African Association of Agricultural Economists. *Shaping the Future of African Agriculture for Development: The Role of Social Scientists*. Proceedings of the Inaugural Symposium, 6 to 8 December 2004, Grand Regency Hotel, Nairobi, Kenya

Consumers' Perceptions and Willingness to Pay for organic vegetable in Benin and Ghana

Theodore Nouhoheflin[1], Ousmane Coulibaly[1], Andy J. Cherry[1], Ramatu Al-Hassan[2] and Patrice Y. Adegbola[3]

Theodore Nouhoheflin, Agricultral economist/consultant, International Institute of Tropical Agriculture
08BP: 0932, Tripostal-Cotonou, Benin, Tel: Office: 229 350188 Private: 229 851456
Fax: (229) 350556, Email: t.nouhoheflin@cgiar.org, Email 2: tnouho@yahoo.fr

Abstract: Vegetable plays important roles in the socio-economic development in West Africa. It contributes to insuring food security, provides raw materials for local industries, generates foreign exchange and provides employment and incomes for most of the population. However some health hazards are caused by the misuse of chemical on vegetable. This study is undertaken within the framework of the research project: 'Public-private partnerships for development and implementation of entomopathogenic viruses as biopesticides for key lepidopteran pests in Ghana and Benin. It assesses the potential market of organic vegetables and analyse consumers' awareness and perceptions of chemical pesticide residues in vegetables and assess the premium levels that consumers are willing to pay for chemical free vegetables. Data were collected through a formal questionnaire on consumers' perceptions of produce quality problems, their level of awareness of heavy chemical pesticide use on vegetable and their willingness to pay for a vegetable if it is chemical free. A Hedonic-pricing model was used to identify the key factors most likely to affect consumers' willingness to pay for bio-vegetables. The results show that consumers are aware of the heavy use of chemicals on vegetables. The level of awareness of health hazard linked to chemical pesticides among consumers is more widely spread. The characteristics that consumers are looking for in assessing the quality of vegetable are: damage free, freshness, size, bright colour and hardness. Consumers are willing to pay more than 50% as price premium for chemical free vegetable. The most likely factors influencing consumers' willingness to pay for chemical free vegetable are the socio-professional category acting as a proxy for income level, the awareness of chemical residue, the availability, the label and the taste. In conclusion, this study showed that there is a consistent potential demand for organic vegetables if they meet characteristics above mentioned.

Introduction

Peri-urban agriculture plays important roles in the socio-economic development of Ghana and Benin. It contributes to insuring food security, provides raw materials for local industries, generates foreign exchange, and provides employment and incomes for most of the population, thereby contributing to poverty reduction. However some health hazards are caused by the misuse of chemical on vegetable, mean crop of peri-urban agriculture. The risk to consumers to inappropriate use of chemical pesticide is high because they are not aware of the health hazards linked to chemical residues in vegetable. This study was undertaken within the framework of the research project: 'Public-private partnerships for development and implementation of entomopathogenic viruses as bioinsecticides for key lepidopteran pests in Ghana and Benin, West Africa' which is being implemented by the International Institute of Tropical Agriculture and funded by the Department for International Development (DfID) of the United Kingdom. The purpose is to assess the potential for developing a biopesticide market in Ghana and Benin with a probable spill-over to other West African countries. The specific objectives are to analyse consumer awareness and perceptions on chemical residues in vegetables, to assess consumers' willingness to pay for bio-vegetables and at last to determine the key factors affecting consumers' decision making in buying organic vegetables.

Rising concerns over the safety aspects of chemical pesticides means that officialdom is more likely to raise the level of awareness of these problems among farmers. Already, the Food and Agriculture Organisation (FAO) and the UNDP are supporting the implementation of the IPM strategy in Ghana. The

World Bank also supports pest control strategies that promote the use of biological or environmental control methods (Youdeowei, 2000).

