AN EMPIRICAL ANALYSIS OF CONSUMERS PURCHASING BEHAVIOUR TOWARDS ORGANIC PRODUCTS IN THAILAND

A thesis
submitted in partial fulfilment
of the requirements for the Degree of
Doctor of Philosophy in Agricultural Economics

at
Lincoln University
by
Yaowarat Sriwaranun

Lincoln University
2011

Abstract of a thesis submitted in partial fulfilment of the
requirements for the Degree of Doctor of Philosophy in Agricultural Economics

An Empirical Analysis of Consumers Purchasing Behaviour towards Organic Products in Thailand

by
Yaowarat Sriwaranun

In recent decades, the market for organic products has grown tremendously throughout the world, derived from an awareness of environmental problems and concerns about the health and food safety of modern agricultural practices. Despite Thailand's increases in organic production and consumption, the growth is still small and in the early phase of the development. The information about consumers' purchasing behaviour towards organic products is not well researched in Thailand.

This study investigates the important factors in consumers' decisions to purchase organic products (such as vegetables and rice). In addition, this study aimed to estimate the mean willingness to pay (WTP) for organic products (such as Chinese kale, jasmine rice and pork) and assessed the important factors affecting the consumers' WTP a price premium for organic products. A self-administered questionnaire was used to collect the data at five retail stores in Bangkok and metropolitan area. The survey data were analysed using exploratory factor analysis, logistic regression and double-bounded contingent valuation method.

The results show that some respondents have been purchasing organic products but few purchased organic products on a regular basis. Respondents are more likely to purchase organic products if they are female, highly-educated, in middle-age, had knowledge about organic products, often purchase groceries at natural/health food store, concern about health and food safety, and perceive the benefits of organic products associated with quality, health and environmental friendly attributes. However, the respondents who are concern with the high price and limited availability and information about organic products are less likely to purchase organic products. The results of the WTP estimates suggest that respondents are

willing to pay a premium price of 88%, 51% and 51% for organic Chinese kale, organic jasmine rice and organic pork, respectively. In addition, the respondents are willing to pay a premium price for organic products if they have experience in purchasing organic products, have good health, ethical and environmental concerns, perceive the quality and health benefits of organic products and resided in the city. On the other hand, respondents with children in the household are less likely to pay a premium price for organic products.

Keywords: Contingent valuation, logistic regression, organic products, purchase decision, Thailand, willingness to pay.

Acknowledgements

Completing this thesis would not have been possible without the essential and gracious support of the following persons and organizations:

First and foremost, I wish to express my highest appreciation to my supervisors Assoc. Prof. Dr. Christopher Gan and Dr. Minsoo Lee, my principal supervisor and associate supervisor, respectively, for their endless patience, support, encouragement and invaluable advice throughout this journey of challenge and fulfillment.

It is inportant that I emphasize this study would not have been possible without the funding by Khon Kaen University (KKU) and the Office of International Agriculture (OIA). I hereby give my sincere thanks to both organizations. I wish to extend my sincere gratitude to Assoc. Prof. Ausanee Pajeenburawan, Assoc. Prof. Yupa Hanboonsong, Mr. Weera Pakuthai and Assoc. Prof. Paitoon Kachamart for their supportive encouragement to my study at Lincoln University and inspire me along this path.

I also express my appreciation to Assist. Prof. Wisith Limsombunchai and Dr. Chuthaporn Vanit-Anunchai for their constructive advice and assistance with the study's methodology. Appreciation is expressed to all the surveyed supermarkets and stores for allowing me to collect the data. Further , I would like to thank Mrs. Nutchasita Sungkhasopon and Ms. Uri Krankhemdee in assisting me during data collection.

I would like to express my sincere gratitude to Anuwat, Satit, Sajee and Patcharee, Nichamat, Phil and Macy, members of Lincoln University Thai Club and staff at the department of agricultural economics (KKU) for their cheerful moments and support that helped me to overcome many obstacles.

I am thankful to staff in the Faculty of Commerce, Lincoln University, for their assistence in many ways. Special thanks also go to Penny, Yen, Dessy, Chandra, Xin, Emma, Parveen and all fellow graduate students of the faculty for sharing opinions and good times together throughout the length of my study.

My special sincere gratitude goes to my family (my sister, brothers, aunties and uncles) for their unconditional love, constant support and encouraging words. They have given me unlimited encouragement to pursue my academic goals. This thesis is dedicated to the memory of my mother and father.

Table of Contents

Acknowledgements ..... **iv**

Table of Contents ..... **v**

List of Tables ..... **vii**

List of Figures ..... **ix**

Chapter 1 Introduction **1**

1.1 World demand and supply for organic products 1
1.2 Organic products in Thailand 2
1.2.1 Development of organic farming 2
1.2.2 Production of organic products 4
1.2.3 Organic standards and certification 6
1.2.4 Consumption and market of organic products in Thailand 7
1.3 Research problem statement 10
1.4 Research objective 11
1.5 Contributions of the research 11
1.6 Outline of the research 12

Chapter 2 Literature Review **13**

2.1 Definition of organic farming and organic products 13
2.1.1 International definition of organic farming and organic products 13
2.1.2 Definition of organic farming and organic standards in Thailand 16
2.2 Models of consumer behaviour and consumer decision-making processes 18
2.2.1 Consumer decision-making processes towards food products 18
2.2.2 Empirical studies on consumer behaviour for organic products 20
2.2.3 A proposed model of consumers' purchase decisions and consumers' willingness to pay for organic products 35

Chapter 3 Research methodology **43**

3.1 Economic consumer theory 43
3.1.1 Theoretical framework for consumer choice 43
3.1.2 The theoretical framework of consumers' willingness to pay 47
3.2 Research design 56
3.2.1 Instrumentation 57
3.2.2 Data Collection 64
3.2.3 Data analysis 66
3.2.4 The empirical implementation (economic models) 78

Chapter 4 Descriptive Statistics and Factor Analysis – Results and Discussion **82**

4.1 The number of respondents and the response rates 82
4.2 Socio-demographic profiles of the respondents 83
4.3 Food purchasing behaviour 87
4.3.1 Households' food preparation and shopping patterns 87
4.3.2 Food attributes/characteristics 90
4.3.3 Respondents' attitudes towards health, food safety, ethics and the environment 92
4.3.4 Perception of organic products 95
4.3.5 Knowledge of organic and other credence products 98

4.4 Organic product purchasing behaviour 99
4.4.1 Purchasing organic vegetables 104
4.4.2 Purchasing organic rice products 105
4.4.3 Purchasing organic meat products 106
4.5 Factor analysis 112
4.5.1 Attitude towards health, food safety, ethics and environment 112
4.5.2 Perception of organic products 114
4.5.3 Summary 116

Chapter 5 Purchasing Behaviour and Willingness to Pay - Results and Discussion 118

5.1 Empirical models of consumers' purchase decisions towards organic products 118
5.1.1 Empirical model: purchase and regularly purchase organic products 121
5.1.2 Empirical model: purchase and regularly purchase organic vegetables 128
5.1.3 Empirical model: purchase and regularly purchase organic rice 131
5.2 Empirical models of consumers' willingness to pay for organic products 137
5.2.1 Respondents' responses to the double-bounded dichotomous choice 137
5.2.2 Specification of the probability distribution functions in the double-bounded contingent valuation method 139
5.2.3 Willingness to pay premium for the three specified organic products 142
5.2.4 Consumers' WTP for organic products 146
5.3 Summary 154

Chapter 6 Conclusions and Implications 155

6.1 Summary and empirical findings 155
6.1.1 Summary and major findings 155
6.2 Implications of the study findings 165
6.2.1 Academic Implications 165
6.2.2 Practical implications 166
6.3 Limitations of the study 171
6.4 Recommendations for future study 173

Reference 176

Appendix A The Survey Questionnaire 188

Appendix B Descriptive Analysis 202

B.1 General attitudes related to health, food safety, ethics and environment 202
B.2 Perception towards organic products 203
B.3 Knowledge of organic and other credence products 204
B.4 The important of product attributes when purchasing vegetables, rice and meat 205

