

Research Paper

**Consumers' Perception of Safety of Leafy Vegetables and Its Effect
on Their Vegetable Purchasing Decisions in the Kumasi Metropolis
of Ghana**

Abstract

The study sought to determine consumers' perception of the safety of leafy vegetables and how it affects their decision to purchase leafy vegetables in the Kumasi Metropolis of Ghana. Data employed in the study comes from 200 consumers in the study area. The main findings are that consumers are very much aware of unsafe leafy vegetable in the retail market which is caused by the use of chemicals and contaminated water on vegetable produce. Also, consumers also perceive retailers as mishandling leafy vegetables in the retail market and that consuming leafy vegetable with chemical residue is a risk to consumers' health. Demographic characteristics such as educational level, type of occupation and monthly income had a significant positive relationship with consumers' perception of leafy vegetable safety. Also, unsafe perception had a significant effect on the purchasing decision of leafy vegetable. The findings of the study imply that a consumer demographic characteristic has the ability to influence his or her perception on safety of leafy vegetables and an unsafe perception is likely to affect the decision to purchase this produce. Also, the high awareness and consumer perceptions indicate consumers will patronize any accredited marketing outlet that is set up to sell agricultural produce, certified to be free from chemical residue contamination.

KEY WORDS: Consumer, Safety, Perception, Vegetable, Purchasing decision, Kumasi

1. INTRODUCTION

The production of fresh perishable vegetables is about 90% which is supplied from urban and peri-urban production systems according to Cofie et al., (2003). They are produced close to market proximity to avoid spoilage and contamination by pathogens. The increase in

urbanization and the awareness of healthy living by consumers globally has recorded a higher demand for vegetables.

A study on behaviour and attitude by Wier et al., (2003), emphasized that health hazards were the main motivation for purchasing of organic and pesticide free vegetables by consumers. The use of pesticides in excess and sewage water on vegetables raise concern for health implications, increasing consumer interest in organically produced foods in response to human health (Gregory, 2000). Considering safety measures, using chemicals on vegetables (leafy) will definitely leave some residues in the crop. Studies conducted in Ghana (Oboubi et al., 2006), revealed that peri-urban produced vegetables contained considerable chemical deposits and faecal coli form as residues. They report that farmers have no other choice than to use water from highly polluted sources. This raises public health concerns due to possible crop contamination with pathogens and health risks associated with the consumption of their produce

The significance and rising importance of hygienic food consumption has drawn the need to understand better the extent to which food safety and hygiene influences consumers attitude of purchasing vegetables. The use of sewage and polluted wastewater cannot be disregarded because access to clean water for irrigating vegetables has become a major challenge. As an alternative, the use of polluted or contaminated water is extensive. Also, vegetables on the retail market in urban cities are carelessly handled (unsafe) and this leads to increasing health risk to consumers.

As consumers become more and more concerned with the safety, nutritional value, and environmental effects of their vegetable consumption and its production, it is important that we gain an understanding of consumers' perceptions of leafy vegetables grown as foods. It is also important to find out how consumers' perceptions influence their buying decisions. There have been several researches on safety of vegetables to the consumer looking at its health concerns but what has not been done is the extra step to how the perceptions of safety affect consumers' vegetable purchasing decisions. The study therefore seeks to address this gap.

2. LITERATURE REVIEW

2.1 Consumers' perception of leafy vegetable safety

Safety is defined as the assurance that a food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use (FAO/WHO, 2009). A vegetable is said to be safe when it is free of chemical residues such as pesticides used in conventional vegetable production and the use of polluted water on vegetables which is known to cause contamination.

Demand for aesthetic attributes for example, spotlessness and good looking produce especially colour, size and shape by urban consumers has also encouraged excessive use of pesticides and chemical fertilizers as revealed by Okello et al., (2010). Also, the increase in global food production has largely been fuelled by increasing use of pesticides, herbicides, and other chemicals. Research has found that the majority of consumers view organically grown food products as “safer” or “less risky” when compared to conventionally grown food (Williams and Hammitt, 2002). For example, in Williams and Hammitt's study in 2002, approximately 700 organic and conventional food buyers were surveyed on what they thought the risk of death was from pesticide residue on conventionally grown food. Survey respondents estimated that between 50 and 200 people per million die each year from pesticide residue on food.