The European Union has undertaken a programme for harmonising the Maximum Residual Levels (MRLs) for agro-chemicals permitted in agricultural products. As with products grown in Europe, all imports originating from non- member countries must comply with this regulatory development. By the year 2005, all horticultural produce originating from non-EU member countries and exported to the EU will meet with "zero" tolerance regarding pesticide residues containing substances for which EU approval has been revoked (COLEACP Pesticides Initiative: Pesticides File, 2001). This is a challenge to exporters of horticultural products to the EU (which is the major destination of Ghana's horticultural exports) to find safer alternatives to chemical pesticides.

2. Methodology

2.1 Sampling and Surveys

A sample of 97 vegetable consumers had been randomly selected in 2001 in Ghana from the formal survey in the Accra and Tema Metropolitan areas and parts of the Ga district in the Greater Accra region. This sample had updated and completed to 100 vegetable consumers in 2002 for complementary information. In Benin, a sample of 100 vegetable consumers was also randomly selected in coastal region of Benin: Porto-Novo, Cotonou, Ouidah, Lokossa and Grand-Popo.
Data were collected with a formal questionnaire from consumers in both countries. Consumers had been interviewed about their perceptions of produce quality problems, their level of awareness of heavy chemical pesticide use on vegetable and their willingness to pay for a head of cabbage or tomato at a given price if the produce is chemical free. Key factors most likely to influence the willingness of consumers to pay for organic vegetable had been also identified.

2.2 Model

* *Analytical framework: The Logit*

This model was used to identify key factors most likely to influence the willingness of vegetable consumers to pay and corresponding prices for organic vegetables. This model has found several empirical applications in the literature (Falusi, 1975; Rahm and Huffman, 1984; Hailu, 1990). The model is mathematically represented as:

$$\phi(\beta X_i) = \int_{-\infty}^{\beta X_i} \frac{1}{\sqrt{2\,\Pi}} \exp\left(\frac{-t^2}{2}\right) dt$$

Where t is a random variable distributed as a standard normal deviate; ß is a vector of unknown coefficients. X_i is a vector of characteristics of the i^{th} individual. Φ (ßX_i) is the probability that the i^{th} individual will pay a high price for organic vegetable. Thus, the probability to pay higher for organic vegetable is the area under the standard normal curve between $-\infty$ and ß X_i. The larger is the value of ß X_i, the more likely willingness to pay is to take place.

* *The empirical model*

The empirical specification of the logit model was employed, based on Hedonic-Pricing Method (HPM) to identify the factors likely to affect consumers' willingness to purchase an organic vegetable in Ghana and Benin. This method was used to identify the key determinants affecting consumers' decision-making. For example, if a consumer were to choose between two identical cabbages, (a) one produced with chemical pesticide, (b) and the other produced with biopesticide, which one would he/she buy? and at what price? (5% higher than (a)? or 50% higher?). The descriptive statistics on the variables include in the empirical model and their expected signs are given in table 1. The dependent variable is the willingness to pay higher price for organic vegetable (WTPBIO), which takes a value of 1 for consumers who are willing to pay higher price for organic vegetable and a value of 0 for those who would not pay more than they paid for vegetables that are treated with chemical pesticide.

Table 1: Names and description of variables

Variables names	*Description*		
Dependent: WTPBIO	Willingness to pay higher premium price for organic vegetable (1= yes, 0=no)		
Independent:		Modality	Expected signs
HHTOTAL	Household size	Number of persons	-
OCCUPAT	Major occupation of head of household	1= Trader; 2= National functionary; 3=International functionary; 4=Business man	+
CHEMIC	Consideration of chemical free in buying vegetable	1= Vegetable chemical free 0= Vegetable with chemical residue	+
DAMAGE	Consideration of Insect damage free in buying vegetable	1= Vegetable insect damage free 0= Vegetable with insect damage	–
DIRTY	Consideration of Dirty water free in buying vegetable	1= Vegetable dirty water free 0= Vegetable with dirty water	–
FRESH	Consideration vegetable Freshness	1= Vegetable freshness considered 0= otherwise	+
HEALTH	Awareness of health risk	1= To be aware 0= Not to be aware	+
RESIDUE	Awareness of chemical residues in vegetable	1= To be aware 0= Not to be aware	+
LABEL	Label to guarantee bio-vegetable quality	1= Consider Label 0= Not consider label	+
APPEA	Appearance of bio-vegetable	1= Bad ; 2=Same ; 3= good ; 4=Any	+
TASTE	Taste of bio-vegetable	1= Less taste; 2= good taste	+
AVAIL	Availability of bio-vegetable	1= Available 0= Not available	+
DISTANC	Distance between market and house	1= Buy bio-vegetable even if the market size is more far than the chemical ones 0= Otherwise	+