Appendix C Factor Analysis 206

C.1 Correlation Matrix of consumers' general attitudes 206
C.2 Correlation Matrix of consumers' perception 208

Appendix D Logistic Regression 210

D.1 Correlation matrix and collinearity diagnostics 210
D.2 Collinearity Diagnostics for independent variables in the estimated models 213

List of Tables

Table 1.1 Organic agricultural land areas in Thailand, 1998-2005 5

Table 1.2 Organic production and market value in Thailand, 2003-2005 8

Table 1.3 Marketing channels of organic products and other green products in Thailand 9

Table 2.1 Organic standards, certifications and product labels created by different countries 16

Table 2.2 Summary of the key findings from studies on consumers' purchase behaviour towards organic products 38

Table 2.3 Summary of key findings from existing studies on consumers' willingness to pay a premium for organic products 41

Table 3.1 Relationship between Compensating variation, Equivalent variation, Willingness to pay and Willingness to accept 49

Table 3.2 Types of WTP questions and the data collected using Contingent Valuation surveys 55

Table 3.3 Three highest frequencies of responded WTP amounts from the pre-test survey. 62

Table 3.4 Dichotomous choice questionnaire for eliciting a consumer's WTP 62

Table 3.5 Selected Bangkok and metropolitan area food stores for the survey 65

Table 3.6 Guidelines for Identifying Significant Factor Loadings 68

Table 3.7 WTP ranges of the double-bounded dichotomous choice model 78

Table 3.8 Description and hypothesized signs of variables for consumers' purchase decisions and willingness to pay for organic products models 80

Table 4.1 Number of the respondents (classified by questionnaire versions and survey places) for a use of organic products survey 83

Table 4.2 Socio-demographic profile of respondents to a survey on the purchase of organic products 86

Table 4.3 Food preparation and food purchasing behaviour of respondents 89

Table 4.4 Respondents' ranking of food product attributes when purchasing food products 91

Table 4.5 Respondents' attitudes towards health, food safety, ethics and environment 94

Table 4.6 Respondents' perceptions of organically grown products 97

Table 4.7 Respondents' knowledge of and sources of information about organic and other credence products 99

Table 4.8 Respondents purchasing behaviour towards organic products 102

Table 4.9 Respondents proportion of expenditure on organic products compared with the total expenditure in each product category 103

Table 4.10 Respondents' reasons for not purchasing organic products 104

Table 4.11 Respondents view about important vegetable attributes when purchasing vegetables 107

Table 4.12 Respondents' purchasing behaviour towards organic vegetables 108
Table 4.13 Respondents view about important rice attributes when purchasing rice 109
Table 4.14 Respondents' purchasing behaviour towards organic rice 110
Table 4.15 Respondents view about important meat attributes when purchasing meat..... 111
Table 4.16 Rotated component matrix for the respondents' general attitudes related to health, food safety, ethics and environment 115
Table 4.17 Rotated component matrix for the respondents' perceptions of organic products 116
Table 5.1 Number of observations for the dependent variables used in Model 1 (purchase organic products) and Model 2 (purchase organic products on a regular basis) . 119
Table 5.2 Descriptive statistics for dependent and independent variables 120
Table 5.3 Estimated model for consumers' purchase decisions towards organic products (Model 1 and Model 2)..... 127
Table 5.4 Estimated model for consumers' purchase decisions towards organic products (Model 1 and Model 2)..... 134
Table 5.5 Estimated model for consumers' purchase decisions towards organic vegetables (Model 1 and Model 2)..... 135
Table 5.6 Estimated model for consumers' purchase decisions towards organic rice (Model 1 and Model 2)..... 136
Table 5.7 Distribution of willingness to pay responses for the double-bounded dichotomous choice 138
Table 5.8 Values of log-likelihood function by Log-normal, Log-logistic and Weibull probability distributions..... 141
Table 5.9 Coefficients of the double-bounded dichotomous choice model for organic Chinese kale, organic jasmine rice and organic pork 141
Table 5.10 Percentages of the anchoring between the maximum WTP and the lower bound in the second bid in the Model 3 (min, max2)..... 142
Table 5.11 Percentage of consumes' willingness to pay a price premium for organic products 143
Table 5.12 Estimates for consumers' willingness to pay for organic Chinese kale, jasmine rice and pork 145
Table 5.13 Retail prices for organic Chinese kale, jasmine rice and pork[1] 145
Table 5.14 Estimated model for consumers' willingness to pay for organic Chinese kale.. 150
Table 5.15 Estimated model for consumers' willingness to pay for organic jasmine rice.... 151
Table 5.16 Estimated model for consumers' willingness to pay for organic pork 153
Table 6.1 Summary of the significant factors affecting consumers' purchase decisions and consumers' willingness to pay for organic products 164

List of Figures

Figure 2.1 Categories of agricultural practices prevalent in developing countries..... 14
Figure 2.2 Factors affecting consumers purchase decisions regarding organic products..... 20
Figure 2.3 Conceptual model for consumers' purchase decisions and willingness to pay for organic products in Thailand 37
Figure 3.1 The locations of the selected food stores in the Bangkok and metropolitan area 65
Figure 3.2 The bidding sequence for the double-bounded dichotomous choice 78

Chapter 1
Introduction

1.1 World demand and supply for organic products

Since the mid 1980s, the production and consumption of organic products have grown substantially throughout the world. The areas of certified organic farms have increased from 16 million hectares in 2001 to 31 million in 2006 in over 120 countries. By 2006, Australia had the largest organic farmland, accounting for 38 percent of the total world's organic farmland. On the demand side, global sales of organic food and drinks reached approximately US$33 billion, increasing by US$5 billion in 2006. Europe and North America are the major organic markets, accounting for over 95 percent of global revenue. Although the consumption of organic products is only a small percentage of global food consumption (1-2 percent), total sales of organic products have increased 10-30 percent annually from the niche markets (Wier & Calverley, 2002; Willer & Yussefi, 2007).

The growth in demand for organic products is enhanced by increasing public concern about health and environmental problems (Byrne, Bacon, & Toensmeyer, 1994; Huang, Kan, & Fu, 1999; Makatouni, 2002; Schifferstein & Oude Ophuis, 1998). Consumers are concerned that the agricultural and food manufacturing sectors may cause environmental degradation. Over the last two decades, industrialised countries have attempted to reduce the use of fertilizers and synthetic pesticides in conventional agriculture because the seepage of nitrogen through the ground threatens worldwide biodiversity and brings about environmental damage (Hansen, Alrøe, & Kristensen, 2001). Organic farming refers to an alternative agricultural system that manages to use only organic manure and prohibits the use of chemical pesticides and fertilizers (UNCTAD, 2004). Thus, it is not surprising that consumers' perceptions of organic agricultural practices are positive for the impact on the environment. This statement is supported by Davies, Titterington and Cochrane (1995) who said that environment and health concerns were the most important aspects for consumers choosing organic produce in Northern Ireland.

Consumers' behaviour for food products now not only considers the environment issue but also they pay more attention to food safety and the quality of food when purchasing food. In terms of quality and consumption of food, especially in developed countries, consumers have

been faced with a period of saturation of food quantity. Thus, food quality is increasingly important in consumer food choices (Gil, Gracia, & Sánchez, 2000). In addition, the increasing income growth of middle-class consumers in both developed and developing countries is fuelling the rise of the demand for the quality attributes of goods such as health, nutrition, safety attributes and guarantees of quality (Krissoff, 1998). Thus, consumers desire more food produced from chemical-free and organic farm practices. Food safety, health and nutrition are often rated as top factors influencing organic choices by consumers (Demeritt, 2002; Sanjuán, Sánchez, Gil, Gracia, & Soler, 2003). Consumers concerned about food safety clearly are supported by Notermans, Gallhoff, Zwietering and Mead (1995) that using heavy chemicals on farms has raised consumers' concerns about hazardous chemical residues in food. As a result of the consumption of food contaminated by pesticides, there are some populations suffering from food-borne diseases, one of the most recent common health problems causing morbidity and mortality. Several studies concluded that food poisoning and pesticide residues were the main health and safety concerns for primary household food shoppers (Bourn & Prescott, 2002; Buzby & Skees, 1994).

