799**	0.0968	-0.3281*	-0.0379	0.0008	0.0019	0.0055	0.0049	-0.0131	-0.2889	0.0046	0.0038	0.0495	0.0403	-0.0982
Trust in Governmen t	0.9282	-0.0017	-0.0091	-0.0227	-0.0012	0.03465	0.0633	-0.0015	-0.0033	-0.0094	-0.0081	0.0222	0.1811***	-0.0040	-0.0031*	-0.0352***	0.0238***	0.0661***
Financial Risk	0.2933***	-0.0054	-0.0287***	-0.0716***	-0.0038	0.1095***	0.1169	-0.0027	-0.0060	-0.0173	-0.0150	0.0410	0.1059	-0.0024	-0.0018	-0.0206	-0.0139	0.0387
Health Concern	0.1739**	-0.0032	-0.0170**	-0.0425**	-0.0022	0.0649**	0.2268**	-0.0053	-0.0117**	-0.0335**	-0.0291**	0.0796**	0.1352	-0.0030	-0.0023	-0.0263	-0.0178	0.0494
Access to Information	-0.1022**	0.0019	0.0099**	0.0249**	0.0013	-0.0381**	-0.1372**	0.0032	0.0071**	0.0203**	0.0176**	-0.0482**	-0.0902	0.0020	0.0015	0.0175	0.0118	-0.0329

Model Fitness		Defined boundaries for 1.kg of a bundle of safer lettuce WTP bids	Model Fitness	Defined boundaries for 1.kg of a bundle of safer lettuce WTP bids	Model Fitness	Defined boundaries for 0.5kg of safer Tomatoes WTP bids
Number of observations	350	No WTP=0	350	No WTP=0	350	No WTP=0
LR chi2(11)	41.11	Bid 1 = WTP < CFA 250	43.22	Bid 1 = WTP < CFA 150	43.22	Bid 1 = WTP < CFA 150
Prob > chi2	0.000	Bid 2 = CFA 250 < WTP < 400	0.000	Bid 2 = CFA 150 < WTP < CFA 300	0.000	Bid 2 = CFA 150 < WTP < CFA 300
Pseudo R2	0.1601	Bid 3 = CFA 400 < WTP < CFA 700	0.1634	Bid 3 = CFA 300 < WTP < CFA 500	0.1634	Bid 3 = CFA 300 < WTP < CFA 500
Log pseudo likelihood	-321.49	Bid 4 = WTP > CFA 700	-319.47	Bid 4 = WTP > CFA 500	-319.47	Bid 4 = WTP > CFA 500

= significant at 10%, ** = significant at 5% and * = significant at 1%*

Source: Authors Computations

5.1 Conclusions and Policy Recommendations

The study examined consumers' willingness to pay for safer vegetables in Ouagadougou, Burkina Faso. Specifically, it examined how much consumers were willing to pay for safer cabbage, lettuce and tomatoes and the factors influencing their willingness to pay. Multi-stage sampling technique was used to sample 350 respondents; a comprehensive semi-structured questionnaire was then used via face-to-face interview to collect data for the analysis. Contingent valuation method (CVM) using a hybrid of open-ended and two stage process of elicitation (double-bound) approaches were used to elicit the amount consumers were willing to pay for safer vegetables. An ordered probit model was then estimated to identify the determinants of consumers' willingness to pay for safer vegetables.The major findings from the study are as follows: Almost all the respondents (98.6%) were willing to pay more for safer vegetables The amounts consumers were willing to pay for all the three selected vegetables if safer were high with mean values of CFA 322, CFA 400, CFA 265 for an average size 1.5kg of cabbage, 1kg of a bundle lettuce and 0.5kg (500g)of tomatoes representing 63.5%, 100% and 59.0% increment respectively: In general, WTP for the vegetables was high for the following categories of respondents: the relatively young; educated, salaried workers; the rich; those who are health conscious. Contrary to our *a priori* expectations, risk lovers, those who had access to information, and those who considered the appearance of vegetables before buying them had lower WTP. This findings is inline with[23] The former group of consumers should be targeted for policy formulation. Given that there is a willingness to patronize safer vegetables, we recommend the production of safer vegetables in Tamale. This should be taken up, especially by the private sector. The government should also go into the certification of vegetables to put confidence in consumers.

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Plagiarism Declaration Statement

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AI Disclaimer

The author(s) hereby declare that no generative AI technologies, including but not limited to Large Language Models (e.g., ChatGPT, Copilot) or text-to-image generators, were used in the writing, editing, or creation of any content within this manuscript. All work presented is the result of human effort and intellectual contribution.

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