

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

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KNUST

**ASSESSMENT OF THE CONSUMERS' AWARENESS AND
MARKETING PROSPECTS OF ORGANIC FRUITS AND
VEGETABLES**

By

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DECLARATION

I hereby declare that this is my own work towards the Master of Science in Food Quality Management and that, to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for an award of any other degree in another University, except where due acknowledgement has been made in the text.

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DEDICATION

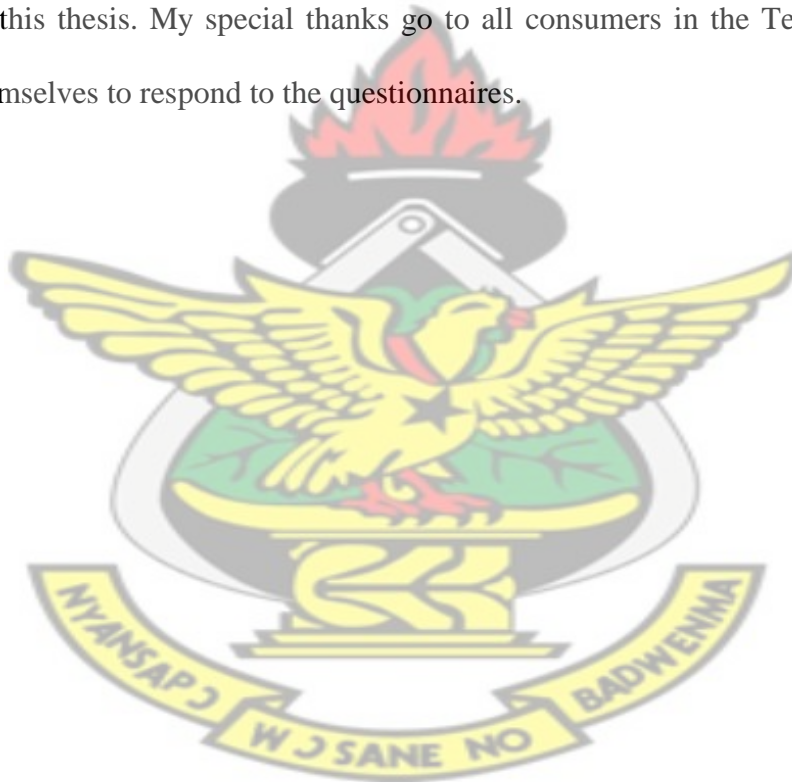
This thesis is dedicated to my supportive husband Mr. Seth Agyei Domfeh for his support and encouragement throughout the programme. Further, to my lovely twins Ohene Agyei Domfeh and Ohenewaa Agyei Domfeh.

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ABSTRACT

The increase in the consumption of organic products has been demand led, the consequence of a positive shift in consumer attitudes to organically produced food and also supply driven, with consumer reaction to more competitive prices and increasing availability. As a result of the increasing demand for organic foods, this study was aimed at assessing consumers' awareness and willingness to pay premium for organic fruits and vegetables as well as determining the marketing prospects of these organic foods in the Techiman Market. The face-to-face interview technique was employed using a structured questionnaire for this cross-sectional study from September to November, 2014. Out of 330 questionnaires administered, 318 were valid and included in the data analysis accordingly. This study showed that most of the consumers (74.53%) were aware of organic foods and they became aware generally through the radio (36.71%) and school/books (22.78%). Majority of the consumers were willing to pay up to 50% premium for the organic fruits and vegetables. The study found that there was a huge market potential for organic fruits and vegetables in the Techiman Market. The estimated market potential for the organic fruits and vegetables were GH¢3,514,383,194.70 and GH¢5,341,348,087.50 per year, respectively. The empirical results showed that age, marital status and income significantly influence consumers' willingness to pay a premium for organic fruits and vegetables. Also, knowledge of chemical residues in chemically grown fruits and vegetables and their associated health risks significantly influence consumers' willingness to pay a premium for organic fruits and vegetables.

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LIST OF ABBREVIATIONS

DASH	Dietary Approaches to Stop Hypertension
DFID	Department for International Development
FiBL	Research Institute of Organic Agriculture
GAP	Good Agricultural Practise
GDP	Gross Domestic Products
GOAN	Ghana Organic Agriculture Network
GSS	Ghana Statistical Service
HDRA	Henry Doubleday Research Association
IFOAM	International Federation of Organic Agriculture Movements
ITC	International Trade Centre
MoH	Ministry of Health (MoH)
NGO	Non-Governmental Organisations
PAN	Pesticide Action Network
SPSS	Statistical Package for Social Scientist
UK	United Kingdom
US/USA	United States of America
WTP	Willingness to Pay

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Organic farming can be defined as the farming system which improves and encourages agro ecosystem health, comprising biological cycles, soil biological activity and biodiversity, and does not involve the use of modern farm inputs for instance chemical fertilizers and synthetic pesticides (Gold, 2007). Organic foodstuffs are produced via methods of organic farming and are preserved without the use of chemical food additives, industrial solvents or irradiation (Obuobie *et al.*, 2006). The main difference between organic and conventional production practices are soil and pest management aspects of the production (Gilroy *et al.*, 1993; Philips and Peterson 2001). Organic farming systems depend on ecologically established practices including biological pest management and composting; practically excluding the application of antibiotics, synthetic chemicals and hormones in crop production (Karen and Greene, 2005). One advantage of organic farming is that it does not contribute to water pollution through chemical pesticides runoff and also consumers do not have to worry about pesticides residue on fresh fruits and vegetables (Phillips and Peterson, 2001).

With the increase in food safety and environmental quality issues all over the world, organic foods have speedily appeared as a significant food industry in the US and other countries since the early nineteen-eighties (Lohr 1998; Thompson, 1998). For example, the total retail price of organic foods in United States had increased from about 178 million US dollars in 1980 to one billion US dollars in 1990, and had reached 7.8 billion US dollars in 2000 (Vandemen and Hayden, 1997; Myers and Rorie, 2000).

Agriculture is the most important sector of the Ghanaian economy as it employs a larger population (about two thirds), and contributes to about half of the country's Gross Domestic Products (GDP) and export earnings (IFOAM, 2003). Agricultural production in Ghana comprises of organic and conventional methods. Although the organic sub-sector in Ghana is relatively underdeveloped, the organic farm land under production have increased from a projected 5,453 hectares in 2003 to 19,132 hectares in 2006 which accounts for only 0.13% of the entire land under agricultural production (IFOAM and FiBL, 2006). The most commonly grown organic vegetables in Ghana includes; lettuce, cabbage, green pepper, carrot, tomato, garden eggs, green beans and spring onions, which are often used in exotic diets and frequently eaten raw. Organic fruits also include; pineapple, pawpaw, mango, orange, pear and water melon (Obuobie *et al.*, 2006).

Fruit and vegetable production in the urban, peri-urban and rural areas in Ghana plays vital roles in the socio-economic development. It generates raw materials for local industries, ensures food security, and also offers employment, foreign exchange and income for a section of the Ghanaian population (Obuobie *et al.*, 2006). Whereas organic farming has been recognised as an effective way to enhance food safety and environmental quality (Wang and Sun, 2003), its adoption in most sub-Saharan African countries is very much decided by the consumers' awareness and request for organic food produces (Hine and Pretty, 2007).

The stakeholders involved in the development of organic products include; Non-Governmental Organisations (NGOs) such as the Ghana Organic Agriculture Network (GOAN) and trade associations working extensively with this organization such as the Henry Doubleday Research Association (HDRA), International Trade Centre (ITC), Department for International Development UK (DFID) and Pesticide Action Network UK (PAN-UK) (IFOAM, 2003).

1.2 RATIONALE OF THE STUDY

Organic foods are rapidly emerging as an important food industry in the world with Ghana not being an exception. Organic farming and its produces provide various benefits to farmers, consumers and other stakeholders. Consumers benefit from organic foods through the intake of which fruits and vegetables are no exception. Fruits and vegetables are two of the main sources of antioxidants which lower the danger of heart disease and several types of malignancies, fibres which aid in the control of cholesterol levels in humans, and vitamins such as folic acid which helps in the prevention of birth defects. Fruits and vegetables are also beneficial in salt balance particularly in cases of hypertension (Poole *et al.*, 2007).

The increase in the public worries about food safety matters on the use of growth hormones, fertilizers, genetically modified organisms, pesticide residues, and the increase in the consciousness of environmental quality concerns have led to an expanding demand for environmentally safe produces (Arbindra and Wanki, 2005). Governments are therefore encouraging healthy diets, thus to make available healthier, safer and more confident citizens (Poole *et al.*, 2007). The nutrition shift in the direction of unhealthy diets is taking place at a faster frequency in developing countries than in developed countries (Fraser, 2005).

The empirical findings of this proposed study would provide estimates on the preparedness of consumers to offer higher prices for organic fruits and vegetables which would help in the design and execution of suitable national incentive programme for the diffusion and adoption of more environmentally friendly agricultural practices. The study would provide insights to farmers and retailers with regard to how much the consumer would be prepared to pay for organic fruits and vegetables at marketplaces.

The identification of factors influencing the purchase of organic foods would make available valuable information in the formulation of short and long term marketing plans. Also, the

outcome of this study would benefit Government and NGOs in their policy makings towards organic farming and organic products. The Ministry of Health (MoH) in Ghana would benefit from the findings by knowing the policy direction in its advocacy for the increase in the consumption of vegetables and fruits. It would also help to improve the long term productivity and diversity of fruits and vegetables production in the urban, peri-urban and rural areas.

1.3 PROBLEM STATEMENT

The consumption of large quantities of fruits and vegetables in a diet protects the body against various health problems such as coronary heart disease, stroke as well as some forms of cancers (Rapley *et al.*, 2005). The Ministry of Health (MoH), Ghana, is advocating for the consumption of more vegetables and fruits (Obuobie *et al.*, 2006), but a lot of concerns have been raised about the production methods employed by fruits and vegetables producers, and the health risks related to some fruits and vegetables due to the misapplication of chemicals and inorganic fertilizers (Nouhoheflin *et al.*, 2004). Organic farming has been recognised as an effective approach to enhance food safety and environmental quality (Wang and Sun, 2003), but its adoption in most sub-Saharan African countries is strongly decided by the consumers' awareness and request for organic food produces (Hine and Pretty, 2007).

Although, organic systems are more profitable, have similar yields and more environmentally sustainable as compared to other systems (Reganold *et al.*, 2001), most farmers are in doubt to embrace organic farming owing to the limited statistics on market size and marketing prospects (Wang and Sun, 2003). Thus one of the problems faced by producers of fruits and vegetables in Ghana is the marketing of their produce (Obuobie *et al.*, 2006). Fruit and vegetable farmers in Ghana who have received some training from Ghana Organic

Agriculture Network (GOAN) are also cautious to convert fully to organic production, due to the undefined markets for organic products as well as not being sure whether consumers would be prepared to pay or offer higher prices for organic foods as compared to the conventional foods (Danso *et al.*, 2002).

Other problems associated with the production of organic vegetables and fruits in Ghana include; the focus on the export market, lack of developed domestic market and lack of marketing strategies (Sefa-Dedeh and Adovor, 2005). But based on the current research available, there is limited information on the consumer awareness and marketing prospects of organic fruits and vegetables in the Techiman Market even though Techiman is known in Ghana and West Africa as a whole because of its largest food market in the sub-region. This has made this research imperative.

1.4 RESEARCH QUESTIONS

- I. Are consumers in the Techiman Market aware of organic fruits and vegetables?
- II. Are consumers in the Techiman Market prepared to pay a premium for organic fruits and vegetables?
- III. What factors determine the consumers' preparedness to pay a premium for organic fruits and vegetables?
- IV. Is there any market potential for organic fruits and vegetables in the Techiman Market?

1.5 HYPOTHESES OF THE STUDY

- I. Consumers are aware of organic fruits and vegetables in the Techiman Market.
- II. Consumers in the Techiman Market are prepared to pay a higher price for organic fruits and vegetables
- III. The preparedness of consumers to pay for organic fruits and vegetables is influenced by socio-demographic characteristics and awareness variables.
- IV. There is a market potential for organic fruits and vegetables in the Techiman Market.

1.6 OBJECTIVES OF THE STUDY

This study was aimed at assessing consumers' awareness and willingness to pay premium for organic vegetables and fruits as well as determining the marketing potential of these organic foods in the Techiman Market of Ghana.

The specific objectives of the study were:

- I. To assess the awareness of consumers with regards to organic fruits and vegetables.
- II. To assess the consumers' willingness to pay a premium for organic fruits and vegetables.
- III. To determine the factors that influences the willingness of consumers to pay a premium for organic fruits and vegetables.
- IV. To determine the market potential for organic fruits and vegetables in the Techiman Market.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Several researchers, critics as well as authors have commented or written at length on the consumers' awareness and marketing prospects of organic fruits and vegetables. This chapter will therefore consider the findings or the studies that have been published or stated, and are relevant to this study.

2.2 ORGANIC FARMING

Organic farming can be defined as the farming system which improves and encourages agro ecosystem health, comprising biological cycles, soil biological activity and biodiversity, and does not involve the use of modern farm inputs for instance chemical fertilizers and synthetic pesticides (Gold, 2007). Organic foodstuffs are produced via methods of organic farming and are preserved without the use of chemical food additives, industrial solvents or irradiation (Obuobie *et al.*, 2006).

Organic farming techniques are globally regulated and legally put in force by many nations. These methods are mainly based on the criteria set by the International Federation of Organic Agriculture Movements (IFOAM), which is the worldwide mother organisation for organic farming organisations (Paull, 2010). The main difference between organic and conventional production practices are the soil and pest management aspects of the production (Gilroy *et al.*, 1993; Philips and Peterson, 2001).

Organic farming techniques combine scientific knowledge of modern technology and ecology while the traditional farming methods are founded on naturally occurring biological processes (Karen and Greene, 2005). The main methods of organic farming include biological pest control and mechanical cultivation, green manures and compost, crop rotation, and virtually exclude the use of synthetic chemicals, antibiotics and hormones (Karen and Greene, 2005).

Organic farming techniques employ the natural environment to improve agricultural production. Examples of these methods are: the addition of leguminous crops to help in nitrogen fixation, promoting biological insect predators, practising crop rotation to renew soil fertility, and the inclusion of natural materials such mulches and as potassium bicarbonate to control weeds and diseases (Philips and Peterson, 2001). One advantage of organic farming is that it does not contribute to water pollution through chemical pesticides runoff and also consumers do not have to worry about pesticides residue on fresh fruits and vegetables (Phillips and Peterson, 2001).