The rise of supply and demand for organic products is clearly apparent in developed economies but it is relatively in infancy in developing economies. Although developing countries have a small proportion of organic production and sales compared with the total world's amount, their share is expected to expand. In Asia, significant domestic markets are developing in China, Hong Kong, Malaysia, Philippines and Thailand (UNCTAD, 2004). The development of the organic farm industry in Thailand has remained in the upper middle range in Asia (Willer & Yussefi, 2006).

1.2 Organic products in Thailand

1.2.1 Development of organic farming

Resulting from the "green revolution" in the 1960s, the agriculture system in Thailand has changed from traditional agriculture to commercial agriculture, typified by monoculture. One consequence of monoculture farming system is increased agricultural productivity with intensive use of artificial fertilizers and pesticides. Three main problems arise from the change. First, over the last two decades, Thai farmers have been in a crisis of indebtedness. For the intensive farming system (monoculture), farmers have relied more on external inputs such as seeds, chemical inputs and labour, resulting in high cost farm production. At the same

time, the farmers have faced a decline in the farm-gate prices of products. Thus, many farmers have suffered a reduction in net revenue (Schröeder & McEachern, 2004). Secondly, there has been an increase in public health concerns associated with using high rates of chemicals on farms. Consumers have been aware of health and food safety because chemical contamination in the food-chain can cause deleterious effects such as food poisoning, and cancer. In addition, the heavy uses of chemical inputs on farms leaking chemical residues also have negative effects on farmers' health. Thai farmers face health problems due to pesticide poisoning, which causes many deaths. For example, the amount of illness and number of deaths caused by chemical residues in the agriculture sector is around 3,200 and 32 cases per year, respectively (Vanit-Anunchai, 2006; Wiboonpongse & Sriboonchitta, 2004). Thirdly, the impact of conventional agriculture on the environment, ecology and biodiversity is becoming a serious issue in Thailand. Certain chemicals existing in agricultural land and water lead to the environmental degradation. For instance, water erosion and chemical deterioration have caused soil degradation and 80 percent of the total area of soil has been degraded (Stracke-Laßmann, 2007). To address these problems, the sustainable agriculture system including integrated, natural, New Theory farming and organic farming has been considered a possibility for improving agricultural systems and producing a sustainable environment. The organic agriculture movement in Thailand, as a part of the strategies for sustainable agricultural development, has emerged and increased in popularity since the early 1990s (Jitsanguan, 2001; Schröeder & McEachern, 2004).

At present, the development of organic farming is partly due to increasing support from development organizations, such as non-government organisations (NGOs) and the government (Lorlowhakarn et al., 2008). Organic farming in Thailand was initially implemented by local NGOs that have established the Alternative Agriculture Network (AAN) in the early 1980s to educate and promote sustainable methods of agriculture by co-operating with farmer groups and traders. Green Net Cooperative and Earth Net Foundation were established in 1993 by AAN. These two organizations work together to develop organic agricultural production, provide the fair-trade market service to producer groups and promote organic food consumption in both domestic and international markets. Currently, organic farms supported by AAN play an important role in developing organic farming in Thailand (Panyakul, 2001).

Since the 8th and 9th National Economic and Social Development Plans (1997-2001 and 2002-2006)[1], the Thai government has strongly supported and encouraged organic farming and this has partly resulted from the policies of sustainable development and a self-sufficient economy by His Majesty the King. Many projects have been launched under these policies (Eischen, Prasertsri, & Sirikeratikul, 2006). For example, the sustainable agriculture pilot project, launched by the Ministry of Agriculture and Cooperatives, proposed to promote chemical-safe agricultural production and to enhance agricultural outputs without harming the environment and human health. This project aimed to convert 20 per cent of arable land to sustainable agriculture; it has over 30,000 farms involved in this project. Thailand's National Agenda on organic agriculture was launched for a 5 year programme, covering the period 2006-2010, and the Cabinet approved a 16 million baht budget for the development of organic agriculture. There were 26 governmental departments from 6 Ministries and participating universities involved. This policy aimed to support farmers in using organic inputs instead of agrochemicals and to encourage 850,000 farmers to convert a conventional area of 17 million rais (2.7 million hectares) to organic agriculture. This could reduce imports of agrochemicals (e.g. fertilizer, pesticide and veterinary medicine) and support exporting of the organic products. Training in organic agriculture for farmers in several provinces has been done by the Department of Agriculture and the Department of Agricultural Extension. Furthermore, the Ministry of Public Health launched the "Health for all" and "Food safety" polices to create awareness of the adverse impact on health from the use of chemicals in food production (Kramol, Thong-ngam, Gypmantasiri, & Davies, 2006; Schröeder & McEachern, 2004). As a result of this support and encouragement, a number of farms have shifted from conventional farming to organic farming and organic farming has spread throughout rural farms in Thailand (Lorlowhakarn et al., 2008).

1.2.2 Production of organic products

Agriculture in Thailand is known as small scale farming with an average farm size of roughly 25 rais[2] per household so most organic farms are small scale. Organic producers in Thailand comprise two types based on organization and farm size. The first is individual farm producers such as small family farms and agribusinesses. The second is farmer groups with small family farms. Farm groups are organized by farmer organizations, NGOs, government

[1] National Economic and Social Development Board (NESDB) has put the national agenda on sufficiency economy on the 9th National Development Plan (2002-2006).
[2] 1 hectare = 6.25 rais

agencies or private companies; they account for almost all organic farmland. Farmer groups are supported by NGOs and government and the members are provided with organic inputs, extension support and markets for organic products. For the farmer groups organized by the private companies, the farmers produce and sell the organic products to the companies while the companies supplies the technical training and organic certification (Panyakul, 2001).

Over a decade, organic farming in Thailand has been one of the fastest growing parts of agriculture. Interest in certified organic farming has grown, which reflects the fact that the size of organic farmland has increased rapidly from roughly 2,560 hectares in 2002 to 19,123 hectares in 2007, representing around 1 per cent of total agricultural area (Willer & Kilcher, 2009). In the five years from 2002 to 2007, organic farmland increased more than seven fold. Currently, certified organic farming systems in Thailand have only cropland; organic livestock is still in the early stage of support from government and the private sector. Thus rice, vegetables and fruit are the predominant crops accounting for 80 per cent, 10 per cent and 3 per cent, respectively, in 2005 (see Table 1.1) (Lorlowhakarn et al., 2008).

Table 1.1 Organic agricultural land areas in Thailand, 1998-2005

Unit : Rai

Year	*Rice*	*Field crops*	*Vegetables*	*Fruit*	*Other*	*Total*
1998	6,281		-		-	6,281
1999	510		-		-	5,510
2000	7,005		3,519		-	10,524
2001	9,901		3,519		-	13,419
2002	32,841		22,382		769	55,992
2003	46,719		22,261		769	69,749
2004	52,183	7,860	13,284	12,777	769	86,872
2005	108,302	6,731	14,845	4,995	761	135,634

Source: Green Net/Earth Net Foundation (2005)

According to Willer & Yussefi (2003) and (2007), the number of organic farms has increased. In 2001, the number of certified organic farms was very small, only 940 farms, which is equivalent to 0.02 per cent of the total agricultural area. By 2004, there was a huge increase in the organic farming operations with roughly 2,500 farms, a 0.49 per cent share of total farms in Thailand (Lorlowhakarn et al., 2008). With respect to organic farming, it can be said that although the number of organic farms is still a small percentage of the total agricultural farms, many farmers have decided to change their conventional production methods to adopt organic farming methods.