One other study surveyed approximately 700 conventional fresh produce buyers and found that the majority of consumers perceived a relatively high risk to be associated with conventionally grown produce when compared to other public health hazards.

2.2 Demographic factors that affect consumer perception

Recently, with the advent of the 21st century, the question of how socio-economic and demographic variables influence consumer perception and behaviour has become an important issue that has to be studied with respect to consumer risk perception. According to research, effects of demographic and socio-economic characteristics of families living in urban areas on their consumption habits and post-purchase behaviour have been studied.

Socio-demographic factors are well known to affect food choice. Lower socio-economic status and lower education level are associated with lower consumption of vegetables. Higher social classes and those with a higher educational status are in general more health-conscious and better able to conceptualize the relationship between diet and health (Cox et al.).

2.3 Effects of perception on consumer purchasing decision

The consumption phenomenon is described as a natural process that goes from birth until death. The act of consumption influences consumer purchasing decision while allowing them to adapt new behaviours and attitudes. Considering food products, especially in the case of vegetables, criteria other than price affect the purchasing decision.

Consumers most importantly in recent studies attach safety of food products than the external appearance of the vegetable. Literature reviewed by Yeung and Morris (2001) suggest that consumer purchase decision is driven by their perception of risk. Consumers will avoid purchasing leafy vegetables that are perceived as unsafe. According to Saba and Messina (2003), pesticide use has been thought by consumers to be associated with long-term and unknown effects on health. Whether or not this is true is arbitrary because if people believe those chemicals are associated with unknown health effects, that perception alone can influence buying decisions. Health and safety concerns according to Yiridoe, Bonti-Ankomah and Martin (2005) are seen to be key factors in influencing consumer preference and sub-sequential buying decisions.

3. METHODS

3.1 Sampling and data collection

The data employed in the study were collected in January 2013 using structured questionnaires. The data was collected from Kumasi Metropolis in the Ashanti region of Ghana. Out of the ten sub-metros of the metropolis, five were selected using simple random sampling. Again, five suburbs were selected, each from the five selected sub-metros using simple random sampling. The major or biggest retail market in each suburb was purposefully selected due to degree of expected consumer concentration. Forty (40) buyers or consumers were selected from each retail market using accidental sampling, making a total sample size of 200. The questionnaires were administered to 200 consumers of the ages 18 years and above because of their ability to make informed decision and purchasing power through face to face interviews.

All questions or statements making up the questionnaire were coded and keyed into SPSS. The demographic characteristics of consumers were analyzed using descriptive statistics including