Since the 1990s, the market size of organic foods has increased rapidly, attaining 63 billion US dollars worldwide (Helga *et al.*, 2013). This demand for organic foods has compelled an analogous upsurge in organically managed agricultural land which has developed over ten (10) years (from 2001 to 2011) at a cumulative rate of 8.9% per year (Paull, 2011). As of 2011, an estimated 37,000,000 hectares of land were organically used worldwide, representing almost 0.9% of the overall world agricultural land (Helga and Kilcher, 2011).

2.3 THE HISTORY OF ORGANIC FARMING

Forest gardening, which is the traditional food production system dating from primitive times, is believed to be the world's most flexible and oldest agro ecosystem (Stinner, 2007). Traditional farming was the novel method of agriculture which has been practiced for over

the years (Stinner, 2007). Artificial fertilizers were invented during the eighteenth century with super phosphates initially and then ammonia-based fertilizers, and similarly, chemical pesticides were created in the 1940s (Horne, 2008). Whereas the use of artificial fertilizers and chemical pesticides is helpful in the short term, this inputs had devastating longer term side effects such as erosion and increase in soil infertility as well as health consciousness about the chemicals residues in conventional foods (Stinner, 2007).

In the later part of 1800s and early 1900s, the soil biologists began to create concepts on how new developments in biological science may possibly be applied in agriculture as an approach to remedy the negative effects of artificial fertilizers and chemical pesticides, while still conserving higher food production. Rudolf Steiner created biodynamic agriculture in the Central Europe, which is the early version of organic agriculture (Lotter, 2003). Steiner was motivated by divine reflection rather than scientific thoughts (Paull, 2011).

In the late 1930s and earlier part of 1940s, two accomplished botanists, Sir Albert Howard and his wife Gabrielle, developed organic agriculture. These botanist were inspired by their practices in traditional farming techniques in India as well as their formal education in science (Paull, 2006). Sir Albert Howard has been recognised as the “father of organic farming”, because he was the first person to add scientific knowledge and philosophies to these traditional farming approaches (Lotter, 2003; Stinner, 2007).

In some developing world, most farmers cultivate in accordance with traditional approaches which are analogous to organic farming but these methods are not certified, and may or may not include the up-to-date scientific developments in organic agriculture (Paull, 2007). However, the rising environmental consciousness in the general population in recent times has converted the initially supply-driven organic crusade to a demand-driven one, and also

higher prices and some government subventions have lured farmers into organic farming for economic reasons (Paull, 2007).

2.4 ORGANIC FARMING WORLDWIDE

The market size for organic foods are resilient in the North America (6 billion US dollars) and Europe (8 billion US dollars), out of the total 20 billion US dollars globally (Paull, 2011). Australasia has 39% of the total organic agricultural land globally as of 2007, which include Australia's 1.18 million hectares of organic farm land (Schonbeck, 2010). European Union has 23% of the total global organic agricultural land, tailed by Latin America (19%), Asia with 9.5%, North America (7.2%) and Africa with 3% (Schonbeck, 2010).

In addition to Australia, the other countries with the maximum organic agricultural land are; Argentina with 3.1 million hectares of organic agricultural land, China (2.3 million hectares), and the United States with 1.6 million hectares. Most of the Argentina's organic agricultural land consist of pasture similar to that of Australia (Helga and Kilcher, 2011). Countries including Spain, Uruguay, Brazil, Germany and the United Kingdom follow the United States of America in the size of organic agricultural land (Helga and Kilcher, 2011).

In the European Union, the countries with the utmost percentage of organic agricultural land in 2005 were Austria (11%) and Italy (8.4%), tailed by both Greece and Czech Republic with 7.2%, and the lowest proportions in Ireland (0.8%), Poland with 0.6% and Malta (0.1%) (Paull, 2011). The percentage of the organic agricultural land in the European Union grew from 3.9% (in 2005) to 4.7% (in 2009), and the countries with utmost portion of the land were Liechtenstein with 26.9%, Austria (18.5%) and Sweden with 12.6%. In Austria, the percentage of organic agricultural land increased to 20% (in 2010) with 16% of farmers in organic production (Helga and Kilcher, 2011).

In 2005, about 168,000 hectares of land in Poland were used in organic farming (Paull, 2011). Further, in Romania about 100,000 hectares of land were used in organic farming in 2010, representing almost 1% of the total used agricultural land in the country. Also, 70 to 80% of the local organic produce in the Romania was exported which amount to about 100 million Euros (Paull, 2011).

After the downfall of the Soviet Union, the farm inputs that were acquired from the Central and Eastern countries of Europe were not accessible in Cuba, and consequently most farmers in Cuban converted their farms into organic techniques out of necessity (Helga and Kilcher, 2011). Therefore, organic agriculture is a normal practice in Cuba, while it continues to be a substitute practice in other countries. Though some foodstuffs called organic in Cuba would not satisfy the certification conditions in other countries, Cuba exports organic citrus to other markets in the European Union that meet the European Union organic standards (Helga and Kilcher, 2011).

2.5 ORGANIC FARMING IN AFRICA

There are nearly 900,000 hectares of certified organic agricultural land in Africa which constitutes about 3% of the organic farm land worldwide (Helga and Kilcher, 2009). The countries with the greatest organic agricultural land in Africa include Ethiopia followed by Uganda and Tunisia (Helga and Kilcher, 2009). Most farmers in Africa cultivate different organic crops including cash crops like coffee, cocoa, tea, cotton and olives, fresh fruits and vegetables (Helga and Kilcher, 2011).

2.5.1 The Export Market

Most of the certified organic foods from Africa is intended for export markets, with majority being exported to the European Union, which is the Africa's main market for farming produce (Helga and Kilcher, 2011). The overall export of organic foods from Uganda has been projected at 36.87 million US dollars (Helga and Kilcher, 2011). Due to the domination of smallholder farmers in Africa, the common supply chain for organic foods consist of private enterprises comprising of many smallholder farmers to secure the adequate quantities for export or smallholder farmers working in groups on a project to package and supply organic produce for exporting through other companies (Helga and Kilcher, 2011).

In Tanzania, the overall worth of the nine (9) most exported organic product classes in the country is estimated at 10 million Euros (Kledal and Kwai, 2010). The exports are mostly intended for the European Union and the United States. In terms of tons, cash crops like cocoa, coffee and cashews are on the top (Helga and Kilcher, 2011).

2.5.2 The Local Market

Although the market size for organic foods is still small in Africa, the domestic markets for organic foods are growing with these markets commonly situated near the capital cities (Helga and Kilcher, 2011). Most of the consumers of organic products in Africa are non-nationals and upper-middle class inhabitants with values comparable to European organic consumers (Helga and Kilcher, 2011). Organic products marketed in Africa include fresh fruits and vegetables, dairy products, herbs, wine, meat and other personal care products.

Tunisia and Egypt have specific shops and supermarkets that have organic sections. Likewise, organic shops in South Africa, Ghana Kenya and Uganda are also picking up and as a result playing an increasing role in the domestic organic market (Helga and Kilcher,

2011). In Zambia, farmers sell their organic produce in local markets created by the farmers or to the supermarkets in the cities (Helga and Kilcher, 2011). Few African countries have created a concrete campaign strategy for local organic markets but with the increasing awareness of organic products, there is a certainty that the prospects of domestic African markets for organic products will upsurge (Helga and Kilcher, 2011).

2.5.3 The State support

Regardless of the profits of organic agriculture, it still given little funding and other support from African governments, and is usually not assimilated into agriculture programs (Kledal and Kwai, 2010). Nevertheless, in countries like South Africa, Kenya, Tanzania, Tunisia and Uganda, there is an increasing acknowledgement by policy makers that organic farming has a substantial role to play in the handling of the persistent challenges with food security and climate variation in Africa (Helga and Kilcher, 2011).

Organic policies are in the process of being developed in these countries, and the national organic movements strongly participate in the process (Kledal and Kwai, 2010). It is undoubtedly that once finalised, these policy structures will help realise the multi-functional importance of organic agriculture in these countries. Proper instituted organic policies offer access to educational and training programs, financial resources, and improved market prospects for organic farmers (Kledal and Kwai, 2010).

Due to the various benefits of organic agriculture and the development of the organic sector in many countries, an office for organic agriculture has been created in the Ministry of Agriculture in countries like Ghana (Helga and Kilcher, 2011). This office operates as an interaction point for organic agriculture to coordinate between the government and the organic industry. The office is aimed at increasing the consciousness of organic agriculture

and training of the officers of the ministry at the regional and district levels, so that they can better assist the organic farmers and support the extra expansion of the organic sector in the country (Helga and Kilcher, 2011).

Since organic farming is affordable and has multiple benefits, it is imperative to empower national policy structures on organic agriculture in other African countries in order to build the capabilities of the African governments to develop resilient, sustainable and productive farming (Kledal and Kwai, 2010).

2.6 SOME PROBLEMS FACING ORGANIC FARMING IN AFRICA

2.6.1 Lack of Appropriate Agriculture Policy

In Africa, there is a limited policy with regards to organic farming as well as agriculture as a whole (Bourn and Prescott, 2002). The policy makers in Africa should consider vital issues such as promoting organic agriculture both for export and domestic markets as well as using proper farming inputs in organic agriculture (Bourn and Prescott, 2002). These vital issues can be taken care of when formulating appropriate agriculture policies to promote organic farming in Africa (IFOAM, 2003).

2.6.2 The Lack of Awareness

It had been proposed that many of the farmers in the Africa have inadequate knowledge about organic farming and its benefits as compared to the conventional farming systems (IFOAM, 2003). The use of organic techniques requires the consciousness and preparedness on the part of the farming community (Kledal and Kwai, 2010). Information about the accessibility and usefulness of additional nutrients to enhance the soil is also significant to increase production

but most farmers lack the knowledge of making compost with modern methods as well as its application (IFOAM, 2003).

2.6.3 The Absence of Quality Standards for Bio-manures

The need for the fixation of criteria and quality parameters for bio-manures and bio-fertilizers has ascended with the increasing acceptance of organic farming in Africa (Magkos *et al.*, 2006). There are more brands of organic manures on the market, containing high amounts of natural nutrients and vital elements (Kledal and Kwai, 2010).

With the high illiteracy among farmers in Africa, most of the farmers are unaware of the side effects of using the commercially accessible bio-manure products. Although the idea of organic farming itself stress importantly on the manures produced on the farm as well as the farmers' household, many of the brand-named products accessible in the market may not be categorically organic (Magkos *et al.*, 2006). In some situations, elements from the chemicals slip into the manures due to faulty production procedures which could make the product inorganic (Kledal and Kwai, 2010).

2.6.4 Low Production

Conventional agriculture has been shown to produce more yield than organic agriculture in Africa (Samuel, 2007). Most farmers experience some loss in their yields as a result of the neglect of synthetic farm inputs during the conversion of their farming methods from conventional to organic. The restoration of biological activity in terms of growth of useful insect population, suppression of pests and soil fertility problems also take some period and the decrease in the yields is as a result of these situations (Samuel, 2007). Most smallholder

farmers cannot deal with the hazard of low yield after the converting their conventional farming practices into organic farming. Also, there are no arrangements to compensate the farmers during this period and the price premiums on the organic products will not be enough to support the farmers (Parrot and Marsden, 2002).

2.7 ORGANIC FARMING IN GHANA

Agricultural production in Ghana comprises of organic and conventional methods. Although the organic sub-sector in Ghana is relatively underdeveloped, the area of land under organic food production has escalated from a projected 5,453 hectares in 2003 to 19,132 hectares in 2006, and this accounts for about 0.13% of the total organic farm land under production in Ghana (IFOAM and FiBL, 2006).

Agriculture is the main sector of the Ghanaian economy which employs large portion of the population (about two thirds), and contributes to about half of the country's Gross Domestic Products (GDP) and export earnings (IFOAM, 2003). Ghana does not have a significant local market size for organic products and therefore the future expansion of this sub-sector is based on the organic trading relations with established markets like Europe (Gyau and Achim, 2007). The main organic export commodities in Ghana are palm oil and fresh fruits. Other organic products include vegetables, cocoa, cereals, banana and cashew (IFOAM, 2003).

Fruits and vegetables production plays significant roles in the socio-economic growth in Ghana. It provides employment, ensures food security, offers raw materials for the local industries, and generates foreign exchange and income for a section of the population (Nouhoheflin *et al.*, 2004; Obuobie *et al.*, 2006). In Accra, the capital city of Ghana, there is about 800 to 1,000 farmers engaged in commercial urban vegetable cultivation where the

vegetables produced are consumed by more than 200,000 urban dwellers every day (Obuobie *et al.*, 2006).

2.7.1 Food Safety and Certification in Ghana

With the increasing demand for harmless produce by consumers, the Ghanaian horticultural industry has established plans to build local capacity in the production, and quality management to ensure the transportation of safe produce (Sefa-Dedeh, 2006). The Global GAP (Good Agricultural Practise) accreditation of farms has been on-going in the Ghana and over 60% of foremost exporters are at present Global GAP accredited and others are in the course of being certified (Sefa-Dedeh, 2006).

The concept of Ghana GAP is now developing into a national quality management system. The methodology taken is a gradual normalising of best practices in Ghanaian horticulture and benchmarking with other existing protocols (Sefa-Dedeh, 2006). It is predictable to guide concerns on safety, quality and traceability. Ghana GAP is an additional public-private partnership which focuses on safety and the quality of horticultural products from Ghana (Sefa-Dedeh, 2006).

2.7.2 The Stakeholders involved in Organic Farming in Ghana

The stakeholders involved in the development of organic products in Ghana includes; Non-Governmental Organisations (NGOs) such as the Ghana Organic Agriculture Network (GOAN) and the trade associations working strongly with this organization such as the Henry Doubleday Research Association (HDRA), Department for International Development UK

(DFID), International Trade Centre (ITC) and Pesticide Action Network UK (PAN-UK) (IFOAM, 2003).

The Ghana Organic Agriculture Network (GOAN) is a non-governmental organisation which is located in Kumasi, Ashanti Region of Ghana. With the assistance from Henry Doubleday Research Association and Pesticide Action Network UK, the GOAN was established in 1995 to provide training, information and guidance on organic agriculture methods. In addition, the GOAN associates with other research institutions to scrutinise the alternative approaches to pest control for oil palm, cocoa, fruits and vegetables (IFOAM, 2003).