1.2.3 Organic standards and certification

The demand for organic certification occurs from a need to assure consumers that organic farmers and processors follow organic production practices and quality standards (Panyakul, 2003). In Thailand, organic certification is conducted by several certification bodies. Organic certification bodies can be divided into three categories: Thai private bodies, international bodies and Thai government bodies (see Table 2.1). The first and only private organic certification body in Thailand is the "Organic Agriculture Certification Thailand (ACT)", established in 1995. ACT carries out independent certification, where ACT's members include producer organizations, consumer groups, NGOs, environmentalists, academics and media. ACT was accredited by the internationally recognized organic certification service, the International Organic Accreditation Service (IOAS), and received International Federation of Organic Agriculture Movements (IFOAM) accreditation in January 2002. Thus, ACT has forged several international linkages to assist the export of organic Thai products. Currently, ACT has focused attention on providing certification services (inspection and certification cover crop production, processing and handling) to small-holder farmers both for individual farms and for farmer group certification with the international control system. Approximately 40 per cent of organic cultivated area was certified by ACT. Several international organic certification agencies operate in Thailand including Bioagricert (Italy), BCS (Germany), Soil Association (United Kingdom) and OMIC (Japan). Almost half of the organic cultivated area was inspected by these international certification agencies and most organic products from these certified organic area aim to export to the European Union and the United States of America (Lorlowhakarn et al., 2008)."Organic Thailand" was the first national organic certification body established by Thai government, in 2002, and currently it is managed by the Institute of Organic Crops, Department of Agriculture, Ministry of Agriculture and Cooperatives. Developing the national organic standards and accreditation systems is another policy under the national agenda of organic agriculture in order to assure national and international recognition. Approximately 15 per cent of the cultivated organic area is certified by this government certification and many organic products with the "Organic Thailand" label are sold in the domestic market, but this certification still lacks international market recognition.

Organic certification is necessary to inspire confidence in consumers. Developing various organic certification standards to meet consumer demand and public concerns is a strategy to enhance consumers' preferences and consumption for organic products (Antle, 1999).

However, the multiple types of certification available in the market confuse consumers. At present, supermarkets and stores sell products under different health and environmentally friendly labels, such as pesticide-free products, hygienic products and organic products. Some consumers can differentiate these products by checking certification labels. However, many consumers, especially new purchasers of organic products, often confuse the organic products with other health and other types of environmentally friendly products because there is little promotion of these labels. They are lack of knowledge and face misinformation about the definition of the difference between organic products and other type of health and environmentally friendly products (Lorlowhakarn et al., 2008; Panyakul, 2001). As a result, those consumers may not pay a price premium for an organic product when organic prices are higher than for other environmental friendly grown products (Vanit-Anunchai, 2006).

1.2.4 Consumption and market of organic products in Thailand

The general increase in the concern about health, food safety and environmental awareness contributes to an expanding demand for organic and environmentally friendly products. However, no current studies containing information about the size of the domestic organic market in Thailand have been conducted. According to what was available, health food and non-certified organic products in the Thai domestic market is estimated to be approximately 280 million baht per year (US$ 75 million) (Rundgren, 2006). The latest research, carried out by Green Net/Earth Net Foundation in 2006, report that the market for organic products has been growing rapidly. The total volume of organic products distributed to markets had dramatically increased from 375 million baht in 2003 Baht to 920 million baht in 2005; the value of domestic market was 494.5 million baht (see Table 1.2). Despite the fact that the development of an organic market in Thailand is in its initial stages and it is a new product in the domestic market, demand for organic products is forecast to increase at approximately 10-20 percent per annum (Eischen et al., 2006).

The variety of organic products in the market is limited. Most are unprocessed products such as rice, and fresh vegetables and fruit. There are few processed products in the market such as sugar, soybeans, tea and honey. Organic rice is mostly exported but organic vegetables and fruits are mostly sold for domestic consumption. In 2002, domestic consumption of organic rice and organic vegetables accounted for roughly 10 and 95 percent of the total value of each product category, respectively (Lorlowhakarn et al., 2008).

Table 1.2 Organic production and market value in Thailand, 2003-2005

Unit : Rai

Year	*2003*		*2004*		*2005*	
	Production (tons)	*Value (million baht)*	*Production (tons)*	*Value (million baht)*	*Production (tons)*	*Value (million baht)*
Rice	7,007.90	210.24	7,827.41	313.10	18,960.38	534.75
Field crops			1,571.96	55.02	2,040.92	45.16
Vegetables	2,671.28	160.28	2,656.73	159.40	4,618.18	255.83
Fruit			3,833.10	76.66	3,746.51	74.93
Other	76.88	4.61	76.88	4.61	49.11	9.69
Total	9,756.05	375.13	15,966.08	608.79	29,415.10	920.36

Source: Green Net/Earth Net Foundation (2005)

Marketing channels for organic products, currently, are diversified and consumers are easily reached whereas previously the products were limited to only small retail stores. The involvement of the broader distribution channels has been responsible for dramatic growth in the demand for and supply of organic products. Distribution channels for organic products comprise supermarkets or hypermarkets, natural/health stores, direct marketing, farmers markets and organic restaurants (see Table 1.3). Natural/health food stores, supermarkets and modern trade chain stores dominate the organic market in Thailand (Lorlowhakarn et al., 2008). For example, Foodland and Villa Market, modern health supermarkets, are recognised as high quality and safe product shops. There is a widespread range of organic products available in these supermarkets and all the organic products are controlled and labelled as 'organic'. Carrefour, an international modern chain, is arranging the organic vegetable project. Carrefour supplies selected vegetables from contracted farms with the products certified by "Organic Thailand" and "BCS" (Wiboonpongse & Sriboonchitta, 2004). The TOPS supermarket chain includes the idea of safe food in its market strategy and currently offers a distribution channel for organic products from small-holder farmers. Green Net, Lemon Farm and Aden shops are known as natural/health stores where organic, health and environmentally friendly products are their main products. These stores provide a larger range of the products, which are not only food products but also non-food items such as herbal shampoos and soap, detergent, cotton bags, and handcrafts. One type of distribution channel becoming popular at present is organic restaurants but they are located only in big cities (i.e. Chiva-Som, Anothai restaurants) (Eischen et al., 2006). However, consumers still mention a lack of organic products in the domestic market as the main barrier to purchasing

organic products (Roitner-Schobesberger, 2006). This may imply that the distribution channels of organic products are still limited in certain areas.

Organically grown products in Thailand have been described as a niche market with a price premium. There are no reliable statistics available on the retail price of organic products. According to the survey by Panyakul (2001), the retail price of organic products varied greatly with not only the products but also location and outlet. The retail price of organic products is generally 100 per cent and 30 per cent higher than conventional products and hygienic products, respectively. For organic vegetables, Lorlowhakarn et al. (2008) reported that a price premium for organic over conventional vegetables was 75 per cent. Certified organic product prices are much higher than uncertified organic product prices (Panyakul, 2001). The high prices of organic products are because of their high cultivation costs, the complicated processing and the cost of organic certification (Kasikorn Research Center, 2004). Price is a major constraint for consumers when making their decision to purchase organic products. The gap between conventional and organic products is high and it is significant that differences exist between consumers' willingness to pay price premiums for organic products versus market prices for conventional products (Thompson, 1998).

Table 1.3 Marketing channels of organic products and other green products in Thailand

Market Channels	*Shop names*
Supermarkets/hypermarkets	Tesco Lotus, Carrefour, The Mall, Villa, Foodland, Big C, Save, Safeway, Tops
Natural/Health stores	Lemon Farm, Aden Shop, Puan-sukaparp, Fried of Nature Shop, Green Net, Golden Place, Home Fresh Mart, Market Place, Gourmet
Direct Marketing	Nong Jok Farm, Green Net, Oriental Rice Queen Co.Ltd., Amway, Vegbasket
Weekly Market/farmers' market	Im-Boon market (Chiang Mai), weekly markets in other provinces
Traditional Markets	Local shops, cooperative stores
Organic Restaurants	Anotai, Mama's Secret (Bkk), Chiva-Som (Hua Hin), Red Room (Phuket), Santi Asoke network

Source: adapted from Panyakul and Sukjitrattikan (2003); Eischen et al. (2006); Isvilanonda et al. (2006)

1.3 Research problem statement

Organic products were introduced to the market in Thailand as environmentally friendly and healthy products. Over this recent period, health and environmental concerns have increased among Thai people regarding the potential adverse effects of chemical use and residue contamination in food products and the environment (Vanit-Anunchai, 2006; Wiboonpongse & Sriboonchitta, 2004). This heightened awareness impacts on the demand and supply for quality products, such as organic products, in the market place. Many organic small-holder farms and organic private companies have developed and marketed foods in response to increasing demand for organic products. This resulted in a significant increase in area under organic management during the last decade. The consumption of organic products has been increasing. However, the market share for organic products is still relatively small because there are some major obstacles to increasing the domestic demand. The market for organic products in Thailand is at the beginning of its development. A large group of consumers still do not purchase organic products and a few organic product consumers purchase it regularly (Roitner-Schobesberger, 2006). Moreover, organic products' relatively higher price was mentioned in several previous studies (Panyakul, 2003; Roitner-Schobesberger, 2006). In addition, organic products have credence attributes such as taste, animal welfare, health and environmental issues that cannot be observed. Consumers find it hard to perceive these credence attributes when making a decision to purchase or even when consuming. Therefore, it is possible that consumers may not purchase organic products if they are not informed about the particular attributes to distinguish organic products from other products (Giannakas, 2002; Panyakul, 2003; Roitner-Schobesberger, 2006).