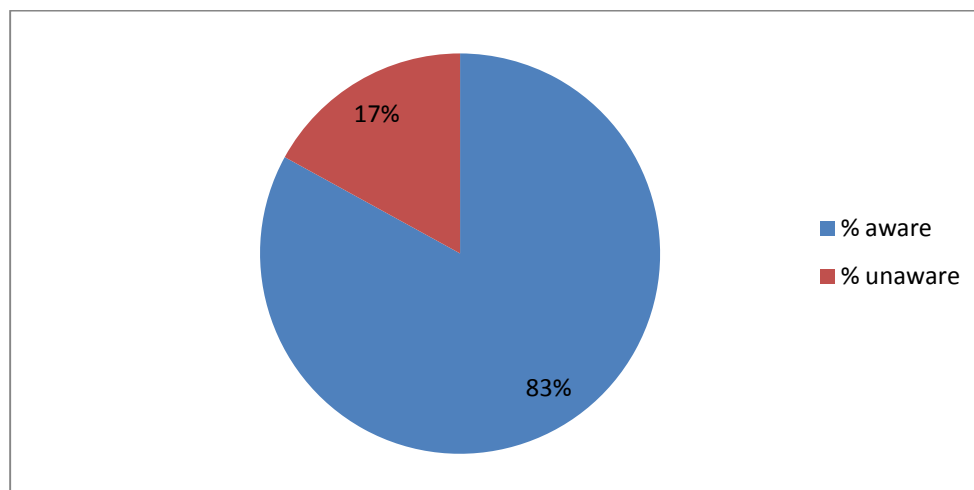
means, percentages and frequency tables. Consumers' awareness of unsafe leafy vegetable in the retail market was assessed with 'yes' and 'no'. Perceptions of consumers were assessed by using a 5-point Likert scale (from 1 representing 'strongly agree', 2 for 'agree', 3 for 'neutral', 4 for 'disagree' and 5 for 'strongly disagree'). Consumers were asked to indicate the extent to which they agree to statements of safety of vegetables in the retail market. These perception scores were averaged to form the consumer perception index. Consumers' demographic characteristics were cross tabulated against their perception to find the influence one has on the other. Also consumers' perceptions were cross tabulated against their purchasing decision of leafy vegetable to find the association between them. The results obtained were compared with literature to find out if perception actually has influence on purchasing decision of leafy vegetables in the retail market.

4. RESULTS AND DISCUSSIONS

4.1 Consumer awareness and perception of the safety of leafy vegetable

Almost all consumers (83%) were aware of unsafe leafy vegetable and stated indicators of which these vegetables are said to be unsafe (Fig. 4.1).

Figure 4.1: Awareness of unsafe leafy vegetable

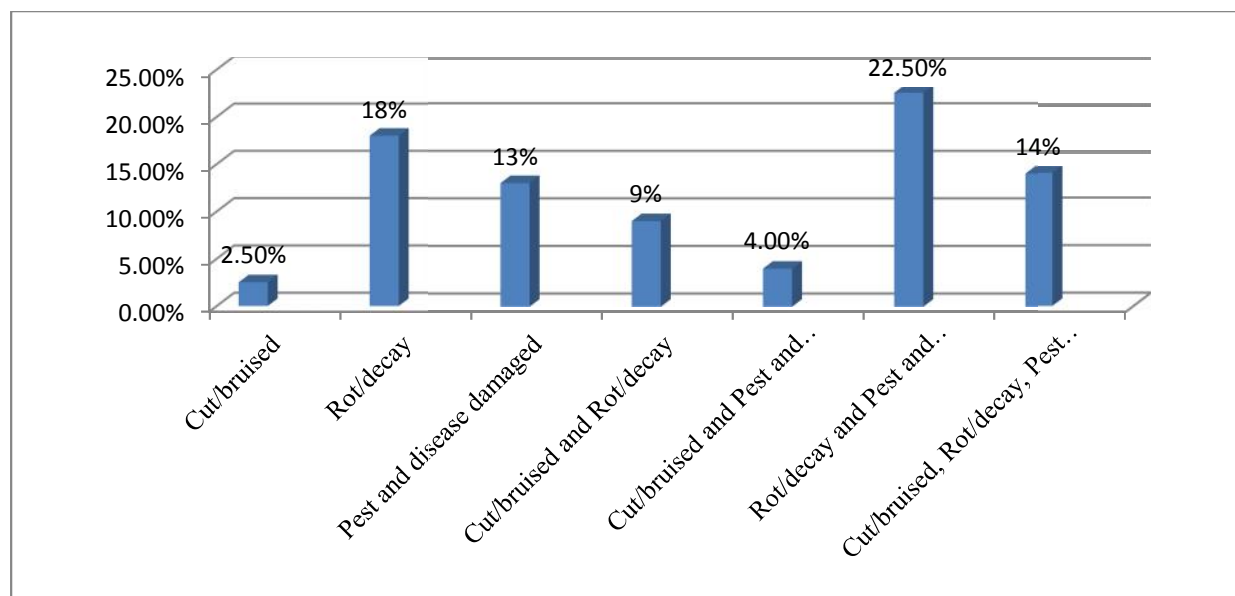


Source: Field Data, 2013

Figure 4.2 shows that most consumers (22.5%) perceive rot/decay and pest and disease damage to be an indicator for unsafe leafy vegetable. Also 18% agreed solely on rot/decay as an indicator for unsafe leafy vegetable. Whereas 14% indicated cut/bruised, rot/decay, pest and disease