3. Results

Consumers' perception of produce quality problems

The survey results show that the demand for tomato is higher compared to cabbage in the daily vegetable purchases. Tomato is used in the daily meal as ingredients for soup, stew or salad. Compared to tomato, cabbage is purchased twice a week by 20 and 14% of the consumers in Ghana and Benin respectively. Daily market is the major source of supply of vegetables in both countries.

The characteristics that consumers are looking for in assessing the quality of cabbage and tomato are: damage free, freshness, big size, bright color and hardness. In Ghana, most of the consumers do not consider risks of health hazards due to heavy chemical residues as a major factor in buying vegetables contrary to Benin where more than 50% of the consumers reported that risk as important in their purchase decision (Tables 2&3).

Table 2: Vegetable Characteristics used by Consumers in assessing the quality of cabbage and tomato in Ghana

Characteristics	Cabbage (%) N = 100	Tomato (%) N = 100
Colour	74	24
Freshness	69	75
Size	51	32
Hardness	37	23
Insect damage free	33	67
Dirt free	5	9
Chemicals free	3	3

Source: Surveys in Ghana, 2001-2002

The same factors affecting purchase decisions have been reported in Benin (table 3) except the hardness for tomato and cabbage fruits. Physical damage free of fruits ranks first as a major criterion in buying cabbage. This is followed by dirt free and size. The three factors taken into consideration for a decision to purchase tomato are size, colour and dirt free ranked by priority by farmers.

Table 3: Vegetable Characteristics that Consumers Use in Assessing the Quality of cabbage and tomato in Benin

Characteristic	Cabbage (%) N = 100	Tomato (%) N =100
Colour	69	92
Freshness	80	90
Size	83	93
Hardness	6	2
Insect damage free	87	86
Dirty water free	86	9
Chemicals free	50	62

Source: Surveys in Benin, 2001-2002

Consumers' awareness of heavy chemical pesticide use and alternatives in vegetable production

The survey results show that 80% of consumers are aware of the heavy use of chemicals on vegetables in Ghana. Most of the consumers do not know about biopesticides, and their use in vegetable protection. In Benin, more than half (60%) of vegetable consumers know about the misuse of chemical pesticide on vegetable. A small proportion of consumers (24%) know about biopesticides and in vegetable protection. More than 70% of the consumers are aware of the potential damage of chemical pesticides on health. The level of awareness of health hazard linked to chemical pesticides among consumers is more widely spread in Ghana than Benin (Table 4).

Table 4: Consumers' awareness of chemical pesticides and biopesticides

Modality	Usage of chemical pesticides (%)	Usage of Biopesticides (%)	Awareness of chemical residues (%)	Awareness of chemical pesticide on health (%)

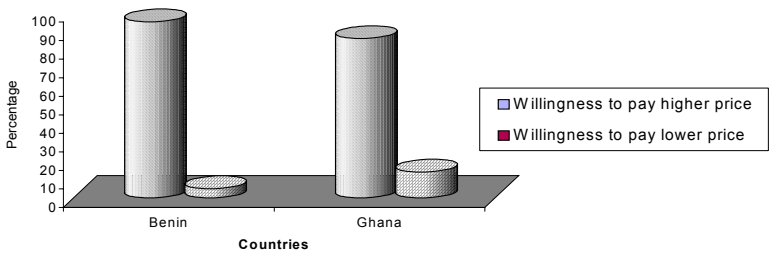
	Ghana	Benin	Ghana	Benin	Ghana	Benin	Ghana	Benin
Yes	80	60	19	24	85	67	88	71
No	20	40	81	16	15	33	12	29
Total	100	100	100	100	100	100	100	100

Source: Surveys in Ghana and Benin, 2002

Consumers' willingness to pay for organic vegetables

The survey results indicated that 86% of the consumers in Ghana and 95% in Benin are willing to pay higher price premium for organic vegetable (Graph 1).