To be successful in enlarging the domestic organic market, it is important to understand the characteristic differences between consumers who purchase and do not purchase organic products and to understand consumers' preferences of organic products and how much consumers would be prepared to pay a premium for organic products. This information is not well research or documented. Several studies have looked at the consumer behaviour towards environmentally friendly products in Thailand but there has been little academic research on consumer purchasing behaviour and consumers' willingness to pay for organic products. Especially, indeed, there has been a largely unknown significant difference between consumer types. Lack of such information is a major impediment to the growth of organic products consumption and the future development of organic product marketing.

A better understanding of the factors affecting consumers' purchase decisions and consumers' willingness to pay for organic products is essential to plan an effective marketing strategy for the development of the domestic organic product market in Thailand. The identification of the maximum premium in the various market segments are willing to pay for organic such products is necessary to help producers adopt adequate pricing strategies in domestic markets. The findings will help policy makers further improve and sustain organic farming at the grass roots level. Thus, this research will elicit individual preferences for organic products by assessing the willingness to pay a price premium for organic products and will investigate the factors affecting the purchase decisions and provide policy implications.

1.4 Research objective

The objectives of this research are to:

1. provide an overview of the production and marketing of organic products in Thailand.
2. determine the predominant factors influencing consumers' purchase decisions towards organic products.
3. estimate a price premium and investigate the critical factors affecting consumers' willingness to pay a price premium for organic products.
4. provide a marketing strategy of organic products for marketers and producers in Thailand.

1.5 Contributions of the research

This research is expected to contribute to the development of the domestic market for organic products in Thailand. The findings provide significant information about gauging consumer opinion and knowledge toward organic products and making better decisions concerning organic products for consumers. The findings will assist policy makers and marketers to plan market strategies for developing the domestic organic product market.

The study seeks to apply the findings to the market and to guide retailers to target consumers who are more likely to increase their organic products consumption. Moreover, the results of

this study will be very useful in organizing the retail sales of organic products and advertising and publicity campaigns to encourage the marketing of organic products in Thailand.

In addition, the research findings can assist policy makers in developing the supply side of organic products. A domestic organic market is critical to the success of organic farming. The growth in organic product demand will push and drive success in organic farming in both small farms and private farms. Moreover, the research findings will also give advantages to the farmers/producers.

1.6 Outline of the research

The study is divided into six chapters. The study opens with an introduction, problem statement, and outlines the study's objectives. Chapter Two reviews the definition of organic farming and products and theories on consumers' decision making processes and literature related to consumers' purchase decisions and willingness to pay for organic products. Chapter Three discusses consumers' choice theory, the methods for generating empirical estimates of factors affecting consumers' purchase decision and consumers' willingness to pay and also the survey design and data collection method of the research. The results of descriptive statistics and the empirical models are presented and discussed in Chapters Four and Five, respectively. The last chapter provides the conclusions of the research and policy implications and makes suggestions for future research.

Chapter 2
Literature Review

Chapter two is organized as follows: Section 2.1 defines organic farming and organic products. Section 2.2 provides a discussion of the models of consumers' decision making process and outlines previous research associated with factors influencing consumers' purchase decisions and consumers' willingness to pay for organic products.

2.1 Definition of organic farming and organic products

2.1.1 International definition of organic farming and organic products

The definition of organic farming varies slightly among countries and regions, depending on regulations. Organic research organizations have defined organic farming, according to production practices and principles, which is more than agricultural production prohibiting the use of synthetic chemicals or genetically modified organisms (GMOs). Organic farming, one of several approaches to sustainable agriculture, emphasises land management and maintains the ecological balance between animal life and the natural environment. It requires soil building crop rotations and for animals to be kept in a more natural environment. Furthermore, the organic approach is not only in the production stage but also through handling and processing (UNCTAD, 2004). Currently, only International Codex Alimentarius Guidelines and International Federation of Organic Agriculture Movements (IFOAM) are the international sources of general principles applying to organic farming (FAO, 2002). The Codex Alimentarius Commission defines organic agriculture as follows:

> "Organic agriculture is a holistic production management system which promotes and enhances ecosystem health, including biological cycles and soil biological activity. Organic agriculture is based on minimising the use of external inputs, avoiding the use of synthetic fertilizers and pesticides. Organic agriculture practices cannot ensure that products are completely free of residues, due to general environmental pollution. However, methods are used to minimize pollution of air, soil and water. Organic food handlers, processors and retailers adhere to standards to maintain the integrity of organic agriculture products. The primary goal of organic

agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people" (FAO, 2002, p. 5).

An alternative definition by IFOAM, a private sector international body, defines organic agriculture as

> "Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved" (IFOAM, 2008, p. 1).

Organic products are divided into two categories according to their production processes: uncertified organic products and certified organic products (see Figure 2.1). Uncertified organic products are produced by organic agricultural practices but are not certified by an organic certification body. On the other hand, certified organic products are products that have been grown and processed according to strict standards that are verified by an appropriately constituted certification body or authority. Basically, organic certification is designed to certify every step of processing products including growing, harvesting, handling, storage, processing, transportation and marketing, to make sure that the products meet the required standards (UNCTAD, 2004). Certified organic products have the label "certified" to indicate that the production process meets the organic standard while "non-certified" labels refer to organic grown products that are not subject to organic inspection and certification (Parrott, Olesen, & Høgh-Jensen, 2006).

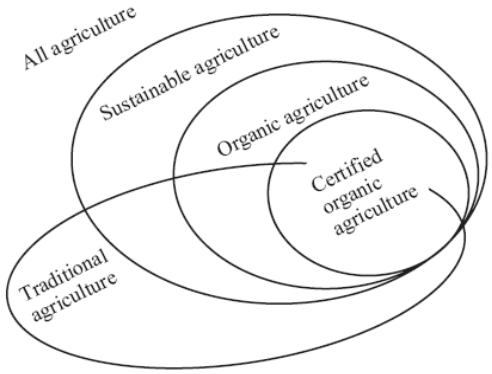

Figure 2.1 Categories of agricultural practices prevalent in developing countries

Source: UNCTAD (2004), p.144

Organic labels vary depending on the certification body. They inform the consumer about the type of standards complied with during production. There are many certification bodies but most available certification bodies in the world market operate from developed countries. Organic standards have four levels: (1) International voluntary standards including the Codex Alimentarius and IFOAM guidelines. These guidelines are regularly reviewed, particularly the criteria for permitted substances and the process by which inspection is carried out and certification held; (2) National mandatory standards: the Codex Alimentarius and IFOAM guidelines are considered when developing national organic standards. Most national standards are more country specific including regulations; (3) Local voluntary standards: these standards respond to particular consumer demands in each country; and (4) Accreditation: certification bodies can apply the authoritative standards such as voluntary international standards or the national mandatory standards and the procedures will be accredited and given formal recognition (UNCTAD, 2004). For example, the International Organic Accreditation Service (IOAS) will give the "IFOAM Accredited" logo to accredit the procedures of certification bodies that are in the IFOAM Accreditation Programme (Courville, 2006).