138 damaged, 13% also agreed on pest and disease damaged as unsafe. Only 2.5% indicated
139 cut/bruised leafy vegetable as unsafe.

140 Figure 4.2 indicators of unsafe leafy vegetables



141
142 Source: Field Data, 2013.

143 Based on the responses to the perception statements in table 4.1, leafy vegetables are generally
144 considered of not being safe with an average score of 2.53. The perception of leafy vegetable
145 produced with excessive use of chemical scored averagely 1.55. An average score of 2.52 and
146 1.22 was obtained for the perception of retailers mishandling leafy vegetable in the retail market
147 and the fact that consuming leafy vegetable with chemical residue posses health risk
148 respectively. Consumers are aware of the excessive use of chemical on leafy vegetable produce
149 which is a major activity in vegetable production to meet market demand. With this, consumers
150 are of the view that leafy vegetables are unsafe because of health implications and the fact that
151 leafy vegetables with chemical residue is very unsafe for consumption which can even cause
152 death in extreme cases.

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156 **Table 4.1 Consumer perception on safety of leafy vegetables**

Perception statement	Strongly Agree Score=1	Agree Score=2	Neutral Score=3	Disagree Score=4	Strongly Disagree Score=5	Mean score
Leafy vegetables in Ghana are generally not safe	35 (17.5%)	75 (37.5%)	44 (22%)	37 (18.5%)	8 (4%)	2.53
Leafy vegetables sold in the retail market are produced with excessive chemicals	107 (53.5%)	79 (39.5%)	11 (5.5%)	3 (1.5%)	-	1.55
Retailers mishandle leafy vegetables in the retail market	42 (21.0%)	52 (26.0%)	69 (34.5%)	34 (17%)	3 (1.5%)	2.52
Consuming leafy vegetable with chemical residue possess health risk	162 (81.0%)	35 (17.5%)	1 (0.5%)	1 (0.5%)	1 (0.5%)	1.22

157 Source: Field Data, 2013.

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159 **4.2 Relationship between consumers' demographic characteristics and safety perception**

160 The results obtained for the study did not vary with the demographic groupings of the
 161 respondents as proposed by Hoban (1999) that demographic characteristics are determinants of
 162 consumer perception. The demographic characteristics of respondents cross tabulated with their
 163 perception gave significant results. Level of formal education (years), occupation, monthly
 164 income were significant with perception of unsafe leafy vegetable at 10%, 10%, 1% and 1%
 165 respectively. Thus, there is a relationship between these attributes of consumers and their
 166 perception of safety of leafy vegetables. It is expected that more educated would be more health
 167 conscious have a better understanding of the dangers of consuming vegetables that bear any of
 168 the traits in figure 4.2 above. Gender was significant at 5% with the perception of the use of
 169 excessive chemicals on leafy vegetable produce. This is consistent with findings by Williams and
 170 Hammitt (2002). In their studies, gender was a significant predictor of perceived microbial
 171 pathogen (disease) risks with women having a higher perceived risk than men; but was
 172 associated with perceived pesticide residue risk at 10% level.