Graph 1: percentage of consumers' willingness to pay a premium for bio-vegetable



Given a standard price of a head of cabbage costing $ 0.25 treated with chemical pesticides, consumers were asked how much they would be willing to pay for similar sized chemical-free cabbage and/or tomato. On average, consumers are willing to pay up to 57 and 50% more respectively for cabbage and tomato not treated with chemical pesticides in Ghana. The high standard deviations are explained by mixed perceptions from consumers on the demand for bio-vegetables (see table 6, 8).

Premiums are slightly higher in Benin and have been estimated to reach up to 66 for cabbage and 56% for tomato (see table 7, 9). This is explained by an increasing rate of poisoning due to the misuse of chemical pesticide such as Endosulfan on cotton during the last five years in Benin. In both countries, consumers are concerned about the types of pesticides used on vegetable and the awareness about health risks has been increasing because of on-going campaigns by Medias.

Table 6: Minimum and maximum price premium for a organic cabbage and tomato in Ghana

Scenario	Sample Size	Minimum ($)	Maximum ($)	Mean ($)	St.dev. ($)
WTP for cabbage chemical-free	97	0.06	0.6	0.36	0.1
WTP for Tomato chemical-free	92	0.06	0.6	0.36	0.1

Source: Market Surveys in Ghana and Benin, 2002

Table 7: Minimum and maximum price to Pay for Cabbage and Tomato Chemical free in Benin

Scenario	Sample Size	Minimum ($)	Maximum ($)	Mean ($)	St.dev. ($)

WTP for cabbage chemical-free	101	0.2	1.5	0.4	0.1
WTP for Tomato chemical-free	107	0.1	1.5	0.4	0.1

Source: Market Surveys in Ghana and Benin, 2002

Table 8: Consumers Willingness to Pay for Chemical-free Cabbage and Tomato in Ghana

Scenario	Mean WTP ($)	Std dev. (WTP)	Premium
A chemical-free $ 0.25-sized cabbage	0.39	0.08	57%
A chemical-free $ 0.25-sized tomato	0.37	0.08	50%

Source: Market Surveys in Ghana and Benin, 2002

Table 9: Consumers Willingness to Pay for Chemical-free Cabbage and Tomato in Benin

Scenario	Mean WTP ($)	Std dev. (WTP)	Premium
A chemical-free $ 0.25-sized cabbage	0.45	93	66%
A chemical-free $ 0.25-sized tomato	0.39	92	56%

Source: Market Surveys in Ghana and Benin, 2002

Determinants of consumers' willingness to pay for organic vegetables

A Hedonic-pricing model (HPM) was used to identify the determinants likely to affect consumers' willingness to pay for chemical free vegetables produce.
Three factors were found to affect consumer choices for cabbage in Ghana and are: socio-professional category acting as a proxy for income level, the awareness of chemical residue in vegetables and the taste of the produce treated with the new biopesticides (table *a* in annex). They affect positively and significantly the consumers' willingness to pay for organic vegetables.

In Benin (table *b* in annex), three factors were found to be significant and positively related to the consumer's willingness to pay for organic vegetables. They are awareness about health risks, organic vegetable availability throughout the year, and the label to guarantee the quality of the produce. The results clearly indicate that consumers need to be duly informed for a sound choice between organic and chemically treated vegetables.
Table *c* & *d* in annex show the likely factors, which may affect consumers' willingness to pay for tomato chemical free respectively in Ghana and in Benin.