Table 2.1 show organic standards and organic certification labels created by different countries. Several countries such as the United States of America, Italy, Germany and Australia use the international voluntary standards for organic products as guidelines to creates their own organic standard, represented by certification labels, such as Bio, Soil association, USDA organic, and JAS.

Table 2.1 Organic standards, certifications and product labels created by different countries

Country	*Organization*	*Certification label*
Public standards and certifications		
The European Union[1]	The European Union (released in July, 1991)	
The United States of America[1]	National Organic Program (NOP) under US Department of Agriculture (USDA) (released in October, 2002)	
Australia[2]	Australian Quarantine and Inspection Service (AQIS)	
Japan[1]	Japanese Agricultural standard (JAS) under Ministry of Agriculture, Forestry and Fisheries (released in April, 2001)	
Thailand[3]	Department of Agriculture under Ministry of Agriculture and Cooperatives (released in 2002)	
Private standards and certifications		
-	International Federation of Organic Agriculture Movements (IFOAM)	
United Kingdom[1]	United Kingdom Registry of Organic Food Standards (UKROFS), regulated by The Department for Environment, Food and Rural Affairs(DEFRA) (released in 1946)	
Italy[3]	Bioagricert (launched in 1984)	
Germany[3]	BCS (launched in May, 1992)	
Australia[2]	Biological Farmers of Australia (BFA)	
New Zealand[2]	New Zealand Biological Producers and Consumers Council Inc (accredited by IFOAM)	
Thailand[3]	Organic Agriculture Certification Thailand (ACT) (accredited by IFOAM)	

Source: [1] FAO, (2004)
[2] Lyons and Lawrence, (2001)
[3] Ellis, Panyakul, Vildozo, and Kasterine, (2008)

2.1.2 Definition of organic farming and organic standards in Thailand

The Standards for Organic Crop Production (SOCP) was the government's first organic standard released in October, 2001. This standard, set by the Department of Agriculture,

Thailand Institute of Scientific and Technological Research and Department of Export Promotion, mainly aimed to promote food safety and the export of healthy food products. In 2002, as part of the conformity assessment system, the government designated the National Bureau of Agricultural Commodity and Food Standards (ACFS) and Ministry of Agriculture and Cooperatives, to take responsibility for the national standardization of food products in Thailand. The main objectives of the ACFS were to control agricultural products, food, and processed agricultural products by setting up and certifying food standards as well performing as accreditation. The ACFS, working with the Thai National Organic Standards Board, set the national organic standards. The certification and accreditation systems of the National Standards for Organic Agriculture were developed from FAO/WHO, SOCP, ACT guidelines, which include production, processing, labelling and marketing of organic agriculture (ACFS, 2003). The first National Standards for Organic Agriculture were approved and announced by ACFS in 2003 - TACFS 9000-2003. ACFS have recently launched an organic livestock standard – TACFS 9000-2005 and organic marine shrimp farming standard – TACFS 7413-2007. The National Organic Standards Board of ACFS defined organic farming as

> "an ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It is based on maximum reliance on natural inputs and minimal use of off-farm inputs and management practices. Synthetic chemical products and products obtained from genetic modification or genetic engineering are prohibited from application in organic production. Product management needs to maintain quality and organic standards" (ACFS, 2003).

Organic Agriculture Certification Thailand (ACT) was the private standard accredited by IFOAM (see IFOAM, 2008). According to ACT, a fundamental principle in organic farming is to minimise environmental impacts as much as possible while sustaining an economically viable level of production by avoiding the use of highly soluble mineral and synthetic nitrogenous fertilizers and the use of synthetic pesticides and feed additives, and to maximise animal welfare (ACT, 2005).

These organic standards in Thailand are not different in terms of meaning but differ with regard to execution (e.g. the conversion time, procedure for certification).

2.2 Models of consumer behaviour and consumer decision-making processes

2.2.1 Consumer decision-making processes towards food products

Consumer behaviour is defined as “activities people undertake when obtaining, consuming and disposing of products and services” as well as “a field of study, focusing on consumer activities”. Consumer behaviour studies focus on not only ‘why and how people buy’ but also on ‘why and how people consume’ (Blackwell, D'Souza, Taghian, Miniard, & Engel, 2006). Thus, if marketers and researchers want to understand consumer behaviour, they have to know about the consumer’s mind.

The Consumer Decision Process shows a map of consumers’ minds, that is used to examine how a consumer makes a purchase decision for goods and services (Williams & Hammitt, 2001). This process focuses primarily on five major stages of decision-making: need (or problem) recognition, search for information, pre-purchase evaluation, purchase (or choice) and post-consumption evaluation (or outcome). The Engel-Blackwell-Miniard model (EBM) is one of many consumer decision-making models that have been developed. The EBM model presented the process of consumer decisions in seven stages for the decision-making process. The first stage of the purchase decision is consumers’ needs or problems. Consumers purchase products or services when they are sure that the products can respond to a need or solve a problem. Then, when consumers recognize their needs, they start searching for information and solutions to fulfill their needs. Pre-purchase evaluation of choices, the next stage, involves consumers using their pre-existing evaluations as a basis for choosing the most satisfactory products or services before making their final purchase decision. The consumption and the post-consumption evaluation stages can happen immediately or later. If their expectation matches their perceived preferences, consumer satisfaction occurs while consumer dissatisfaction appears when the expectation is higher than the performance. The post-consumption evaluation is stored in the consumer’s memory and is significant for future decision making. The last stage is divestment such as recycling or remarketing, where environmental concerns play an important role in consumers’ divestment methods (Blackwell et al., 2006).

In the EBM model, many variables influence and shape the consumer decision-making process, including internal/individual factors and external/surrounding factors. The individual factors are characteristics of the individual. Internal factors (individual differences) are

divided into five categories. 1) *Demographics, psychographics, values and personality*: how different people react in the decision process. Marketers use demographic analysis as market segment descriptors. In addition, psychographic variables are used to measure lifestyle and investigate individual traits, values, beliefs and preferred behaviour patterns, which provide more insight about the market segment. 2) *Consumer resources*: three primary resources that consumers consider when making a decision are time, money and information. 3) *Motivation*: motivation is an activated need state leading to goal-directed behaviour to satisfy that need. 4) *Knowledge:* knowledge refers to the information stored in the consumers' memory that is relevant to product purchase and consumption. 5) *Attitudes:* attitudes refer to what individuals like or dislike for something (Blackwell et al., 2006).

There are five different external factors (environmental influences) that influence consumers' purchase decisions. 1) *Culture*: culture refers to the set of values, ideas, artifacts, and other meaningful symbols that help individuals communicate, interpret and evaluate as members of a society (Blackwell et al., 2006, p. 303). 2) *Social class:* social class refers to several homogeneous groups of society in which individuals in the group share similar values, interests, and behaviours. Socioeconomic status differences are often used to determine social class and may lead to differing forms of consumer behaviour. 3) *Family:* the family decision making often influences other family members who are responsible for purchasing household products for their family. 4) *Personal influence:* this refers to the influence that another person or group of people, who closely associate (reference group), has on consumers' purchasing choices. 5) *Situation:* situation changes lead to behaviour changes. The change in a situation is sometimes unpredictable, such as a job lay-off (see Blackwell et al., 2006).

The EBM model can provide a basic way to analyse specific models of consumer behaviour towards food products because it covers a wide range of decision situations and product categories of consumer behaviour. For organic products, the model of consumers' purchase decisions has been developed and documented. Bonti-Ankomah and Yiridoe (2006) provided a comprehensive review of the literature on consumer preferences and demand regarding organic products. In addition, they presented a framework of factors influencing consumers' purchase decisions towards organic products (see Figure 2.2). Consumers' preferences and purchasing decisions are based on the perceived desirable attributes of the products driven by the consumers' knowledge of the 'organic' term. Social and demographic characteristics and

economic factors are significant factors that are involved with the decision to purchase organic products (see details in Section 2.2.2).