2.8 FRUITS AND VEGETABLES

Diets rich in vegetables and fruits are known to reduce blood pressure and the risk of heart diseases, avoid some type of cancers, improve vision, reduce the risk of digestive problems, and lower the blood sugar level (Hung *et al.*, 2004). Examples of the most commonly grown organic vegetables in Ghana are lettuce, cabbage, green pepper, carrot, tomato, garden eggs, green beans and spring onions while organic fruits also include pineapple, pawpaw, mango, pear and water melon (Obuobie *et al.*, 2006).

2.9 HEALTH BENEFITS OF FRUITS AND VEGETABLES

2.9.1 Prevention of Cardiovascular Diseases and Blood Pressure

Diets rich in vegetables and fruits have been testified to lower the risk of heart diseases and stroke. A study (Hung *et al.*, 2004) had showed that the higher the average day-to-day consumption of fruits and vegetables in a diet, the lower the probabilities of acquiring cardiovascular diseases as compared to those with the lowest fruits and vegetables intake

which is less than about 1.5 servings a day. Although most of the fruits and vegetables are more likely to lower the likelihoods of developing cardiovascular diseases, green leafy vegetables including cauliflower, cabbage, lettuce, spinach and citrus fruits such as lemons, limes, and grapefruits make the important contributions (Hung *et al.*, 2004).

Several studies in the Europe and United States have revealed that persons who eat above five (5) servings of fruits and vegetables daily have about 20% lower chance of developing coronary heart disease and stroke, as compared to persons who eat below three (3) servings daily (He *et al.*, 2006; He *et al.*, 2007).

Also, a study (Appel *et al.*, 1997) which examined the consequence of a diet rich in vegetables and fruits on blood pressure found out that persons with elevated blood pressure who consumed large quantities of fruits and vegetables have their systolic blood pressure reduced by about 11 mmHg as well as their diastolic blood pressure by about 6 mmHg. Similarly, another study had exhibited that fruit and vegetable-rich diets lower the blood pressure even when some of the carbohydrate in the diet are substituted with healthy unsaturated fat or protein (Appel *et al.*, 2005).

2.9.2 Prevention of Tumours

A paper published by the World Cancer Research Fund, together with the American Institute for Cancer Research, suggests that non-starchy vegetables for instance lettuce and other leafy greens such as cabbage in addition to onions, garlic and fruits are more likely to protect the body against numerous forms of cancers, such as those of the mouth, voice box, throat, lungs and stomach (Wiseman, 2008).

Some specific constituents of some vegetables and fruits could also prevent the development of certain cancers. For example, tomatoes may assistance in the protection of men from developing prostate cancer, especially the destructive forms of the tumour (Giovannucci *et al.*, 2007). The increased in the intake of tomato-based products, specifically the cooked tomatoes, and other foods containing lycopene foods may possibly decrease the incidence of prostate cancer (Wiseman, 2008). Lycopene is one of the numerous carotenoids which occurs in brightly coloured fruits and vegetables. A study proposes that foods having carotenoids may safeguard the body against mouth, throat and throat tumours (Wiseman, 2008).

2.9.3 Promotion of Gastrointestinal Health and Vision

Fruits and vegetables have indigestible fibres which absorb water and expand as it moves through the digestive system. This process can avoid symptoms of an irritable bowel, and also reduce or prevent constipation due to the regular bowel movements (Lembo and Camilleri, 2003). The process of bulking and relaxing action of insoluble fibres also reduces the pressure inside the intestinal tract which may aid in the prevention of diverticulosis (Aldoori *et al.*, 1998).

Fruits and vegetables can likewise keep the eyes in a healthy shape. They may also help to avert two popular aging-related eye diseases, such as macular degeneration and cataracts. These diseases cause eye complications in millions of Americans over 65 years old (Cho *et al.*, 2004; Moeller *et al.*, 2004; Christen *et al.*, 2005). Lutein and zeaxanthin found in fruits and vegetables seem protective against cataracts (Christen *et al.*, 2008).

2.10 MARKET POTENTIAL AND PROSPECTS OF ORGANIC FRUITS AND VEGETABLES

The marketing potential is the maximum sales practically achievable under specific set of guidelines within a definite period (Lehmann and Winer, 2005). A study conducted by Wier and Calverley (2002) who evaluated the market potential for organic foods in Europe concluded that; market potential exist for sales of highly processed organic foods in supermarket sales, and the role of information and systematic proficient promotion of organic products is a necessity for future expansion. There is also a market size for organic milk and apples, and many consumers especially people who have bought organic products are eager to offer extra for organic milk and apples (Wang and Sun, 2003).

In a study (Angkasith, 2001) on coffee cultivation and the marketing prospects of organic arabica coffee, it was concluded that; depending on the market need for organic coffee, there is a high prospects for its cultivation on the highlands, and the organic production approaches will also be of reciprocal gain to the farmers, the highland ecology as well as the consumers.

Edward *et al.*, (2007) conducted a study on the marketing opportunities of the Jamaican's grapefruit industry. Their initial evaluation of the market potential for the exports of grapefruit from Jamaica to the European Union put forward that; the prices of grapefruits will continue to be comparatively high in the European Union market over the long term due to the Jamaica's comparative and other advantages over the European Union in large-scale citrus production. Also, a study conducted by Mainville and Peterson (2005) to explore the potential to develop the cherry-apple hard cider markets in Michigan and concluded that the probable value of hard cider market in Michigan is comparatively small but significantly estimated between 580,000 and 2,900,000 US dollars per year.

2.10.1 Estimation of Market Potential

The estimation of the marketing potential for a particular product is essential in assessing its practicability. It also provides an estimation of the maximum possible sales for a specific market (Lehmann and Winer, 2005). Once the marketing potential for a particular product has been estimated, it would be possible to decide if the market is adequate to withstand the proposed production or tolerate an additional producer in the market place (Wolfe, 2006).

According to Asafu-Adjaye (2000), the overall value of a product is estimated by the product of the average WTP and the number of household or the population used. The estimated market potential for a particular product sets the upper boundary for the market size with respect to that particular product (Wolfe, 2006). The estimation of the market size or potential for a particular product requires specific statistics which include the number of possible buyers, the mean selling price and an estimate of the consumption or the buying rate for a specific period. Once these variables are obtained, the market potential can then derived from the formula:

$$MP = N \times P \times A \times Q$$

Where; MP: Market Potential, N: Number of possible buyers, P: Mean selling price or mean premium willing to pay, A: Average purchase quantity and Q: Average annual purchasing rate (Wolfe, 2006).

2.11 CONSUMER ATTITUDE AND PERCEPTION TOWARDS ORGANIC FRUITS AND VEGETABLES

Attitude can be defined is the readiness or tendency of the consumer to respond positively or negatively to a particular product (Padberg *et al.*, 2002). There is a link between attitude and

perception, hence consumers' attitude in the direction of a particular product is heavily dependent on the perception of the consumers (Alvensleben and Meier, 1990; Padberg *et al.*, 2002). Several studies have investigated what consumers are willing to pay based on consumers' attitude and perception towards organic food and its attributes.

Some studies (Underhill and Enrique, 1996; Williams and Hammitt, 2000; Williams and Hammitt, 2001) have showed that the WTP for organic products is associated to the opinion of its being more ecologically friendly and in support of small-scale farming and rural communities. Another study by Loureiro *et al.*, (2001) also assessed consumers' preference for organic labelled and regular apples with regards to socio-demographic characteristics and they found that; higher food safety issues and perception about the environment upsurge the possibility that a consumer will prefer an organic product. Thus, consumers who have strong ecological and food safety issues will prefer organic apples, while consumers with weaker eco-friendly and food safety issues will prefer regular apples.

Also, Roosen *et al.*, (2004) analysed food risk concerns of German consumers for eleven years (1992 to 2002). The analysis cover the consumers' general risk worries and the specific perception of food safety hazards. General risk attitude were described by variables linking to environmental, lifestyle and food risks. Food safety concerns were grouped into concern about use of biotechnology, residues, unhealthy eating habits, and natural contaminants. The results from this study revealed that the general risk perceptions and awareness about food safety hazards was highly important in the study population.

Naspetti and Zanolli (2006) conducted a study throughout Europe to evaluate organic food quality and safety concerns. The results of this study indicated that quality issues and considerations were among the most vital aspects in every food purchase, with organic food included. However, the average organic consumer usually associate quality to health and

much less to safety, and do not have a distinct organic food quality insight. This study also showed that there is still little awareness of how organic products were cultivated and processed, which features are necessary for the consumer with respect to quality and safety.

A study on consumers' insights and attitudes towards food safety was also conducted in Portugal by Ventura-Lucas (2004). The results of this study indicated that, apart from consumers' residence, the factors assessing lifestyle, particularly those associated with food safety and consumption experience, seem to be the main characteristics explaining Portuguese consumers' insights on food safety. In relation to the impact of food production practices on the environment, the consumers were very concerned and agreed that the normal production system is destructive to the environment as compared to organic system.

Nouhoheflin *et al.*, (2004) also assessed consumers' insight and preparedness to higher prices for organic vegetables in Accra and Tema, Ghana. Using the hedonic-pricing model to detect the main factors likely to affect consumers' WTP for organic vegetables, their results showed that consumers are conscious of the health hazards linked to chemical pesticides. And also, the features they will consider in assessing the quality of vegetables include size, hardness, damage free, freshness and bright colour.

2.12 THE CONSUMER BUYING BEHAVIOUR OF ORGANIC FRUITS AND VEGETABLES

Consumers' purchasing behaviour include activities involved in the purchasing and using of products and/or services for personal and household use, and the consumers' purchasing behaviours are influenced by elements such as psychological factors (perception, motivations and attitude), lifestyle, demographic and economic variables (Lancaster *et al.*, (2001). According to Padberg *et al.*, (2002), consumers' purchasing behaviours are complex and

multidisciplinary, with supports from diverse social sciences such as economics, sociology, psychology, anthropology, geography, nutritional sciences and medicinal sciences.

The fundamental powers of consumers' behaviours are emotions and reasons. Thus the stronger the emotion, the stronger the reason and the more positive or negative the attitude towards the product, the higher or lower is the chance of purchase attitudes (Padberg *et al.*, 2002). Numerous surveys regarding consumer behaviour towards food products (vegetables and fruits) have been conducted in the world.

In a study (Mergenthaler *et al.*, 2007), it was established that the demand for fruits and vegetables from contemporary supply chains particularly contemporary retailers and non-traditional imports was highly income flexible and supermarkets development had influence on the consumers' needs. In Croatia, fruit and vegetable buyers consider freshness and quality as most important characteristics of fruits and vegetables during purchases (Kovacic *et al.*, 2002). In a study by Dierks (2006) to investigate the function of trust as a basis of consumers' behaviours in Germany, found that in situation of a food indignity, trust shows to be among the most conclusive reasons influencing the behaviour of consumers.

Consumers will be more motivated in purchasing organic products by being informed on producers and handlers (improved traceability) and by having more transparency of the inspection methods and results (Naspetti *et al.*, 2005). The elements that seem to be strongly associated with consumer buying behaviours and attitudes include age of household head, income, household size, education, price and quality of the produce (Mukiibi *et al.*, 2006). In South Africa, Vermeulen (2007) showed the price premiums and consumer behaviour associated with organic production were significant in consumers' willingness to pay compared to product attributes such as health.

2.13 WILLINGNESS TO PAY (WTP) FOR ORGANIC FRUITS AND VEGETABLES

According to Dimitri and Greene (2002), the willingness or preparedness to pay is the maximum sum of money the consumer is ready to pay for a particular product of choice. Consumers demanded for niche products such as organic ones in the past. Consumers value organic foods because they recognise them to be healthier, and more ecologically friendly. This preference may be translated into the WTP a premium for organic product. Some studies have scrutinised the consumers' needs and their WTP for organic and pesticide-free products. In a study (Gil *et al.*, 2000) which employed the contingent valuation method to evaluate the consumers' WTP for organic products in Spain showed that consumers were prepared to pay about 15 to 25% above the market price for organic fruits and vegetables. In another study which also examined the consumers' preference and demand for organic apples in the United States revealed that there is a substantial market size for organic apples, and many consumers especially people who have purchased organic food products are eager to pay more for organic foods (Wang and Sun, 2003).

The predominant price premium for organic foods over comparable conventional foods around the world ranges from 10 to 50% (Bonti-Ankomah and Yiridoe, 2006). Nouhoheflin *et al.*, (2004) used the hedonic pricing method to evaluate consumers' insights and preparedness to offer higher prices for organic vegetable in Ghana and Benin. Their results revealed that; Ghanaian consumers were ready to pay over 50% above the market price for chemical free vegetables. Also, another study had showed that consumers in the UK are prepared to pay about 30% above the market price, particularly for organic fruits and vegetables (Hutchins and Greenlagh, 1997).

2.13.1 Product Attributes Affecting Consumers' WTP

The features that consumers look for when evaluating the quality of vegetables include size, insect damage free, colour, freshness, and hardness, and their WTP for chemical free vegetables is influenced by factors such as the consciousness of chemical residues, the accessibility of the product and taste (Nouhoheflin *et al.*, 2004). Also a study conducted by Poole and Martinez-Carrasco (2007) to assess the relationship between information (such as perceptions of fruit quality and consumer satisfaction) and WTP found that; consumers' purchase choices were centred primarily on the overall visual appearance, aroma and firmness of the fruit.

A study (Van der Pol and Ryan, 1996) which used the conjoint analysis to ascertain the consumers' inclinations to fruit and vegetables in Scotland revealed that; factors which influence consumption of fruit and vegetables are freshness, appearance, season and nutritional value. Also a study by Fotopoulos and Krystallis (2002) which examined organic products as eco-products suitable for green consumers revealed that; consumers consider attributes such as appearance, size, colour, freshness and other intrinsic attributes like taste, and nutritional value during purchase of organic products. Similar studies conducted by Wolf (2002), and Bonti-Ankomah and Yiridoe (2006) also revealed that the qualities that are very necessary or extremely desired by the consumers include; fresh looking, fresh tasting, high in nutrition and health, reasonably priced, free of insects and pesticides.