A key factor affecting significantly the consumers' willingness to pay for an organic tomato in Ghana is the taste of the new produce. Consumers are sensitive to good taste and would not renew the purchase of organic produces with bad tastes. Another factor, which may play a role in the consumer's decision toward organic vegetable, is the access to organic vegetable and the sustainability of its supply. In Benin, the result shown in table *d* indicates three significant variables out of the seven introduced in the model. These variables were found to affect consumer choices for cabbage. They are the awareness of chemical residue in vegetables, the awareness of health risks due to chemical residue in vegetables and the availability of organic tomato treated with the new biopesticides.

4. Discussion

Cabbage and tomato are commonly used as ingredients in meal. Daily market is the major source of supply of vegetables. Consumers value more external and visible characteristics like damage free, freshness, big size, and bright color in assessing the quality of cabbage and tomato. In both countries, the majority of consumers were informed that chemical pesticide is used to control vegetable pests but consumers in Ghana do not consider risks of health hazards due to heavy chemical residues as a major factor in buying vegetables. In Benin consumers are more aware about these risks and consider them in their purchase decision. However, most of the consumers do not know about biopesticides and their use in vegetable pests control. In both countries, consumers are willing to pay higher price premium for organic vegetable. The premiums are slightly higher in Benin because of the increasing rate of poisoning due to the misuse of chemical pesticide, widely diffused by media.

The most likely factors that affect consumer's willingness to pay for bio vegetable (cabbage and tomato) without chemical residue in Ghana are the socio-professional category (household income level), the level of information and awareness about the risks of heavy chemical residues in vegetable produces and the taste of chemical pesticide free cabbage. In Benin, beside the information about health risks, the sustainable supply of organic vegetables and the label to guarantee the quality of the product are dominant factors in consumer's decision making.

This study showed that there is a consistent potential demand for organic vegetables (cabbage and tomato) but customers need to be sensitized about the health hazards linked to chemical residues through sustained information campaigns. Labeling of biopesticide-treated vegetable will help to identify the produce at least for consumers who are willing to pay for organic vegetables and price premiums.

References

Adegbola, P. and Singbo, A. (2002) Analyse socio-économique de la filière des biopesticides au Bénin. Phase 2.2. Unpublished report. INRAB/LESR, Porto Novo, Benin, March-April. 33 pp.

Al Hassan, R. and Jatoe, J.B.D. (2001) Opportunities and constraints for development of biopesticides in Ghana. Unpublished report. Department of Agricultural Economy and Farm Management, University of Ghana, Legon, 43 pp.

Blay, E., Cudjoe, A. R. and Braun, M. (2000) Handbook of Crop Protection Recommendations in Ghana: An IPM Approach. Volume 2: Vegetables. Ministry of Food and Agriculture, Ghana.

De Groote, H., Douro-Kpindou, O. K., Ouambama, Z., Gbongboui, C., Müller, D., Attignon, S., and Lomer, C. (2001) Assessing the feasibility of biological control of locusts and grasshoppers in West Africa: Incorporating the farmers' perspective. *Agriculture and Human Values* **18:** 413-428.

Dent, D. R. (1997) Integrated pest management and microbial insecticides. *In*: Microbial insecticides: novelty or necessity? British Crop Protection Council Proceedings/Monograph Series, No. 68, 127–138.

Falusi, A. O., (1975) Application of multivariate probit to fertilizer use decision: sample survey of farmers in tree states in Nigeria. J. Rural Econ. Development, 9(1), 49-66

Gerken, A, Suglo, J-V. and Braun, M. (2001) Crop Protection Policy in Ghana: An Economic Analysis of Current practice and Factors Influencing Pesticides Use. Integrated Crop Protection Project PPRSD/GTZ, Pokuase/Accra.

Hailu, Z., (1990) The adoption of modern farm practices in African agriculture: Empirical evidence about the impact of household characteristics and input supply systems in the northern region of Ghana. Nyankpala Agricultural Research Report, 7.

Harris, J.G. (1997). Microbial insecticides – an industry perspective. In: *Microbial pesticides: novelty or necessity?* (Evans, H.F. ed), British Crop Protection Council Symposium Proceedings No. 68, pp. 41-50.