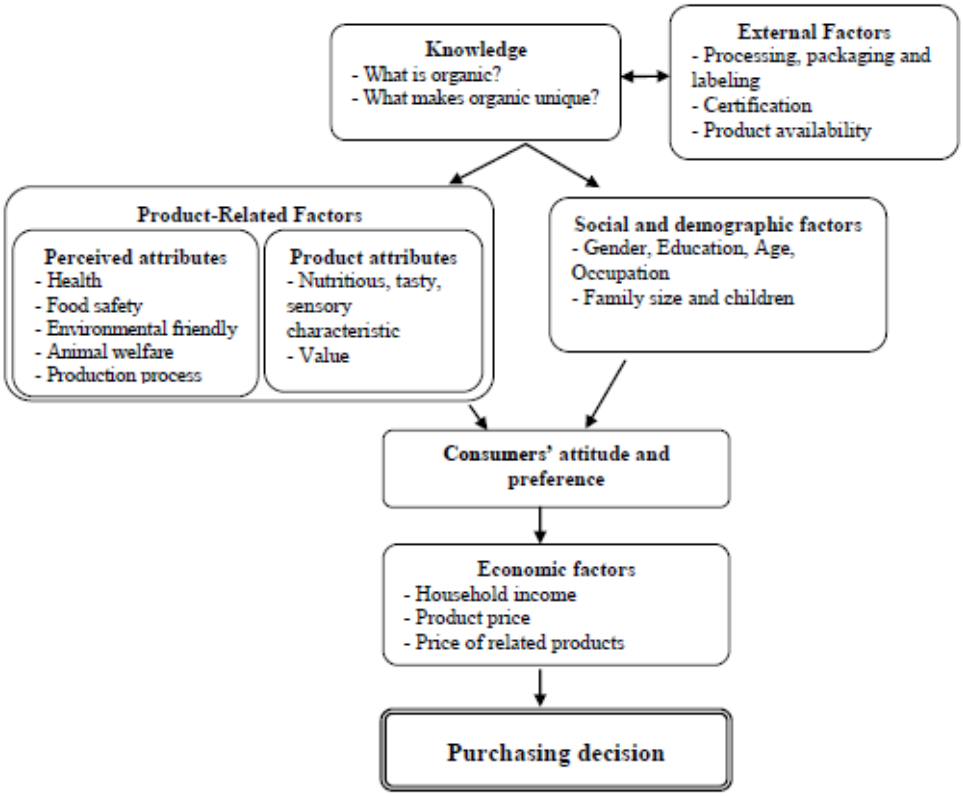

Figure 2.2 Factors affecting consumers purchase decisions regarding organic products

2.2.2 Empirical studies on consumer behaviour for organic products

There are some existing studies regarding consumer demand for organic products. Previous consumer behaviour studies attempted to explain who the purchasers are, why they purchase and how much they are willing to pay. The existing literature on consumer demand for organic food products is almost always related to consumer purchasing behaviour and consumer willingness to pay a price premium to purchase the products. Comprehensive empirical studies have examined the factors explaining purchasing behaviour for organic foods (see Loureiro & Hine, 2002; Makatouni, 2002; Thompson, 1998; Wier & Calverley, 2002). For example, Thompson (1998) reviewed variables predicting consumer demand for organic products and Wier and Calverley (2002) studied consumer demand for organic products in Europe, focusing on the important factors determining consumers buying organic products and the motives and barriers for purchasing. On the other hand, because organic food products are, in general, more expensive than conventional, many empirical studies

have focused on the maximum price premium consumers are willing to pay for organic products and the factors explaining this premium (see Boccaletti & Nardella, 2000; Canavari, Bazzani, Spadoni, & Regazzi, 2002; Gil et al., 2000; Govindasamy, DeCongelio, & Bhuyan, 2005; Sanjuán et al., 2003). For example, Gil et al. (2000) measured the willingness of Spanish consumers to pay for organic products in different regions considering consumers' lifestyles and Govindasamy et al. (2005) studied the factors affecting the willingness of north-eastern US consumers to pay for reduced pesticide produce and organic produce.

2.2.2.1 Empirical studies of consumers' purchase decisions towards organic products

Numerous studies on food consumption behaviour widely established a conceptual model where consumer behaviour towards organic products is determined by both internal (psychologies) and external factors (see Table 2.2). For example, Davies et al. (1995) conducted a series of studies based on actual purchasing patterns of consumers in Northern Ireland and showed that health, environment and taste were the main reasons for purchasing organic products. For demographic characteristics, the results show that purchasers of organic products were more likely to be female with a higher level of disposable household income. A study by Demeritt (2002) revealed that health and nutrition were the highest ranked factors driving the purchase of organic products, followed by taste, food safety and environment. A similar study by Magistris and Garcia (2008) in Italy on factors influencing organic food purchases of urban consumers showed that consumers' decisions to purchase organic foods were influenced mainly by attitudes towards health and environmental benefits. The authors' results also showed income and knowledge of organic products positively influenced consumers' purchase of organic products. Onyango, Hallman and Bellows (2007) studied the influence of socioeconomic factors and the importance of food attributes on consumers' consumption decisions and identified that regular organic food purchases were enhanced by food attributes, such as naturalness, vegetarian, and origin of the products, and the regular consumers of organic products were female and young people.

Consumers' concerns health, food safety, ethics and environment

Previous studies indicated that the important factor determining consumers' purchase decisions regarding organic food products relied on various important psychological variables including health and environmental attitudes, perceived quality products, and level of organic knowledge of consumers (internal factors), and external factors such as socio-

economic and demographic characteristics. In this section, pertinent literature is outlined in the above areas.

In general, many studies have found that the most significant factor explaining organic purchases is health consciousness/concerns which can be considered as an individual benefit (see Cicia, Giudice, & Scarpa, 2002; Meier-Ploeger & Woodward, 1999; Soler, Gil, & Sanchez, 2002; Worner & Meier-Ploeger, 1999). Consumers who are concerned about health are more aware about their state of well-being and are driven to improve their health and quality of life. Furthermore, health-conscious consumers prevent health problems by engaging in healthy behaviour and by tending to be involved with nutrition and physical fitness (Newsom, McFarland, Kaplan, Huguet, & Zani, 2005; Williams & Hammitt, 2001). Schifferstein and Oude Ophuis (1998) discussed the health-related determinants of the consumption of organic products. They found that organic food consumers tended to be health conscious, such as additional exercise and their habits related to food intake, and they were willing to purchase healthier foods to improve their health. Williams and Hammitt (2001) found that consumers perceived organic products as healthy food that enhanced personal wellbeing. Previous research has identified interest in health as a primary intention for the decisions to purchase organic products. For example, Worner and Meier-Ploeger (1999) reported that German consumers primarily purchased more organic food for health and food safety reasons. These findings are supported by Meier-Ploeger and Woodward's (1999) study that showed that approximately 50 percent of British people preferred to purchase organic foods because of their health and 40 percent because of no chemical/pesticides attributes.

Furthermore, consumers were aware of the necessity for food safety and quality in conventional food production because of food scares associated with production and handling, such as chemical contamination (from chemical pesticides, fertilizers, artificial additives and preservatives), food poisoning, and mad cow disease (Soler et al., 2002). Also consumers are being exposed to food that is genetically modified with negative reactions. Consumers' concerns about food safety in food production will translate into market behaviour and alter demand for food products (Huang, 1996). For example, Jolly (1991) concluded that consumers chose to purchase organic products because they wanted to avoid the chemicals used in conventional food production. A survey of organic and conventional food purchasers in the US indicated that several risk factors, including the fear of ill effects related to pesticide residues, growth stimulants and fertilizers, significantly explained their

purchase behaviour towards organic products (Hammitt, 1990). Furthermore, a consumer study by O'Donovan (2002) pointed out that BSE (mad cow disease), technological hazards and microbiological hazards (i.e. antibiotics) in conventional meat production were the main concerns among Irish consumers. Consumers who intended to purchase organic meat were more concerned about food safety issues than those who had no intention to purchase organic meat. Cicia et al. (2002) showed that concern about the use of GM foods or ingredients was rising in importance for purchasers of organic products and this concern encouraged people to purchase organic products.