2.13.2 Socio-Demographic Variables Affecting Consumers' WTP

These are several personal factors which affect consumers' demand decision making. Younger consumers with higher annual incomes, irrespective of gender, would pay higher

dividends for organic produce, and the probability of paying a premium declines as the household size rises (Govindasamy and Italia, 1999).

A study conducted by Arbindra *et al.*, (2005) in the United Kingdom indicated that higher household income positively influenced the chance that consumers would buy organic foods. Also, female consumers were more likely to buy organic produce than male consumers, and older consumers were less likely to purchase organic foods as likened to their younger counterparts. In a similar study conducted in the United States, Arbindra and Wanki (2005) reported that among the socio-demographic variables, age of the respondents was the only variable which had statistically significant impact on the organic food purchase pattern. Thus younger consumers were more likely to buy organic products as likened to older consumers.

Wang and Sun (2003) reported from their study that; younger people with higher income and smaller household size were more prepared to offer higher prices for organic foods. Also, some studies (Darby *et al.*, 2006; Batte *et al.*, 2007) have revealed that consumers who were conscious of organic seals on food products and consumers with higher income per household were more willing to pay higher premiums.

The existence of children in the household, higher food safety worries, and environmental issues upsurge the likelihood that a consumer will pick an organic product. Thus consumers who have children and strong ecological and food safety issues will prefer organic foods, while people without children and with weaker environmental and food safety concerns will prefer conventional foods (Loureiro *et al.*, 2001).

2.13.3 WTP and the Contingent Valuation Model

In examining the viability of a new product, the cost of production and consumers' demand for that product have to be taken into consideration (Kimenju and Hugo, 2008). The evaluation products before they are brought to the market helps to decide the consumers' WTP for such products in a hypothetical markets situation (Quagrainie, 2006). These markets are set up using the contingent valuation methods where consumers are asked to value a new product. This is achieved by directly asking consumers in a survey on how much they would be prepared to offer higher prices for the new product (Lusk and Hudson, 2004).

The contingent valuation method is a survey-based method which is used to examine how consumers assess or appraise goods and services not found on the market. This method is generally used to appraise non-market use values (Venkatachalam, 2004). The WTP from the hypothetical market is considered as an estimation of the worth of the non-market product or service (Halstead *et al.*, 2002). However, contingent valuation studies produce significant outcomes if they are appropriately fixed with in the consumer expansion framework (Hanemann and Kanninen, 1996). In this framework, the consumer is assumed to maximize his or her utility which is subjected to budget limitation and would select the choice that gives him or her the utmost utility. In this perspective, WTP is the highest sum of money a consumer would be prepared to offer for a particular new product (Kimenju and Hugo, 2008).

In the contingent valuation technique, WTP can be achieved by using open-ended questions where consumers are asked to state the highest sum of money they would be prepared to offer for a product with no value suggested to them or close-ended questions where consumers are asked if they would be prepared to pay a specific amount (Hanky *et al.*, 1997).

The open-ended questions offer straightforward estimates and are easier to analyse in a willingness to pay situation for the product or service (Hanemann and Kanninen, 1996). But

according to Arrow *et al.*, (1993), the open-ended questions could be challenging since the consumers might not have enough information to assess the prices of the commodity and might not return realistic estimates.

The close-ended questions alternatively are easier to respond and are more accurate. This is because the consumers are given the price for a product, and faces only a “yes” or “no” choice (Kimenju and Hugo, 2008). There are various formats of the close-ended questions used in willingness to pay studies, but the most commonly used close-ended formats are the single-bounded choice questions or the double-bounded dichotomous preference questions (Hanemann and Kanninen, 1996).

In using the single-bounded format, the person answers only one bid of question. This could be motivation-compatible since it is the consumer’s planned interest to opt for “yes” if he or she is more willing to pay a higher or equal to the proposed price (Mitchell and Carson, 1989). However, the single-bound method needs a larger sample for the study and even statistically inefficient (Hanemann *et al.*, 1991). With the double-bounded dichotomous choice technique, a second offer is presented, which is either higher or lower subjected to the first answer. This makes the double-bounded dichotomous technique statistically more proficient as likened to the single-bounded technique (Hanemann *et al.*, 1991; Kanninen, 1993). The double-bounded dichotomous technique also includes more information about the consumer’s WTP and hence provides more proficient estimates as well as close-fitting confidence intervals (Hanemann *et al.*, 1991).

CHAPTER THREE

MATERIALS AND METHODS

3.1 STUDY DESIGN

The cross-sectional research design was used in this study. The study period was from September to November, 2014. The consents of participants were sought and those who voluntarily accepted to take part in this study were recruited for the study. The face-to-face interview method was employed in this study using a designed questionnaire (**Appendix**). This was to make available the opportunity to clarify questions which were difficult to answer, to obtain the exact data needed for this study, and also to afford the investigator the chance to educate the respondents.

3.2 STUDY SITE

The study was carried out in the Techiman Market. Techiman is located in the Brong Ahafo Region of Ghana. Techiman lies on latitude 7°35'10'' north and longitude 1°56'28'' west, and serves as the capital of the Techiman Municipality (**Figure 3.1**) with a population of about 67,241 (GSS, 2013). Techiman together with Sunyani are the two major cities of the Brong Ahafo Region. Agriculture and related works are the major occupation.

Techiman is typical of Ghanaian cities in its ethnic diversity, its rapidly growing population, and its emphasis on trading activities. Techiman is also known in Ghana and West Africa as a whole because of its largest food market in the sub-region. The market hosts traders from Burkina Faso, Togo, Mali, Cote d'Ivoire and Benin, and is therefore an International Market.

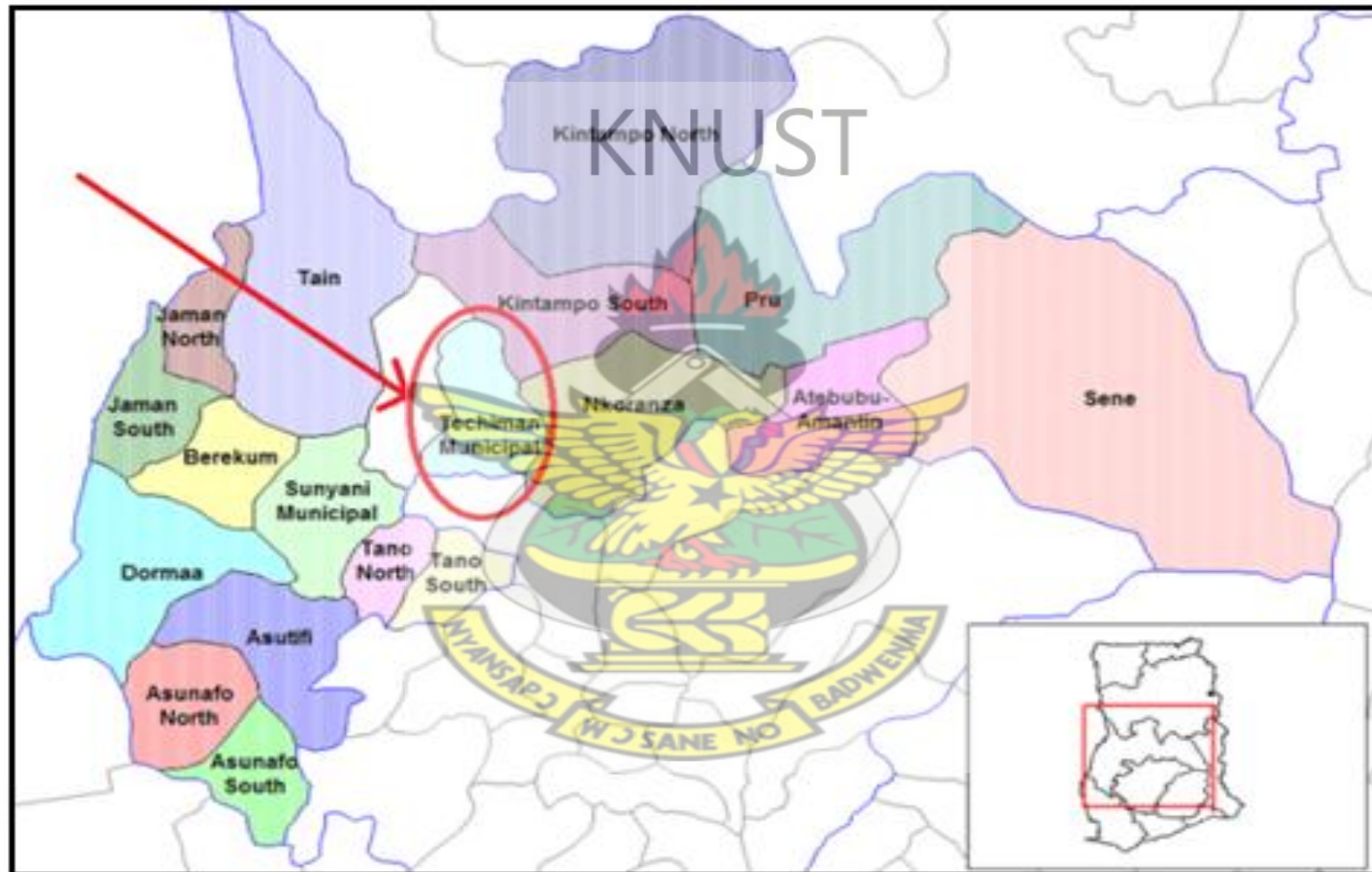


Figure 3.1: Regional Map of the Brong Ahafo Region
(Courtesy: Wikipedia, 2014)

3.3 STUDY POPULATION AND SAMPLE SIZE

All consumers in the Techiman Market, between the ages of 18 and 60 years, were considered and included in the study. A total number of three hundred and thirty (330) participants were recruited for this study from the study population.

3.4 SELECTION OF PARTICIPANTS

The convenient sampling method was used in the recruitment of the participants to respond to the questionnaires. This technique was employed because it is useful for this study design. The consumers were contacted and those who were prepared to participate in this study were recruited.

3.5 DESIGN OF THE STUDY QUESTIONNAIRE

The research questionnaire (**Appendix**) comprised of five sections. The first part included questions on consumers' socio-demographic features such as age, income, gender, household size and educational status. The second section contained general questions about the purchase of organic foods. The third part focused on market potential and included questions such as consumers' food purchase frequency and the expenditure on fruits and vegetables. In the fourth section, questions on consumers' attitude and perception were asked whilst the final section obtained information on consumers' WTP for organic fruits and vegetables.

This designed questionnaire was made up of open and closed-ended questions. In the questionnaire, the open-ended questions offered the consumers the opportunity to express their views about organic products whilst the closed-ended questions gave the respondents pre-coded responses in which the consumers selected the choice they approved most.

The questions on consumers' WTP a higher price for organic fruits and vegetables were designed using the double-bounded dichotomous contingency valuation format. In the double-bounded dichotomous contingency valuation part of the questionnaire, the consumers were given a first bid. The consumer who accepts initial the amount was presented with a second bid which is higher than the initial bid, however, before the double-bounded dichotomous preference questions were presented to the respondents, the concept of organic products in terms of its attributes and the benefits were explained to those unaware of the products. The double-bounded dichotomous contingent valuation approach was used in the evaluation of the mean WTP for organic fruits and vegetables.

3.6 DATA ANALYSIS

The data obtained was analysed with an aid of the Statistical Package for Social Scientist Statistical Software (version 16.0, SPSS Inc., Chicago, IL, USA). A total of 318 out of the 330 questionnaires administered to the consumers were valid and included in the data analysis accordingly. Descriptive analysis of variables was conducted using frequency analysis and mean tests while the enthusiasm of the consumers to offer higher prices for organic fruits and vegetables with regards socio-demographic characteristics and awareness variables were analysed using the logit regression analysis. The elements used in the logit regression analysis are shown in **Table 3.1**.

Table 3.1: Independent Variables Names and Definitions.

Socio-Demographic Characteristics	
GENDER	Gender of Respondents: 1 if individual is Male, otherwise 0
AGE	Age of Respondents:
AGE 1	1 if individual is below 30 years, otherwise 0
AGE 2	1 if individual is 30 - 50 years, otherwise 0
AGE 3	1 if individual is above 50 years, otherwise 0
EDU	Educational level of Respondents (Number of years)
MARISTAT	Marital status of respondents: 1 if individual is married, otherwise 0
EMPMNT	Employment status of respondents: 1 if individual is employed, otherwise 0
HHSIZE	Household size of respondents (Total Number)
HHINCOME	Household income per month:
INCOMELow	1 if individual earns below GH¢500.00, otherwise 0
INCOMEMIDD	1 if individual earns from GH¢500.00 to GH¢1000.00, otherwise 0
INCOMEHIGH	1 if individual earns above GH¢1000.00, otherwise 0
Awareness Variables	
AWARE	Awareness of organic foods: 1 if individual has heard about organic foods, otherwise 0
KNOW	Knowledge of chemical residues: 1 if individual has knowledge about chemical residues in conventional products, otherwise 0
PESTCONCERN	Pesticides concern: 1 if individual has concern about pesticides usage, otherwise 0
HRISK	Health risks: 1 if individual has knowledge about health risk associated with the consumption of chemically grown fruits and vegetables, otherwise 0
ECONCERN	Environmental concern: 1 if individual has concern that chemicals used in conventional farming affect the environment, otherwise 0

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF CONSUMERS

The socio-demographic features of the consumers recruited for this study are shown in **Table 4.1**. Most of the respondents were females (68.87%) with males accounting for the remaining 31.13%. The high percentage of females may be accredited to the fact that most women are in charge of the buying and preparing of food (Assibey-Mensah, 1998), and are involved in marketing activities in Ghana. With regards to educational levels of the respondents, 58.49% had basic education, 9.43% had secondary education and 20.76% had tertiary education. However about 11.32% of them had no formal education suggesting that this study captured more educated consumers. The average household size of the respondents was 4.26 persons per household, and this is in agreement with the national average household size of 4.4 persons per household in the 2010 population and housing census (GSS, 2013).

About 24.53% of the respondents were formally employed, 55.66% of them were self-employed, 6.60% of them were unemployed and 13.21% of them were students. The unemployment rate of the respondents is higher than that the unemployment rate recorded in the Ghana living standards survey from September 2005 to September 2006 which was 3.6% (GSS, 2008). The mean household earnings per month of the consumers was GH¢814.90, as shown in **Table 4.1**. The mean household earnings per month of the consumers was lower than the average annual household earnings which was GH¢1,217.00 recorded in the Ghana living standards survey (GSS, 2008). This may be as a result of the unemployment rate and students population because they did not have any monthly income recorded.