Lisansky, S. (1997) Microbial Biopesticides. In: *Microbial pesticides: novelty or necessity?* (Evans, H.F. ed), British Crop Protection Council Symposium Proceedings No. 68, pp. 3-10.

Lomer, C. J. Bateman, R. P. Johnson, D. L. Langewald, J. and Thomas, M. B. (2001) Biological control of locusts and grasshoppers. *Annual Review of Entomology* 46: 667-702.

Moscardi, F. (1999a) Assessment of the application of baculoviruses for control of Lepidoptera. *Annual Review of Entomology* 44: 257-289.

Moscardi, F. (1999b) How farmers respond to and decide on using a microbial control agent; the *Nucleopolyhedrosis* of *Anticarsia gemmetalis* as a case study. In: Proceedings of the XXXII Annual Meeting of the Society for Invertebrate Pathology. University of California, Irvine, USA. 22-27 August 1999. pp. 59-60.

Ogutu, W. O., Oduor, G. I., Parnell, M., Miano, D. W., Ogol, C. K. P. O., Grywacz, D., Poole, J. (2002) Evaluation of a naturally occurring baculovirus for the management of diamondback moth, *Plutella xylostella* L. in Kenya. In: *Improving biocontrol of* Plutella xylostella (A. Kirk and D. Bordat, eds). Proceedings of the International Symposium, Montpellier, France, 21-24 October 2002, CIRAD/USDA, France.

PRONAF-IITA (2001). Farmer Fields School, Campaign 2000-2001. Working document FFS-IITA, Cotonou, Benin, 2001.

Rahm, M. R., Huffman, W. E., (1984) The adoption of reduced tillage: the role of human capital and other variables. Amer. Agr. Econ. Association, 405-413.

Su, C. Y. (1987) The evaluation of granulosis virus for control of *Plutella xylostella* and *Artogea rapae* at different time intervals. Plant Protection Bulletin (Taiwan, R. O. C.) 29, 397-399.

Su, C. Y. (1988) Utilization of *Plutella xylostella* granulosis virus (PxGV) for control of *P. xylostella*. Chinese Journal of Entomology 8(2), 161-163.

Su, C. Y. (1989) The evaluation of granulosis and nuclear polyhedrosis viruses for control of three lepidopterous insect pests on cruciferous vegetables. Chinese Journal of Entomology 9, 189-196.

Su, C. Y. (1990) Microbial control of the diamondback moth, *Plutella xylostella,* using *Bacillus thuringiensis* and granulosis virus. Plant Protection Bulletin (Taiwan, R. O. C.) 32, 10-23.

Su, C. Y. (1991) Field trials of granulosis virus and *Bacillus thuringiensis* for control of *Plutella xylostella* and *Artogea rapae*. Chinese Journal of Entomology 11, 174-178.

Youdeowei, A. (2000). Pesticide Management in Rwanda: World Bank Assisted Project. In In Pesticide Management in West Africa, Number 1, December 2000. Newsletter published by the FAO and ECOWAS, pp 17-18.

Waage, J. K. (1997) Biopesticides at the crossroads: IPM products or chemical clones. In: *Microbial pesticides: novelty or necessity?* (Evans, H.F. ed), British Crop Protection Council Symposium Proceedings No. 68, pp. 11-18.

Website: http://www.coleacp.org/en/pesticides/dossier/

ANNEX

Table a: **Logit estimation result for Cabbage in Ghana (Dependant variable: WTP a higher price premium price for organic cabbage)**

Variable	Definition	B	S.E.	Wald	Sig	Exp(B)
DISTANC	Distance to bio-cabbage market	1.22	0.84	2.11	0.15	3.37
FRESH	Freshness in buying cabbage	-0.98	1.34	0.54	0.46	0.37
HHTOTAL	Household size	-0.05	0.16	0.08	0.77	0.95
LABEL	Label to guarantee bio-cabbage quality	0.16	1.71	0.01	0.92	1.18
OCCUPAT	Major occupation of head of household	-0.61	0.31	3.95	0.05**	0.54
RESIDUE	Awareness of chemical residues in cabbage	1.92	0.86	5.037	0.02**	6.85
TASTE	Taste of bio-cabbage	2.02	0.84	5.78	0.02**	7.53
Constant		11.93	28.57	0.17	0.67	