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174 **Table 4.2 Relationship between demographic characteristics and unsafe perception of leafy**
 175 **vegetables**

Demographic characteristics	SA	A	N	D	SD	Chi square	Df	Sig.
Gender								
Males	9	27	7	11	2	5.507	4	.239
Females	26	49	37	26	6			
Age (years)								
Below 20	5	4	5	6	0	27.323	20	.126
21-30	20	38	19	25	6			
31-40	4	18	7	4	0			
41-50	3	10	12	2	2			
Above 50	0	3	6	1	8			
Marital status								
Single	13	13	21	10	2	9.707	8	.286
Married	22	42	21	27	6			
Widowed	0	1	0	0	0			
Level of formal education								
Primary	0	5	2	0	1	29.760*	20	.074
JHS/Middle	7	15	17	6	1			
SHS	6	22	8	6	0			
University/Training college	22	34	17	25	6			
Occupation								
Paid employment	9	23	10	4	0	29.867***	12	.003
Student	13	28	9	20	6			
Self employed	11	34	22	9	2			
Unemployed	2	1	3	4	0			
Monthly income (GHC)								
Below 100	6	4	6	2	4	28.534***	12	.005
101 -500	12	32	23	22	3			
501 – 1000	13	26	14	9	1			
Above 1000	4	14	1	4	0			

176 Source: Field Data, 2013.

177 SA-Strongly agree, A- Agree, N-Neutral, D-Disagree, SD-Strongly disagree

178 *, **, *** indicates 10%, 5% and 1% significant levels respectively

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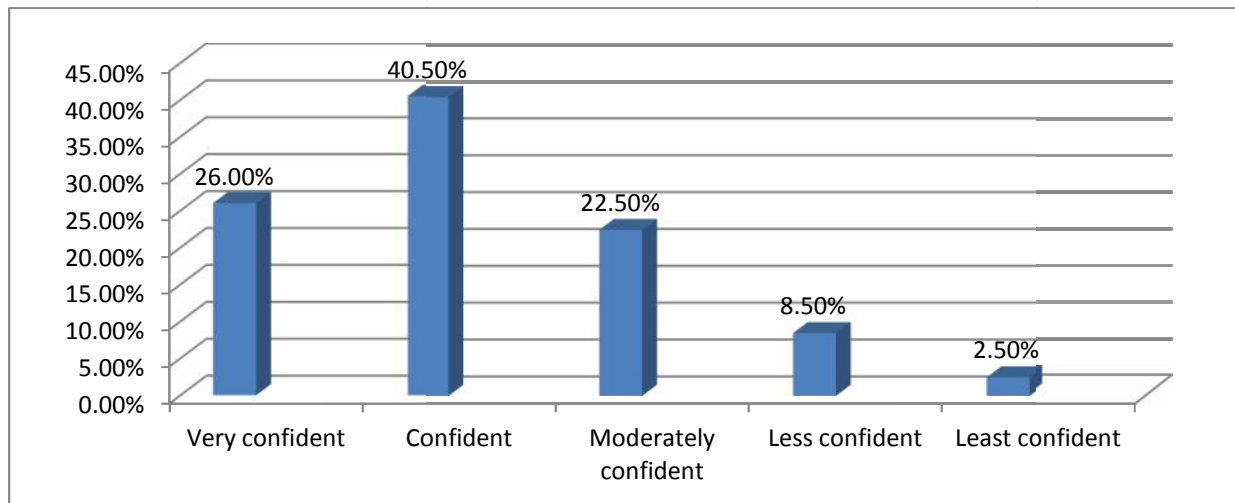
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4.3 Consumer perception and purchasing decision

Many of the respondents (76%) were confident in purchasing of leafy vegetable in the retail market whiles 24% were not. Out of the 76%, 26.0% were strongly confident, 40.5% were confident, 22.5% were moderately confident, 8.5% were less confident and 2.5% were least confident in the purchase of leafy vegetable in the retail market (Fig. 4.3).