Most of the respondents (54.72%) were middle aged (30 - 50 years), 35.85% of the respondents were below 30 years while 9.43% of them were above 50 years. This means that most of the consumers on the market were 18 to 50 years, as shown in **Table 4.1**. With regards to marital status, most of the respondents (67.93%) were married, 27.36% of them were single, 3.77% were divorced and 0.94% were widows.

Table 4.1: The Socio-Demographic Characteristics of the Consumers

Variable		Frequency	Percentage (%)
Gender	Male	99	31.13
	Female	219	68.87
Age	Less than 30 years	114	35.85
	From 30 to 50 years	174	54.72
	Greater than 50 years	30	9.43
Educational Level	No Education	36	11.32
	Basic Education	186	58.49
	Secondary Education	30	9.43
	Tertiary Education	66	20.76
Marital Status	Single	87	27.36
	Married	216	67.93
	Divorced	12	3.77
	Widow	3	0.94
Occupation	Formally Employed	78	24.53
	Self Employed	177	55.66
	Unemployed	21	6.60
	Students	42	13.21
Variable		Mean	Standard Deviation
Average Years of Education		9.00	4.37
Household Size		4.26	2.27
Household Income/Month (GH¢)		814.90	571.50

4.2 CONSUMERS' KNOWLEDGE ON ORGANIC FOODS

As shown in **Table 4.2**, 74.53% of the respondents indicated that they were aware of organic foods while 25.47% of them were unaware of organic foods. Those who were aware of the organic foods became conscious through the radio (36.71%), newspaper (5.06%), television

(16.46%), friends/relatives (18.99%), and either from schools or by reading of books (22.78%). The high percentage of awareness through the radio could be attributed to the increasing number of radio stations in Ghana.

Table 4.2: Consumers' Knowledge on Organic Foods

Variable		Frequency	Percentage
Awareness of Organic Foods	Yes	237	74.53
	No	81	25.47
Source of Information	Radio	87	36.71
	News papers	12	5.06
	Television	39	16.46
	Friends/family	45	18.99
	School/Books	54	22.78

Studies that have investigated consumers' consciousness and knowledge about organic foods in some countries (Jolly *et al.*, 1989; Ekelund, 1990; Akgungor *et al.*, 1997; Hutchins and Greenhalgh, 1997; Wang *et al.*, 1997; Cunningham, 2002; Demeritt, 2002; Hill and Lynchehaun, 2002; Kenanoglu and Karahan, 2002). And an appraisal of these studies suggest that generally there are some consumers' consciousness about organic foods worldwide, and the awareness and knowledge about the organic products can have an emotional impact on attitudes and perceptions about the product and, in the end, purchasing decisions.

Consumers' knowledge and consciousness will continue to be essential in the organic markets in two situations. First, there is quiet a section of the consumers who are unaware of organic foods (25.47%). For instance, a study was conducted in the US to consider the main reasons why consumers do not purchase organic foods and 59% of the study population pointed out that they never thought of organic products for the reason that they did not know about them (Demeritt, 2002). The second part of the knowledge and consciousness puzzle is

the likelihood that those who do not consider organic products may have a collective knowledge about them, but do not have adequate detailed information to clearly discriminate between the unique qualities of organic foods and the conventionally cultivated alternatives.

4.3 CONSUMERS' BEHAVIOUR TOWARDS ORGANIC FOODS

Based on the market preference, 54.01% of the respondents indicated that they would like to purchase organic products from the farm gate, 36.29% from the market retailers and 9.70% from the supermarkets. The percentage of respondents who would like to buy organic products from the supermarkets is inconsistent with a previous study (Fotopoulos and Krystallis, 2002) which observed 80.9% of consumers making their purchases from the supermarkets. None of the respondents indicated that they would like to purchase organic products from street hawkers, as shown in Table 4.3. These results indicate that most consumers would like to purchase their food stuffs from farmers or in the open market.

From the results obtained on the mode of differentiation, 40.08% of the respondents stated that they want organic products to be differentiated from conventional products by labelling, about 49.79% of the consumers indicated they want special markets or shops to be created for organic products in Ghana whereas 10.13% of the consumers indicated they want organic products to be labelled and sold in special markets or shops.

Table 4.3: Consumers' Purchasing Behaviour

Variable		Frequency	Percentage
Market Preference	Farm gate	128	54.01
	Market retailers	86	36.29
	Street hawkers	0	0.00
	Supermarkets	23	9.70
Reason for Purchase	Healthier	175	73.84
	Safer	54	22.78
	Taste better	8	3.38
	Environmental safety	0	0.00
Frequency of Purchase	Always	123	51.90
	Frequently	86	36.29
	Sometimes	28	11.81
	Very seldom	0	0.00
	Never	0	0.00
Mode of Differentiation	Labelling	95	40.08
	Special markets/stores	118	49.79
	Labelling and Selling	24	10.13
	in special markets/stores		

Based on the frequency of purchase, 51.90% of the respondents indicated that they would always purchase organically grown fruits and vegetables while 36.29% also said they would frequently purchase organic fruits and vegetables. Only 11.81% admitted they would on some occasions purchase organic fruits and vegetables if they are on the markets but none of the respondents indicated that they would never purchase organic fruits and vegetables, as shown in **Table 4.3**.

As shown in **Table 4.3**, most of the respondents (73.84%) said they purchase organic fruits and vegetables because they are healthier. This result is similar to a previous study (Magnusson *et al.*, 2001) which reported that most Swedish consumers consider organic fruits and vegetables to be healthier as compared to their conventionally produced alternatives. Other studies have also shown that health is the strong motivation why consumers buy organic products (Tregear *et al.*, 1994; Wandel and Bugge, 1997).

Other reasons why the respondents would purchase organic fruits and vegetables were based on safety grounds (22.78) and taste (3.38%). This result agrees with other existing consumer surveys by Wandel and Bugge (1997) and Magnusson *et al.* (2001) which discovered taste as one of the reasons why consumers purchase organic fruits and vegetables. None of the respondents admitted they purchase organic products based on environmental reasons, as shown in **Table 4.3**. This result agrees with a previous study (Huang, 1996) which indicated that some consumers of organic products were more worried about pesticide residues and nutritional values, and less concerned with environmental stewardship.

4.4 CONSUMERS' HEALTH CONCERNS ON FRUITS AND VEGETABLES

Most of the respondents gave health concerns as the main reason why they preferred organic products (**Table 4.3**). Therefore, the specific health concerns on the consumption of conventional fruits and vegetables were investigated. As shown in **Table 4.4**, 92.45% of the respondents were aware of chemicals residues in conventional fruits and vegetables and 95.24% agreed that the use of chemicals in fruit and vegetable production has negative implications on the environment.

Davies *et al.* (1995) in Northern Ireland also indicated that the most common motives for selecting organic produce was based on the environment and health issues. Some of the environmental effects of synthetic chemicals mentioned by the respondents were; all forms of pollution (62.58%), destruction of the soil (28.91%) and eradication of soil microorganisms (5.78%) (**Table 4.4**).

Table 4.4: Consumers' Health Concerns on Fruits and Vegetables

Variable		Frequency	Percentage
Knowledge of chemical residues in fruits and vegetables	Yes	294	92.45
	No	24	7.55
Knowledge of diseases associated with the consumption of chemically grown fruits and vegetables	Yes	256	87.07
	No	38	12.93
Diseases associated with the consumption of chemically grown fruits and vegetables	Blood pressure	12	4.08
	Heart attack	26	8.84
	Cancer	84	28.57
	Food poisoning	60	20.41
	Typhoid	19	6.64
	Diabetes	15	5.10
	No response	78	26.53
Knowledge on effects of synthetic chemicals on the environment	Yes	280	95.24
	No	14	4.76
Effects of synthetic chemicals on the environment	Pollution	184	62.58
	Destroys the soil	85	28.91
	Killing of microorganisms	17	5.78
	No response	8	2.72

With regards to the knowledge of diseases associated with the intake of chemically grown fruits and vegetables, 87.07% were of the view that the intake fruits and vegetables with chemical residues could cause diseases to humans. Examples of health risks mentioned by the respondents were: blood pressure (4.08%), heart attack (8.84%), cancer (28.57%), food poisoning (20.41%), typhoid (6.64%) and diabetes (5.10%). However, some of these diseases mentioned (blood pressure, heart attack, typhoid and diabetes) show that some of the consumers have misconceptions about the consumption of conventionally produced fruits and vegetables which need to be addressed.

4.5 CONSUMERS' PERCEPTION ON ORGANIC FRUITS AND VEGETABLES

Consumers' perception on the quality, benefit, environmental risk and cost associated with the consumption of organically produced fruits and vegetables were investigated. As shown in **Figure 4.1**, 85.85% of the consumers agreed that the consumption of organic fruits and vegetable has no harmful effect. This finding is supported by a previous study by Swanson and Lewis (1993) which concluded that organic food buyers were more worried with pesticides residues, preservatives and food additives as compared to non-buyers. Also 87.42% agreed that as compared to conventional products, organic products are of superior quality. This means that most of the respondents indicated that organic fruits and vegetables were of superior quality over their conventional produced fruits and vegetables.

About 94.03% of the consumers accepted that organically produced fruits and vegetables are healthier as compared to the conventional alternatives. Some of the respondents also agreed (90.25%) that organic products are tastier as compared to the conventional alternatives. This means that most of the respondents indicated that organic fruits and vegetables were of superior benefit over their conventional produced vegetables and fruits.

Most of the consumers (90.25%) agreed that organically produced vegetables and fruits have less or no environmental risk. This means that most of the respondents indicated that organic farming methods were environmentally safer as compared to the methods used in the conventional production of fruits and vegetables. This finding is buttressed by a previous study (Hack, 1993) which concluded that the main reasons for buying organic products were related to human health and environmental concerns. However, only 34.91% of the respondents agreed that organic fruits and vegetables were more expensive as compared to the conventional fruits and vegetables.

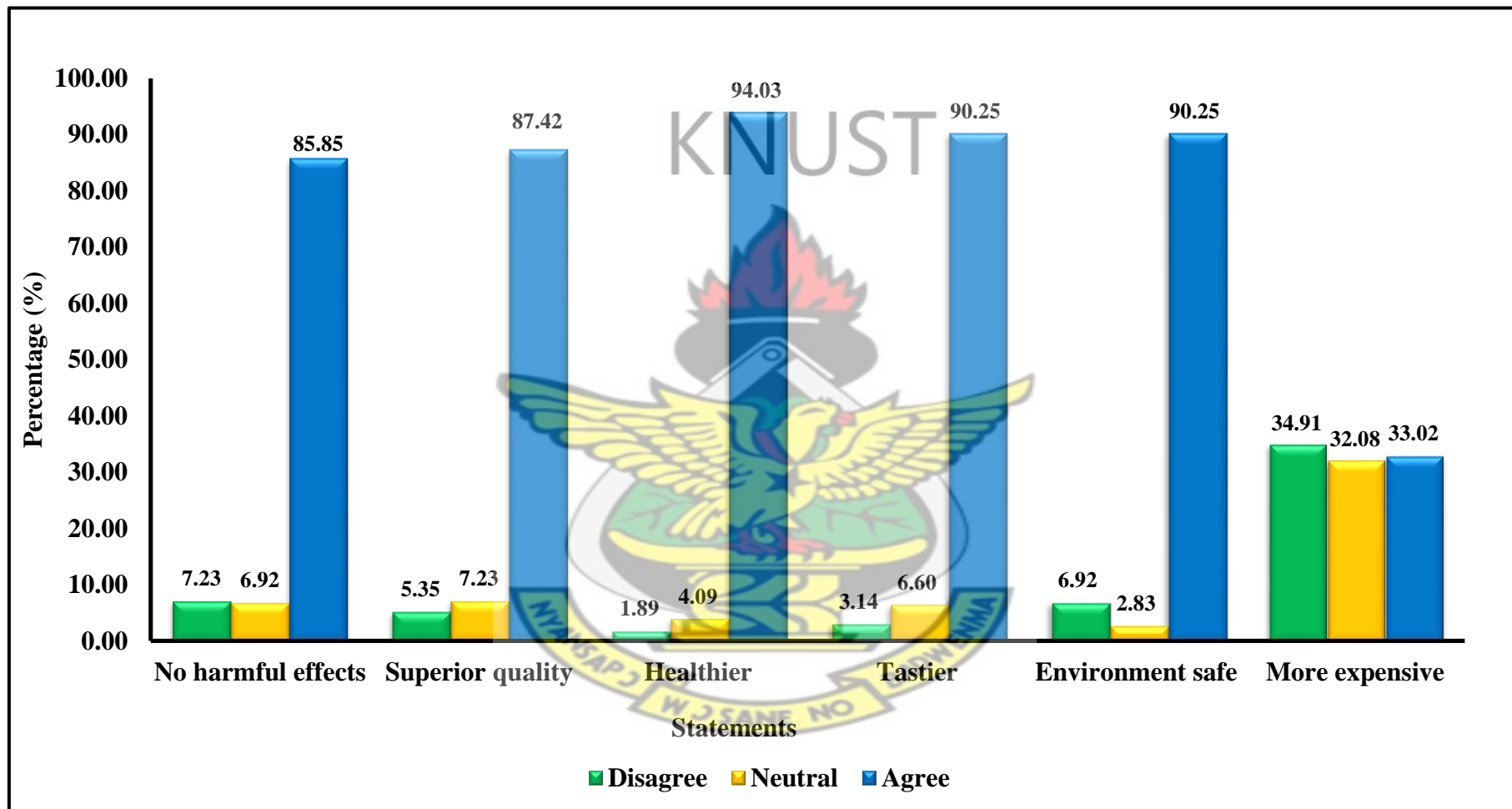


Figure 4.1: Consumers' Perception on Organic Foods

4.6 CHARACTERISTICS CONSUMERS WOULD SEEK WHEN BUYING ORGANIC FRUITS AND VEGETABLES

Consumers' inclination to organic foods is grounded on a common perception that organic foods have more desirable features than conventional alternatives. Besides food safety, human health and environmental considerations as well as other product characteristics such as appearance, nutritive value, freshness and taste effect the preferences of the consumers (Bourn and Prescott, 2002). In this study, the most characteristics consumers looked for when purchasing organic fruits were freshness (88.68%) and colour/ripeness (80.57%) whereas size (64.53%) and hardness (58.68%) were the least characteristics as shown in **Figure 4.2**.