Model Chi-Square	Df	Significance
27.56	11	0.0038***
Predicted Percent Correct: 85.00%; Significance level: * = 10%, **=5%, N= 100		

Table b: **Logit estimation result for Cabbage in Benin**
(Dependant variable: WTP a higher price premium price for organic cabbage)

	Definition	B	S.E.	Wald	Sig.	Exp(B)
RESIDUE	Awareness of chemical residues in cabbage	-2.975	1.672	3.168	.075*	.051
HEALTH	Awareness of health risk linked to cabbage	3.405	1.493	5.201	.023**	30.107
LABEL	Label to guarantee bio-cabbage quality	-1.299	1.264	1.056	.304	.273
SIZE	Size of cabbage	-.258	.488	.281	.596	.772
TASTE	Taste of bio-cabbage	.324	.826	.154	.695	1.382
APPEA	Appearance of cabbage	.575	.976	.347	.556	1.777
AVAIL	Availability of bio-cabbage	-2.860	1.608	3.164	.075*	.057
Constant		-3.788	3.069	1.523	.217	.023

Model Chi-Square	Df	Significance
27.56	7	0.05**
Predicted Percent Correct: 94.6%; Significance level: * = 10%, **=5%, N= 100		

Table c: Logit model result for Tomato in Ghana

Variable	Definition	B	S.E.	Wald	Sig	Exp(B)
AVAIL	Availability of bio-tomato	-10.382	32.6357	0.1012	0.7504	0
CHEMIC	Chemical free in decision making to buy tomato	4.9384	71.5335	0.0048	0.945	139.544
DAMAGE	Damage (insect)_ free in decision making to buy tomato	-1.1069	0.8226	1.8108	0.1784	0.3306
DIRTY	Dirt free (water) in decision making to buy tomato	-0.7705	2.5547	0.091	0.7629	0.4628
DISTANC	Distance to bio-tomato market	1.4774	0.8097	3.3291	0.0681*	4.3817
FRESH	Freshness in buying tomato	-1.2792	0.9125	1.9655	0.1609	0.2783
HHTOTAL	Household size	0.0166	0.1581	0.0111	0.9161	1.0168
LABEL	Label to guarantee bio-tomato quality	-0.413	1.7241	0.0574	0.8107	0.6616
OCCUPAT	Major occupation of head of household	-0.5521	0.3055	3.2656	0.0707*	0.5757
RESIDUE	Awareness of chemical residues in tomato	1.7316	0.789	4.8167	0.0282**	5.6499
TASTE	Taste of bio-tomato	2.0836	0.8484	6.0319	0.014***	8.0336
Constant		11.5871	32.6987	0.1256	0.7231	

Model Chi-Square	Df	Significance
11.11	11	

Table d: Logit model result for Tomato in Benin

	Definition	B	S.E.	Wald	Sig.	Exp(B)
RESIDUS	Awareness of chemical residues in tomato	-2.649	1.496	3.135	.077*	.071
HEALTH	Awareness of health hazards	2.916	1.241	5.521	.019**	18.476
LABEL	Label to guarantee bio-tomato quality	-.629	1.205	.273	.601	.533
SIZE	Size of tomato	-.326	.579	.318	.573	.722
TASTE	Taste of bio-tomato	.452	.802	.318	.573	1.572
APPEA	Appearance of tomato	.321	.845	.145	.704	1.379
AVAIL	Availability of tomato	-1.856	1.252	2.199	.138	.156
Constant		-3.720	2.765	1.811	.178	.024

Model Chi-Square	Df	Significance
11.11	7	0.10*
Predicted Percent Correct: 94.8%; Significance level: * = 10%, **=5%, N= 100		