Figure 4.3 Confidence level of consumers regarding the safety of leafy vegetables

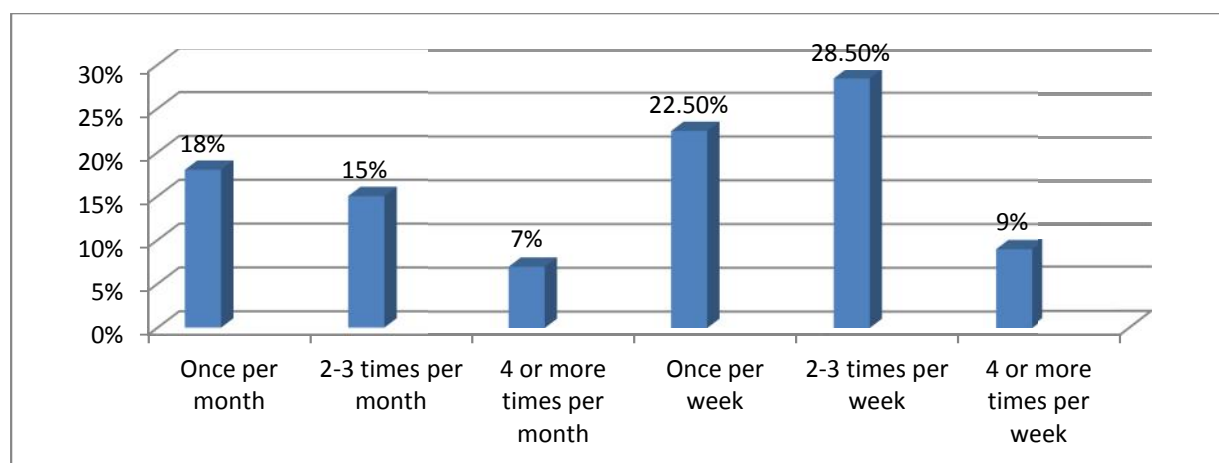


Source: Field Data, 2013

Based on a number of product attributes such as price, storability, freshness, colour/appearance, nutrition, shopping environment, product display, cut/bruised, rot/decay, pest and disease damaged, respondents were made to assess the safety of leafy vegetables (from 1-‘very low’ to 5- ‘very high’).

There were 18% of the respondent who frequently purchased leafy vegetable once per month. 15% of the respondent purchased leafy vegetables 2-3 times per month. Also 7% purchased leafy vegetables 4 or more times. There was 22.5% of the respondent who frequently purchased leafy vegetables once per week. 28.5% frequently purchased leafy vegetables 2-3 times per week. Lastly, 9% frequently purchased leafy vegetables 4 or more times per week (Fig. 4.4).

205 **Figure 4.4: Percentage frequency of purchase of leafy vegetable**



206
207 Source: Field data, 2013.

208 The perception of respondent cross-tabulated with purchasing decision was significant at certain
209 levels. The perception of leafy vegetables in the retail market produce with excessive chemical
210 was significant at 10% (Tab.4.3). Also, general perception of consumers on the safety of leafy
211 vegetables in Ghana significantly influences purchasing decision at 1% significant level
212 (Tab.4.4). Consumers' perception on mishandling of leafy vegetables in the retail market
213 significantly influenced their purchasing decision at 1% significant level (Tab 4.5). Consumers
214 who had negative perceptions about pesticides residue had an increased likelihood of purchasing
215 organic produce. Otto (1990) in his study found 50% of consumers who were concerned about
216 chemical residue on vegetable produce significantly altered their decision to purchase.

217 **Table 4.3: Safety Perception and Purchasing Decision**

Leafy vegetables in retail markets are produced with excessive chemical	Purchasing decision		Chi square	df	Sig
	Yes	No			
Strongly agree	89	19	6.638*	3	.084
Agree	55	23			
Neutral	6	5			
Disagree	2	1			

218 Source: Field Data, 2013.

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221 **Table 4.4: Safety perception and purchasing decision**

How do you perceive safety of leafy vegetables in Ghana	Purchasing decision		Chi square	Df	Sig
	Yes	No			
Very safe	2	1	13.802***	4	.008
Safe	16	2			
Not certain	54	7			
Unsafe	66	27			
Very unsafe	14	11			