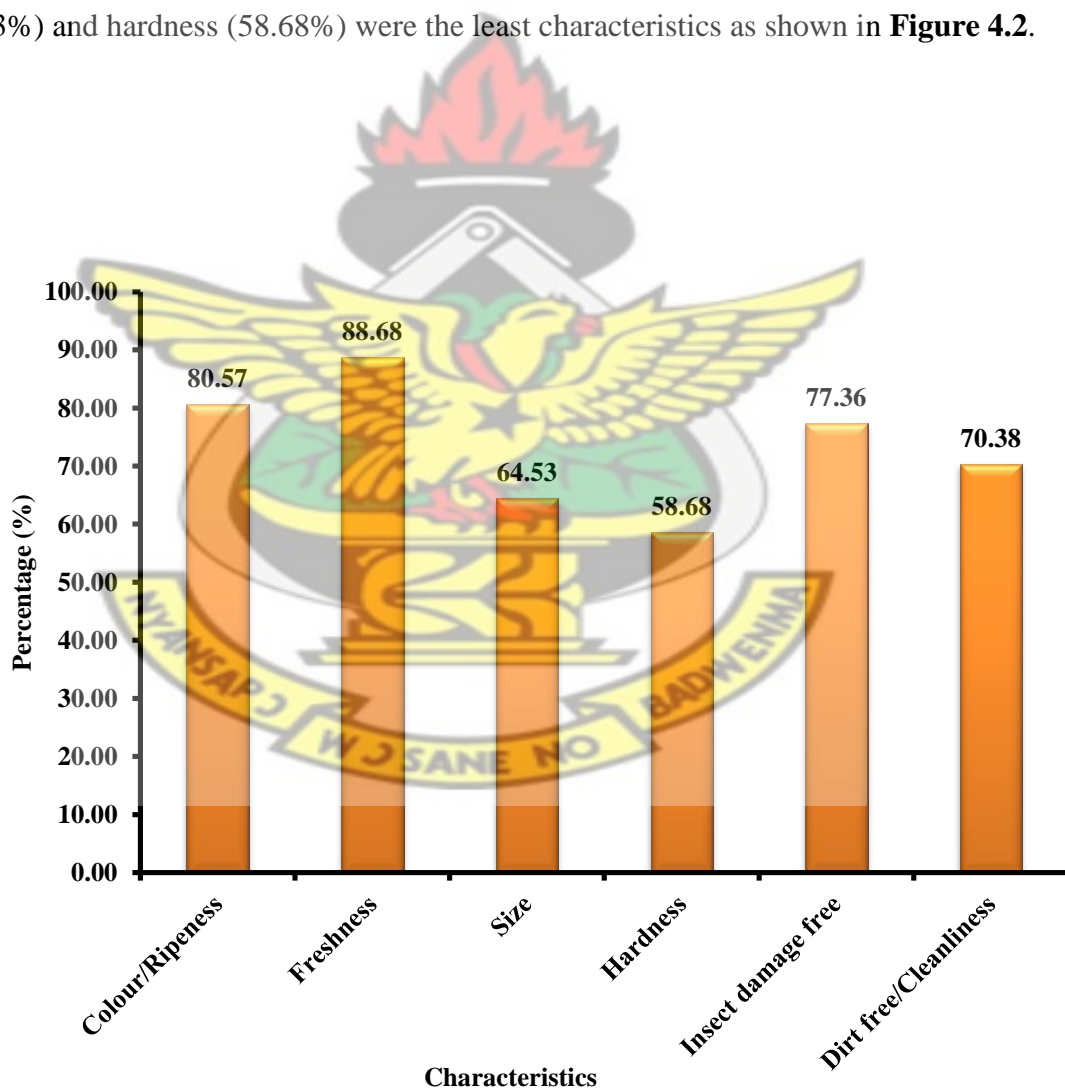


Figure 4.2: Characteristics Consumers would seek when buying Organic Fruits

As shown in **Figure 4.3**, most characteristics consumers would look for when purchasing organic vegetables were freshness (89.81%) and insect damage free (83.77%) whereas size (62.83%) and hardness (61.51) were the least characteristics. The findings of this study is supported by a previous study (Wolf, 2002) which concluded that consumers in California regarded fresh-looking and fresh-tasting grapes as the utmost desirable attribute. Another study (Buzby and Skees, 1994) also concluded that freshness and sensory characteristics were the most important considerations in buying organic foods.

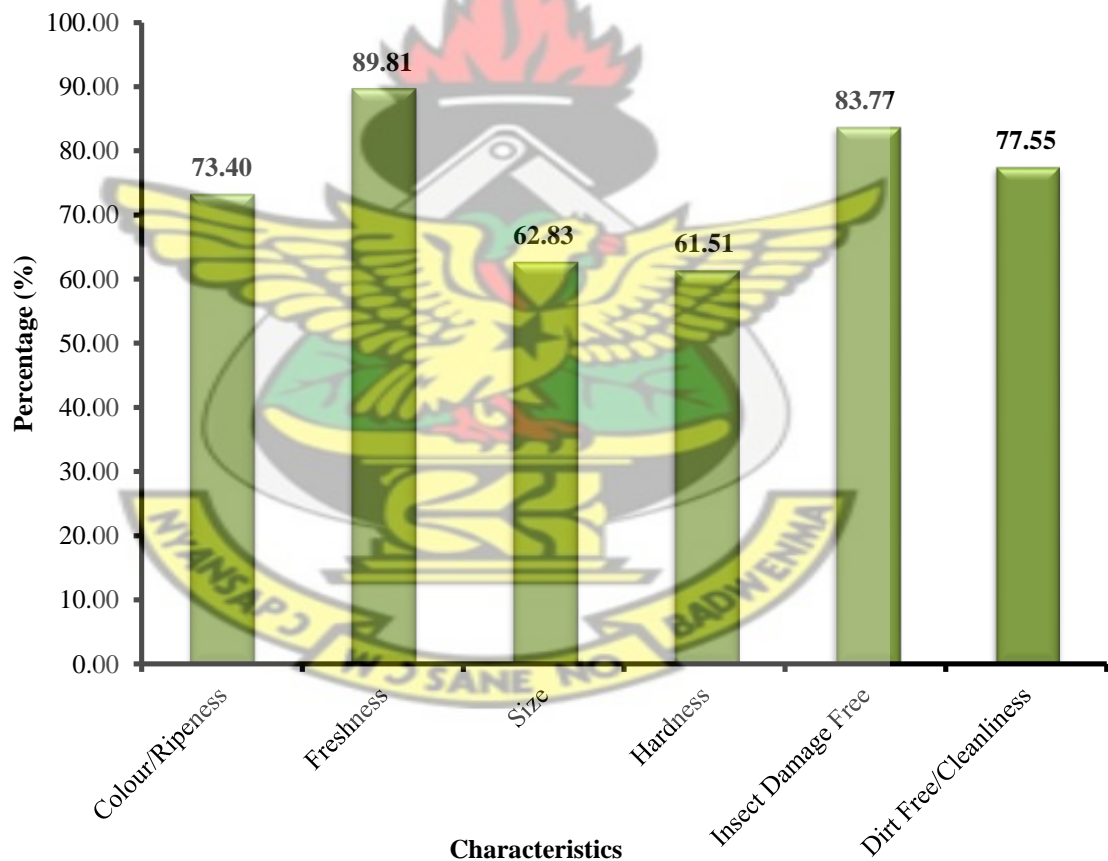


Figure 4.3: Characteristics Consumers would seek when buying Organic Vegetables

4.7 CONSUMERS' PURCHASE FREQUENCY AND EXPENDITURE

The average expenditure on fruits per week was GH¢2.92 with purchase frequency of 1.86 while the average amount spend on vegetables was GH¢3.30 per week with a purchase frequency of 2.34, as shown in **Table 4.5**. Hence, the average annual expenditure on fruits would be GH¢151.84 with purchase frequency of 96.72 and GH¢171.60 for vegetables with purchase frequency of 121.68.

These expenditures are higher than the annual household expenditure of GH¢99.00 for vegetables and GH¢29.00 for fruits in Ghana (GSS, 2008). The observed increases in the household expenditures on fruits and vegetables may be attributed to the current increased in media reportage on the adoption of healthy lifestyle through the consumption of fruits and vegetables. Also, the higher expenditure on vegetables may be as a result of their use in food preparation in most homes in Ghana.

Table 4.5: Consumers' Purchasing Frequency and Expenditure

Variable	Mean purchase per week	Standard Deviation	Mean expenditure (GH¢) per week	Standard Deviation
Fruits				
Water Melon	1.74	1.36	4.23	3.40
Mango	1.85	1.71	2.68	2.36
Pawpaw	1.37	1.30	2.21	2.22
Pineapple	1.68	1.40	3.18	2.95
Orange	2.68	2.07	2.28	2.15
Average	1.86	1.57	2.92	2.62
Vegetables				
Green Pepper	1.77	2.26	2.99	4.11
Carrot	1.65	1.47	2.60	1.82
Cabbage	1.25	1.09	2.47	2.12
Tomato	3.68	2.89	5.10	3.71
Garden Eggs	3.35	3.14	3.34	2.34
Average	2.34	2.17	3.30	2.82

4.8 CONSUMERS' WTP FOR ORGANIC FRUITS AND VEGETABLES

The distribution of respondents' WTP for the selected organic fruits and vegetables are presented in **Figures 4.4** and **4.5** respectively. About 88.68% of the consumers were WTP a premium for water melon, 78.30% of them for mango, 81.13% of them for pawpaw, 77.36% of them for pineapple while 85.85% of them for orange (**Figure 4.4**).

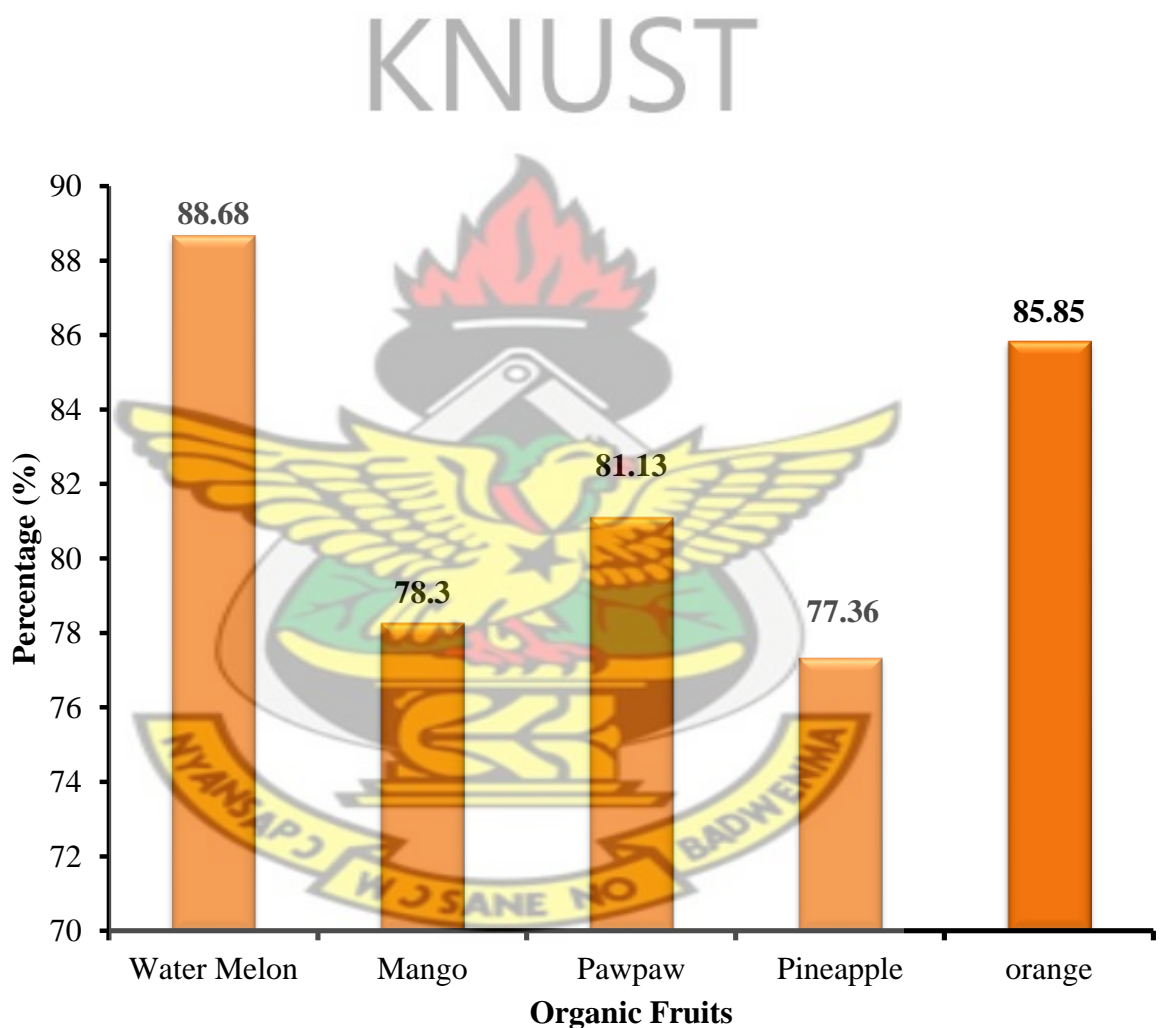


Figure 4.4: Consumers' WTP a Premium for Organic Fruits

Among the vegetables, 85.85% of the consumers were WTP a premium for green pepper, 83.96% of them for carrot, 84.91% of them for cabbage, 87.74% of them for tomato whereas 82.02% of them for garden egg (**Figure 4.5**). These outcomes are in agreement with an earlier study (Cranfield and Magnusson, 2003) which indicated that 82% of consumers were WTP a premium for organically produced fruits and vegetables. Similar findings (Boccaletti and Nardella, 2000) also reported that approximately 89% WTP for pesticides-free fresh vegetables and fruits. Also, Nouhoheflin *et al.* (2004) revealed that 86% of the consumers in Ghana were WTP higher price premium for organic vegetables.