222 Source: Field Data, 2013

223 **Table 4.5: Safety perception and purchasing decision**

How do you perceive the safety of leafy vegetables with regard to how they are handled in the retail market	Purchasing decision		Chi square	Df	Sig
	Yes	No			
Very safe	4	0	29.807***	4	.000
Safe	32	5			
Not certain	79	12			
Unsafe	30	29			
Very unsafe	7	2			

224 Source: Field Data, 2013

225 **5.0 Conclusion and Recommendations**

226 The study assessed the perception of consumers on leafy vegetable safety and its effects on their
 227 purchasing decision with a cross-sectional data collected among 200 consumers in the Kumasi
 228 Metropolis of the Ashanti region of Ghana. The survey results indicate high awareness of unsafe
 229 use of excess chemical and unsafe perception of leafy vegetable. Consumers are of the view that
 230 leafy vegetables produced in Ghana are not safe. There were also significant relationships
 231 between consumers' characteristics such as years of formal education, type of occupation,
 232 monthly income level, and safety perception. The general perception of consumers on safety of
 233 leafy vegetables in Ghana significantly influences purchasing decision at 1% significance level.

234 Based on the finding of the study it is recommended that there should be education of producers
 235 on appropriate use of chemicals and retailers on proper handling methods that will go a long way
 236 to reduce the negative perceptions of consumers and eventually boost the demand for leafy
 237 vegetables. Retailers on the other hand should develop appropriate means of handling leafy

vegetable in a safe way since its perception significantly influences consumers purchasing decision.

References

Cofie, O. O., Veenhuizen, R. and Drechsel, P. (2003). Contribution of Urban and Peri-Urban Agriculture to Food Security in Sub-Saharan Africa. Paper presented at the Africa Day of the 3rd WWF in Kyoto, 17-3-2003.

FAO/WHO (1997): *Codex Alimentarius: Food Hygiene, Basic Text*. 4th edition. Rome.

Cox, D. N., Anderson, A. S., McKellar, S., Reynolds, J., Lean, M. E. and Mela, D. J. (1996) “Vegetables and fruits: barriers and opportunities for greater consumption”. *Nutrition and Food Science*, 5, 44–47.

Yeung, R. M. W., and Morris, J. (2001) "Consumer perception of food risk in chicken meat", *Nutrition & Food Science*, 31(6), 270 – 279

Hoban, Thomas J. (1999) "Consumer Acceptance of Biotechnology in the United States and Japan”. *Food Technology* 53(3): 50-53

Obuobie, E., Keraita, B., Danso, G., Amoah, P., Cofie, O. O., Raschid-Sally, L., Drechsel, P. (2006). Irrigated urban vegetable production in Ghana: Characteristics, benefits and risks. IWMI-RUAF-CPWF, Accra, Ghana: IWMI, 150 pp

Okello, J. J., and Swinton, S. W. (2010) “From circle of poison to circle of virtue: pesticides, export standards and Kenya’s green bean farmers”. *Journal of Agricultural Economics*, 61: 209–224

Saba, A. and Messina, F. (2003) “Attitudes towards Organic Foods and Risk/Benefit Perception Associated with Pesticides”. *Food Quality and Preference*, 14(8), 637-645.

- 269 Wier, M., Hansen, L. G., Andersen, L. M. and Millock, K. (2003). *Consumer Preferences for*
 270 *Organic Foods*. Organic Agriculture: Sustainability, Markets and Policies. CABI Publishing.408
 271 pp.
 272
- 273 Williams, P. R. D. and Hammitt, J. K. (2002) “Perceived risks of conventional and organic
 274 produce: Pesticides, pathogens, and natural toxins”. *Risk Analysis*, 21(2), 319-330.
 275
- 276 Yiridoe, E., Bonti-Ankomah, S, and Martin, R. (2005) “Comparison of Consumer Perceptions
 277 and Preference toward Organic Versus Conventionally Produced Foods.” *Renewable Agriculture*
 278 *and Food Systems*, 20, 193-205