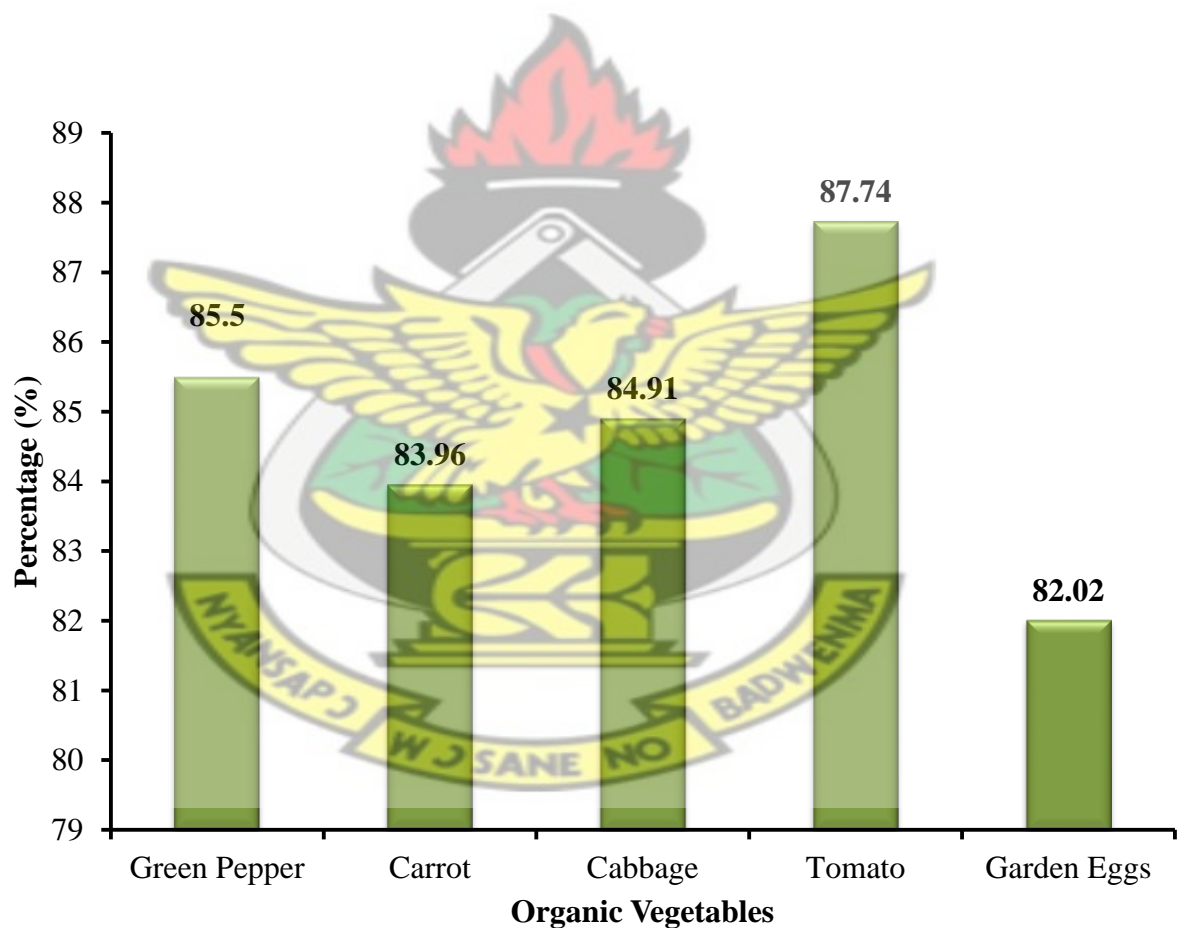


Figure 4.5: Consumers' WTP a Premium for Organic Vegetables

4.9 RESPONDENTS' RESPONSES ON CONSUMERS' WTP

The distribution of responses on consumers' WTP was assessed to provide a fair idea on the number of respondents and percentage premiums they were ready to pay for organic fruits and vegetables.

Table 4.6: Respondents' Responses on WTP for Organic Products

Selected Products	WTP up to 50% premium	WTP 51 to 100% premium	WTP above 100% premium
Fruits			
Water Melon	267 (83.96%)	189 (59.43%)	48 (15.09%)
Mango	234 (73.58%)	158 (49.69%)	44 (13.84%)
Pawpaw	240 (75.47%)	154 (48.43%)	36 (11.32%)
Pineapple	222 (69.81%)	152 (47.80%)	27 (8.49%)
Orange	267 (83.96%)	177 (55.66%)	54 (16.98%)
Vegetables			
Green Pepper	255 (80.19%)	167 (52.52%)	38 (11.95%)
Carrot	261 (82.08%)	174 (54.52%)	45 (14.15%)
Cabbage	246 (77.36%)	168 (52.83%)	38 (11.95%)
Tomato	264 (83.02%)	183 (57.55%)	56 (17.61%)
Garden Eggs	255 (80.19%)	154 (48.43%)	27 (8.49%)

WTP: Willingness to pay

As shown in Table 4.6, respondents exhibited varying WTP percentages. Around 69.81% to 83.96% of respondents indicated that they were WTP up to 50% premium, 47.80% to 59.43% indicated that they were WTP 51% to 100% premium while 8.49% to 16.98% indicated that they were WTP more than 100% premium for organic fruits over the prices of the conventional fruits on the markets.

These findings are similar to a previous findings by Buzby and Skees (1994) in the North America which indicated that most consumers were prepared to pay from 15 to 69 cents above the 50 cents selling price of grape fruit with a lower pesticide residue, and 5% of the

consumers also responded that they would offer more than twice the selling price for a safer grapefruit as compared to a regular fresh grapefruit.

About 77.36% to 83.02% of respondents indicated that they were WTP up to 50% premium, 48.43% to 54.72% indicated that they were WTP 51% to 100% premium whereas 8.49% to 17.61% indicated that they were WTP more than 100% premium for organic vegetables over the prices of the conventional vegetables on the markets, as shown in **Table 4.6**. These findings are supported by a previous study (Goldman and Clancy, 1991) which concluded that consumers were eager to offer a 100% price premium for organic products in general.

4.10 THE WILLINGNESS TO PAY FOR ORGANIC FRUITS AND VEGETABLES WITH REGARDS TO CONSUMERS' CHARACTERISTICS

The logit regression analysis was performed with the consumers' characteristics to determine the significant characteristics that influence consumers' WTP for organic fruits and vegetables. The descriptive information of the features used in the logit regression analysis are shown in **Table 4.7**.

4.10.1 Consumption of Organic Fruits

The empirical findings on WTP for organic fruits are shown in **Table 4.8**. The coefficients of AGE1 were negative and statistically significant at 1% in the willingness to pay model for all the organic fruits. These estimated coefficients put forward that older consumers (≥ 30 yrs) were likely to offer a higher price for the organic fruits than younger ones (< 30 yrs). These empirical findings agree with other studies which showed a negative association between younger consumers and WTP for organic foods (Misra *et al.*, 1991; Loureiro and Hine,

2002). However, the findings from this study contradict with the findings among US consumers (Smith *et al.*, 2008) and Turkish consumers (Akgungor *et al.*, 2007).

Table 4.7: The Variables used in the Regression Analysis

Variables	Definition of variables	Mean	Standard Deviation
Dependent Variables			
WTPFRUIT	WTP higher premium for organic fruit		
WTPVEG	WTP higher premium for organic vegetable		
Independent Variables			
Socio-Demographic Characteristics			
GENDER	Gender of Respondents	0.311	0.46
AGE 1	Respondents below 30 years	0.36	0.48
AGE 2	Respondents from 30 to 50 years	0.55	0.40
AGE 3	Respondents above 50 years	0.09	0.29
EDU	Number of years of formal education	9.00	4.37
MARISTAT	Marital status of respondents	0.68	0.47
EMPMNT	Employment status of respondents	0.80	0.40
HHSIZE	Household size of respondents	4.26	2.27
HHINCOME	Household income per month	814.90	569.70
INCOMELow	Average income below GH¢500	0.29	0.46
INCOMEMIDD	Average income from GH¢500 to GH¢1000	0.40	0.49
INCOMEHIGH	Average income above GH¢1000	0.31	0.46
Awareness Variables			
AWARE	Awareness of organic foods	0.75	0.44
KNOW	Knowledge of chemical residues in chemically grown fruits and vegetables	0.77	0.42
PESTCONCERN	Concern about pesticides residues in chemically grown fruits and vegetables	0.84	0.37
HRISK	Knowledge about health risk associated the consumption of chemically grown fruits and vegetables	0.84	0.37
ECONCERN	Concern that chemicals used in conventional farming affect the environment	0.95	0.21

The coefficients for education (EDU) variable were negative and statistically significant at 1% in the willingness to pay model for all the organic fruits. These experimental findings indicate that consumers who have higher educational levels were less likely to offer more for organic fruits. These findings agree with the studies by Govindasamy and Italia (1998) for

US consumers and Boccaletti and Nardella (2000) for Italian consumers which revealed a negative relationship between education and WTP for organically produced fruits. However, the findings from this study are contrary to studies conducted among South African consumers (Du Toit *et al.*, 2003) and consumers in Turkey (Akgungor *et al.*, 2007) which revealed a positive association between formal education and WTP for organic fruits.

The coefficient of the average household income (INCOME) variable was positive and significant at 10% for pineapple. This suggests that consumers with high income levels were likely to offer a higher price for organic pineapple. This finding agrees with that of Piyasiri *et al.* (2002) for Sri Lankan consumers, and Arbindra and Wanki (2005) for US consumers.

The coefficients of the marital status (MARISTAT) variable were positive and significant at 5% for water melon, mango and pawpaw. This indicates that respondents who were married were more likely to pay more for water melon, mango and pawpaw. The coefficients of the employment status (EMPMNT) variable were negative and significant for mango, pawpaw and orange. This indicates that consumers who were employed were less likely to pay more for organic fruits.

The awareness variables like AWARE, KNOW, PESTCONCERN, HRISK and ECONCERN which were investigated in the WTP models were all statistically significant. The variable AWARE representing the degree of awareness of organic foods carried a negative coefficient for WTP for mango and significant at 10%. The results indicate that the consumers who were conscious of organic foods were less likely to offer more for organic mango. It may be that these consumers may not believe there is a distinction in quality between conventional and organic produce. This finding in this study is contrary to the study (Govindasamy *et al.*, 2006) for US consumers who find a positive association between awareness and WTP a premium.

Table 4.8: Logit Estimates on Consumers' WTP for Organic Fruits

Variables	Mango	Water Melon	Pawpaw	Pineapple	Orange
CONSTANT	1.339*** (0.000)	1.419*** (0.000)	1.280*** (0.000)	1.105*** (0.000)	1.358*** (0.000)
Demographic Characteristics					
GEND	-0.0624 (0.234)	0.0486 (0.302)	-0.0233 (0.657)	0.0471 (0.278)	-0.0894 (0.106)
AGE 1	-0.3339*** (0.000)	-0.2713*** (0.000)	-0.3065*** (0.000)	-0.1806*** (0.005)	-0.2270*** (0.006)
AGE 2	-0.0889 (0.223)	-0.0519 (0.427)	-0.0839 (0.250)	-0.0065 (0.915)	-0.1023 (0.183)
EDU	-0.01882*** (0.000)	-0.01827*** (0.000)	-0.01634*** (0.002)	-0.02288*** (0.000)	-0.01668*** (0.002)
MARISTAT	0.1447** (0.011)	0.1059** (0.038)	0.1424** (0.013)	-0.0390 (0.406)	0.0683 (0.253)
EMPMNT	-0.1059* (0.069)	-0.0598 (0.251)	-0.1132* (0.052)	0.0408 (0.395)	-0.1764*** (0.004)
HHSIZ	0.0127 (0.294)	-0.0028 (0.797)	-0.0005 (0.964)	0.0118 (0.241)	0.0033 (0.799)
INCOME	-0.000063 (0.455)	-0.000026 (0.733)	-0.000015 (0.862)	0.000133* (0.057)	-0.000048 (0.591)
INCOMELow	-0.032 (0.793)	-0.069 (0.533)	-0.011 (0.931)	0.162 (0.112)	-0.133 (0.305)
NCOMEMIDD	-0.0737 (0.365)	-0.0968 (0.185)	0.0025 (0.976)	0.0507 (0.452)	-0.0234 (0.785)
Awareness Variables					
AWARE	-0.0959* (0.060)	-0.0424 (0.353)	-0.0177 (0.728)	0.0418 (0.321)	-0.0551 (0.304)
KNOW	0.1944*** (0.006)	0.0166 (0.791)	0.0812 (0.247)	-0.1613*** (0.006)	0.0236 (0.749)
PESTCONCERN	-0.0055 (0.928)	-0.1483*** (0.007)	0.0080 (0.895)	-0.0658 (0.189)	0.1979*** (0.002)
HRISK	0.0342 (0.654)	0.0747 (0.275)	-0.0040 (0.958)	0.1824*** (0.004)	0.1012 (0.208)
ECONCERN	-0.303*** (0.004)	-0.1444 (0.122)	-0.211** (0.043)	-0.2047** (0.018)	-0.336*** (0.002)

Note: *** = indicates significant at 1%

** = indicates significant at 5%

* = indicates significant at 10%

Figures in parentheses are p-values

The coefficient of PESTCONCERN was significant at 1% and positive for orange. This empirical finding confirm the hypothesis that the probability to offer a higher price premium for organic fruits increases with increased consumer concerns for the use of inorganic pesticides in fruits production, thus confirming what Misra *et al.* (1991) found for US fruits

consumers. Health risk concerns associated with consumption of chemically produced fruits was positively associated with the WTP for pineapples. The positive sign of the HRISK indicates that the consumers with health risk concern were more likely to be ready to offer a premium for organic fruits.

The coefficients of the environmental concern (ECONCERN) variable were negative and significant at for mango, pawpaw, orange and pineapple. This indicates that the consumers with environmental concerns were likely to pay less for organic mango, pawpaw, orange and pineapple. Knowledge of chemical residues (KNOW) associated with consumption of chemically produced fruits was positively correlated to the WTP for organic mangoes. The positive sign indicates that the consumers with knowledge of chemical residues in conventional fruits were likely to be eager to pay more for the organic type.

4.10.2 Consumption of Organic Vegetables

The empirical results on WTP for organic vegetables are shown in **Table 4.9**. The coefficients of AGE1 were statistically significant at 1% and positive in the WTP analysis for carrots, cabbage and garden eggs, and 10% for tomatoes. These estimated coefficients suggest that young consumers (less than 30 years) as compared to middle aged (from 30 to 50 years) and older consumers (older than 50) were more WTP for organic carrots, cabbage, garden eggs and tomatoes. These findings in are in agreement among US consumers (Smith *et al.*, 2008) but in disparity with a study (Misra *et al.*, 1991) which showed a negative association between younger consumers and the WTP a premium for organic products.

Table 4.9: Logit Estimates on Consumers' WTP for Organic Vegetables

Variable	Green Pepper	Carrot	Cabbage	Tomato	Garden Eggs
CONSTANT	1.191*** (0.000)	1.184*** (0.000)	0.985*** (0.000)	0.795*** (0.000)	0.882*** (0.000)
Demographic Characteristics					
GEND	-0.0145 (0.766)	-0.0101 (0.844)	0.0408 (0.404)	-0.0836* (0.063)	0.0190 (0.703)
AGE 1	0.0976 (0.177)	0.2053*** (0.007)	0.2360*** (0.001)	0.1118* (0.092)	0.1983*** (0.007)
AGE 2	0.0705 (0.298)	0.0516 (0.469)	0.0254 (0.708)	0.0681 (0.274)	0.0826 (0.233)
EDU	-0.01578*** (0.001)	-0.01841*** (0.000)	-0.01706*** (0.000)	-0.01650*** (0.000)	-0.01515*** (0.002)
MARISTAT	0.0247 (0.640)	-0.0167 (0.763)	0.0014 (0.978)	0.0780 (0.109)	0.0457 (0.397)
EMPMNT	-0.1890*** (0.001)	-0.0048 (0.933)	-0.0831 (0.125)	-0.0420 (0.397)	-0.0426 (0.441)
HHSIZE	-0.0012 (0.916)	0.0174 (0.143)	0.0155 (0.170)	0.0034 (0.744)	0.0069 (0.548)
INCOME	0.000031 (0.695)	-0.000134 (0.104)	0.000057 (0.468)	0.000105 (0.145)	0.000002 (0.977)
INCOMELow	-0.099 (0.389)	-0.172 (0.155)	0.042 (0.711)	0.173 (0.101)	0.066 (0.573)
NCOMEMIDD	-0.0178 (0.814)	-0.2024** (0.011)	-0.0483 (0.524)	0.1186 (0.089)	0.0792 (0.306)
Awareness Variables					
AWARE	-0.0776 (0.102)	-0.0818 (0.101)	-0.0780 (0.100)	0.0601 (0.167)	-0.0885 (0.068)
KNOW	0.1280* (0.050)	-0.0298 (0.664)	0.0028 (0.966)	0.0533 (0.373)	0.1020 (0.126)
PESTCONCERN	-0.0272 (0.630)	0.0436 (0.462)	-0.0850 (0.132)	0.0153 (0.767)	-0.1077* (0.062)
HRISK	0.0967 (0.173)	0.1275* (0.088)	0.1307* (0.066)	0.1388** (0.034)	0.2723*** (0.000)
ECONCERN	-0.2401** (0.013)	-0.220** (0.032)	-0.1891* (0.051)	-0.2914*** (0.001)	-0.3324*** (0.001)

Note: *** = indicates significant at 1%

** = indicates significant at 5%

* = indicates significant at 10%

Figures in parentheses are p-values

The coefficients of education (EDU) variable were negative and statistically significant at 1% in the WTP analysis for all the organic vegetables. These findings indicate that consumers who have higher educational levels were less likely to offer higher prices for organic

vegetables. These findings in this study are contrary to Piyasiri *et al.* (2002) who concluded that highly educated consumers are more ready to offer a premium for organically produced vegetables.

The awareness variables like, PESTCONCERN, KNOW, HRISK and ECONCERN which were investigated in the WTP models were all statistically significant. The variable KNOW representing the knowledge of chemical residues associated with the consumption of chemically produced vegetables carried a positive coefficient for WTP for green pepper at 10%. The results indicate that consumers who have knowledge of chemical residues associated with the consumption of chemically produced vegetables were likely to offer more for organic green pepper. The finding in this study agreed with a previous study among US consumers (Govindasamy *et al.*, 2006).

The coefficient of PESTCONCERN was negative and this empirical finding refute the hypothesis that the probability to pay higher price premium for vegetables increases with increased consumer concerns for the use of inorganic pesticides in vegetable production. This finding is contrary to the studies of Misra *et al.* (1991) for US vegetable consumers, and Boccaletti and Moro (2000) for Italian vegetable consumers.

Health risk concerns (HRISK) associated with consumption of chemically produced vegetables was positively associated with the WTP for carrots, cabbage, tomatoes and garden eggs. The positive sign of the HRISK indicates that respondents with health risk concerns were likely to offer more for organic vegetables. These empirical findings agree with Nouhoheflin *et al.* (2004) who found a significant positive relationship between health risk and WTP for organic vegetables.

4.11 ESTIMATION OF MARKET POTENTIAL

The number of possible buyers is at least the consumers in Techiman, therefore the number of possible buyers will be 67,241. It was assumed that at any purchase, the consumer buy at least 0.5kg of the product. As shown in **Table 4.10**, the total market size for organic fruits and vegetables were estimated at about GH¢3,514,383,194.70 and GH¢5,341,348,087.50 respectively. The market potential of GH¢1,305,901,555.00 for orange was the highest amongst the organic fruits investigated. Pawpaw on the other hand, had the minimum estimated market size of GH¢255,942,995.50. For the organic vegetables, tomatoes had the largest market potential of GH¢2,462,274,618.00 with cabbage having the minimum estimated market size of GH¢284,093,225.00.

Table 4.10: Empirical Estimation of the Market Potential

Product	Number of possible buyers	Average premium WTP(GH¢)	Purchasing rate per year	Purchasing quantity (Kg) per year	Market potential (GH¢)
Fruits					
Water Melon	67,241	2.00	90.48	45.24	550,477,214.70
Mango	67,241	1.50	96.20	48.10	466,708,350.00
Pawpaw	67,241	1.50	71.24	35.62	255,942,995.50
Pineapple	67,241	1.50	87.36	43.68	384,875,864.80
Orange	67,241	2.00	139.36	69.68	1,305,901,555.00
Total					3,514,383,194.70
Vegetables					
Green Pepper	67,241	2.00	92.04	46.02	569,622,825.30
Carrot	67,241	2.00	85.80	42.90	495,004,035.20
Cabbage	67,241	2.00	65.00	32.50	284,093,225.00
Tomato	67,241	2.00	191.36	95.68	2,462,274,618.00
Garden Eggs	67,241	1.50	174.20	87.10	1,530,353,384.00
Total					5,341,348,087.50

WTP: Willingness to pay

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 GENERAL CONCLUSION

From this study, it can be concluded that most consumers are aware of organic foods in the Techiman Market of Ghana and they became aware generally through the radio and school/books. The main factor that influence consumers to purchase organic foods is based on health grounds and they generally preferred buying organic fruits and vegetables directly from farmers or market retailers. The consumers indicated that organic fruits and vegetables should be labelled or sold in designated organic markets or stores.

Most of the consumers acknowledged that they are aware of the health risks associated with chemically grown fruits and vegetables. However, there were misconceptions among consumers about the types of health risks such as blood pressure, heart attack, typhoid and diabetes associated with conventional fruits and vegetables production. Also, the consumers were generally aware of the effects of synthetic chemicals on the environment with all forms of pollutions being the main environmental effects. The consumers exhibited positive perception on organic fruits and vegetables with regards to benefits, quality, cost and environmental risks as compared to the conventionally produced fruits and vegetables.

The most characteristics consumers would seek when purchasing organic fruits and vegetables were freshness, insect damage free and colour/ripeness while size and hardness would be the least characteristics. The study found that there is a giant market size for organically produced vegetables and fruits in the Techiman Market.

Based on the results, out of an average household monthly income of GH¢814.90, consumers spend an average expenditure of GH¢11.68 on fruits and GH¢13.20 on vegetables per month. The most organic fruits and vegetables consumers were prepared to pay higher prices for were water melon, orange, tomatoes, green pepper with pineapple and garden eggs being the least. Almost all the consumers were ready to offer up to 50% premium for the organic fruits and vegetables.

Some of socio-demographic factors such as marital status, age and income significantly influence consumers' preparedness to offer higher prices for organic fruits and vegetables. Awareness variables such as knowledge of chemical residues in chemically grown fruits and vegetables and its associated health risk significantly influence consumers' readiness to pay higher prices for organic fruits and vegetables.

5.2 RECOMMENDATIONS

In this study, some of the characteristics tested in the willingness to pay analysis were not statistically significant probably due to the sample size. To address this statistical limitation, future studies should consider a larger sample size in order to increase the degree of freedom. Also, further studies should be replicated in other municipalities in the Brong Ahafo Region to determine the overall market size and consumers' preparedness to pay higher prices for organic fruits and vegetables in the region.

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APPENDIX



**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND
TECHNOLOGY, KUMASI**

DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY



**RESEARCH TOPIC:
ASSESSING CONSUMER AWARENESS AND MARKETING PROSPECTS
OF ORGANIC FRUITS AND VEGETABLES**

QUESTIONNAIRE

Serial Number: _____

Dear respondent, you have been humbly selected to provide me with some information regarding **consumers awareness and marketing prospects of organic fruits and vegetables**.

This can be done by checking or writing the appropriate answer (s). I assure you that the information you provide will be strictly confidential and would be handled with due care.

Your corporation in this regard would be fully appreciated.

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS

1.1 Gender of respondent:

☐ Male

☐ Female

1.2 Age of respondent:

☐ Below 20 years

☐ 20 - 29 years

☐ 30 - 39 years

☐ 40 - 49 years

☐ 50 - 59 years

☐ 60 years and above

1.3 Educational level of respondent:

☐ Primary Education

☐ Junior High Education

☐ Senior High Education

☐ Tertiary Education

Others (specify) _____

1.4 Nationality: _____

1.5 Marital status:

☐ Married

☐ Single

☐ Divorced

Other (specify) _____

1.6 Occupation of respondent: _____

1.7 Respondent average income/month: GH¢ _____

1.8 Spouse occupation: _____

1.9 Spouse average income/month: GH¢ _____

1.10 Household size (specify the number): _____

SECTION B: GENERAL QUESTIONS ABOUT PURCHASE OF ORGANIC FOODS

2.1 Have you ever heard of the term-organic foods?

☐ Yes

☐ No (if "No" go to question 2.4)

2.2 If "Yes", where/how did you hear it?

☐ Radio

☐ Newspapers

☐ Television

☐ Friends/family members

Others (specify) _____

2.3 Could you provide a definition of the term-organic foods?

2.4 What characteristics would you look for in buying organic fruits?

(1) Colour/ripeness (2) Freshness (3) Size (4) Hardness (5) Insect damage free
(6) Dirt free/cleanliness

Water Melon:

Other (specify) _____

Mango:

Other (specify) _____

Pawpaw:

Other (specify) _____

Pineapple:

Other (specify) _____

Orange: Other (specify) _____

2.5 What characteristics would you look for in buying organic vegetables?

(1) Colour/ripeness (2) Freshness (3) Size (4) Hardness (5) Insect damage free (6) Dirt free/cleanliness
Green Pepper: Other (specify) _____
Carrot: Other (specify) _____
Cabbage : Other (specify) _____
Tomato: Other (specify) _____
Garden eggs: Other (specify) _____

2.6 Where would you like to purchase your organic food products?

- ☐ Farm gate
☐ Market retailers
☐ Street hawkers
☐ Supermarkets
 Others (specify) _____

2.7 Why do you purchase organic fruits and vegetables? Because it will be:

- ☐ Healthier
☐ Safer
☐ Taste better
☐ Better for the environment
 Other (specify) _____

2.8 Do you have any knowledge of chemical residues in fruits and vegetables you consume?

- ☐ Yes
☐ No

2.9 Do you know any health risks (diseases) associated with the consumption of chemically grown fruits and vegetables?

- ☐ Yes
☐ No

2.10 If yes, can you mention some of the health risks (diseases)? _____

SECTION C: MARKET POTENTIAL

3.1 List the purchased frequency and average amount spent per purchase for the fruits and vegetables below.

Products	Number of times purchase/week	Average amount spent/purchase (GH¢)
Water Melon		
Mango		
Pawpaw		
Pineapple		
Orange		
Green Pepper		
Carrot		
Cabbage		
Tomato		
Garden eggs		

SECTION D: CONSUMER ATTITUDE AND PERCEPTION ON ORGANIC FRUITS AND VEGETABLES

4.1 How often would you purchase organically grown fruits and vegetables:

- ☐ Always (every time)
- ☐ Frequently (on many occasions)
- ☐ Sometimes (on some occasions)
- ☐ Very seldom (almost never)
- ☐ Never

4.2 Do you think the use of synthetic chemical in agriculture has effect on the environment?

- ☐ Yes
- ☐ No

4.3 What effects as a consumer do you think synthetic chemicals have on the environment?

4.4 Do you think there is a pesticide/chemical residue in your fruits and vegetable products?

- ☐ Yes
- ☐ No

4.5 Give reason(s) for your answer above. _____

4.6 Researches have found out that organic products possess the following characteristics compared to conventional products. I would like to get your opinion from the levels below

	Strongly Disagree	Disagree	Somewhat	Agree	Strongly Agree
a). Production of organic products make the environment safe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b). Organic products are healthier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c). Organic products are tastier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d). Organic products have no harmful effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e). Organic products have superior quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f). Organic products are more expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.7 In your opinion, how would you like organic products to be differentiated from conventional?

☐ Labelling

☐ Selling in special markets/stores

☐ Others (specify) _____

SECTION E: WILLINGNESS TO PAY

5.1 Willingness to pay a premium for organic fruits and vegetables

Products	If the price for a quantity of the conventional type is GH¢1.00, would you pay more for the organic type of the same quantity?		If "Yes", would you be willing to pay:						If "No", would you be willing to pay GH¢1.00?	
	Yes	No	GH¢1.50		GH¢2.00		GH¢2.50		Yes	No
			Yes	No	Yes	No	Yes	No		
Water Melon										
Mango										
Pawpaw										
Pineapple										
Orange										
Green Pepper										
Carrot										
Cabbage										
Tomato										
Garden eggs										

5.2 Would you be willing to pay a higher premium for any organic vegetables of interest?

☐ Yes

☐ No

5.3 Would you be willing to pay a higher premium for any organic fruits of interest?

☐ Yes

☐ No

THANK YOU