Animal welfare, which is an issue of ethical concern, are often related to organic products and are pointed out as a widely endorsed factors influencing demand for organic products (Magnusson, Arvola, Hursti, Åberg, & Sjödén, 2003; Vindigni, Janssen, & Jager, 2002). Ethical consumers tended to purchase products that were animal and environmentally friendly so are not harmful to society and environment. Animal welfare is a considerably important issue related to organic food consumption in the Northern part of Europe (i.e. the UK and Denmark) (Harper & Makatouni, 2002; Zanoli & Naspetti, 2002), for example, focus group results of an investigation into consumer attitudes towards organic food in the UK. British consumers reported that concern about the wellbeing of the animals drove them to animal-friendly food purchases (Harper & Makatouni, 2002). Magnusson et al. (2001) studied the motivating factors for organic food purchases in the UK using laddering and focus group interviews. It was found that animal welfare was an important motive for purchasing organic products. However, this welfare concern was not an important factor for the organic consumer in Italy (Torjusen, Lieblein, Wandel, & Francis, 2001).

Another major factor influencing consumers' purchase of organic food products is an environmental concern, which can be regarded as public benefit (see Davies et al., 1995; Leila Hamzaoui & Mehdi, 2008; Lockie, Lyons, Lawrence, & Grice, 2004; Loureiro & Hine, 2002). Based on the study of Dunlap and Van Liere (1978), environmental concern is defined as a belief about humanity's ability to disappoint with the balance of nature, the existence of limits of growth for human societies, and right of humanity to rule over the rest of nature. Grunert and Juhl (1995) found that concerns about the environment are related to environmentally conscious behaviours as well as to specific environmental behaviours. For example, consumers who are more likely to engage in green consumption practices (for example, recycling paper, purchase of environmentally friendly cleaning products) are more likely to have a greater consumption of organic food (Lockie et al., 2004). Devis et al. (1995)

claimed that although only a few participants bought organic products, nearly half of participants were classified as 'green consumers' because they used environmentally friendly detergents and recycled papers.

Many studies investigating the purchasing motives for organic products have found that health, food safety and environment considerations mostly influence organic food purchase (see Demeritt, 2002; Krystallis & Chryssohoidis, 2005; Millock, Wier, & Andersen, 2004; Schifferstein & Oude Ophuis, 1998). Demeritt (2002) found that Canadian consumers ranked health as the most important consideration influencing their purchase of organic food products followed by the environment. Several studies concluded that health is apparently a stronger motive than the environment in consumers' purchases of organic food (see Demeritt, 2002; Hutchins & Greenhalgh, 1997; Magnusson et al., 2003; Makatouni, 2002; Schifferstein & Oude Ophuis, 1998). Magnusson et al. (2003) claimed that egoistic motives were more important indicators than altruistic motives when addressing the purchase of organic products. For example, in the Netherlands, the environmental factor has a significantly weaker effect on a consumer's purchase of organic meat due to specific consumer attitudes to meat and environmental variables, which may indirectly affect the consumers' behaviour (Krystallis & Chryssohoidis, 2005). However, Durham and Andrade's (2005) study showed that the environment is more influential than health in consumers' organic purchase decisions in the U.S.

Consumers' perceptions of organic products

Consumers' purchase decisions for food products are also influenced by specific food attributes, including quality and sensory attributes such as taste, nutrition, appearance and health and environmental benefits (Demeritt, 2002; Radman, 2005; Sylvander, 1995; Zhao, Chambers, Matta, Loughin, & Carey, 2007). Demand for food products has changed to be more for quality than quantity because of saturation of food quantity. Consumers perceived quality of organic products have been investigated comparing with other production systems. For example, the study by Bourn and Prescott (2002) reviewing the comparison of several product attributes between organic produce and conventional produce concluded that not only chemical-free and environmentally friendly attributes but also quality attributes (such as nutritional value, taste, freshness, appearance, colour) influenced consumer choices between organic versus conventionally produced foods. Hutchins and Greenhalgh (1997) revealed that 40 percent of the respondents in their study purchased organic products because of greater

nutritional value for their children. A couple of studies found that sensory attributes, such as taste and freshness, between organic and conventional products were considered to have an effect on consumers' decision-making. For example, Radman (2005) states that organic products were said to be tastier by women, older and more frequent buyers than did other consumers. Fillion and Arazi, (2002) found that consumers perceived organic orange juice had a better taste than conventional orange juice. However, it is not valid to conclude that organic products have better nutritional and sensory quality. Inconsistent results appear in some research. Zhao et al. (2007) studied consumers' sensory attributes such as ripeness, sweetness, and bitterness between organically and conventionally grown vegetables that made contrasting conclusions that there were insignificant differences in overall liking and intensity of overall flavour from both types of produce. Only for tomatoes did consumers agree that conventional were more over ripe than organic tomatoes. Thus, it is unclear and there is no strong scientific evidence, whether organically and conventionally grown products differ between various nutrient concentrations but the difference in a variety of sensory qualities between organic and conventional fruits and vegetables may be significant.

Numerous studies have discussed impediments to purchasing organic products (Davies et al., 1995; Lockie, Lyons, Lawrence, & Mummery, 2002; O' Donovan & McCarthy, 2002; Rodríguez, Lacaze, & Lupín, 2007; Tregear, Dent, & McGregor, 1994). They have suggested that the strong restrictive factors against demand expansion for organic products were price, availability of products and information. They also pointed out that the most important barrier to purchase organic products appeared to be the price premium of organic products. Thompson (1998) stated that organic products are highly price sensitive in demand. For example, Irish consumers mentioned the availability, price and less interest were the main reasons for not purchasing organic meat. However, most consumers who do not purchase the products because of higher price would purchase if the products were less expensive (O' Donovan & McCarthy, 2002). Similarly, Lea and Worsley (2005) showed that for the majority of Australian consumers the high price and the limited availability of organic products in the market hindered the increased consumption of organic products. Nearly half (49 per cent) of British consumers reported that they often or always desisted from buying organic foods because they perceived them to be too expensive (Makatouni, 2002). A study by Rodríguez et al. (2007) pointed out that purchasers and non-purchasers of organic products differed in their ratings of price attributes when purchasing food products. They found that price was the most important consideration followed by health, convenience and

sensory appeal for non-purchasers of organic products. For purchasers of organic products, health and sensory attributes appeared to be more important than price.

Consumers' knowledge about organic products

Organic product knowledge is an important factor influencing the decision to purchase the products because it represents the only instrument that consumers have to differentiate the attributes of organic products from conventional products and to form positive attitudes and quality perceptions toward these products. Previous studies indicated that although consumers whose interest in organic products were mostly affected by their awareness of heath, food safety and environment, levels of knowledge about organic product characteristics have influenced their choices to purchase organic products (see Davies et al., 1995; Demeritt, 2002; Gifford & Bernard, 2006; Azucena Gracia & Magistris, 2008). Gifford and Bernard (2006), who studied the effect of information on the self-reported change in purchase likelihood of organic food products found that the respondents who had low knowledge of organic products were less likely to buy organic food products. In addition, information provided by the public media, mass media, and shopping place affected the consumers' knowledge. Gracia and Magistris' (2008) findings revealed that the consumers' organic knowledge variable was a positive and significant influence on the decision to purchase organic products and be regular consumers of organic products. This means that the higher consumers' organic knowledge, the higher is the likelihood that consumers purchase organic products.

Although organic products have particular credence characteristics (for example, chemical free, environmentally friendly), consumers may not be able to differentiate between organic and conventional products and may not know whether the products are organically grown unless they have been told (Giannakas, 2002). Information available in the market on organic food products determines consumers' organic product knowledge. In particular, if consumers have seen organic food products displayed in shopping places, this positively influences organic product knowledge (Azucena Gracia & Magistris, 2007). A certified organic label is the tool for describing organic product characteristics. A number of studies (Giannakas, 2002; Soler et al., 2002) have revealed that organic labels show how information can affect either the acceptance of negative aspects such as pesticide use, or increase purchase likelihood of organic products. In contrast, some studies have shown how information confuses consumers (see Canavari et al., 2002; Hughner, McDonagh, Prothero, Shultz, &

Stanton, 2007). However, consumers confuse not only existing certified organic labels but also other types of certified product labels in the market. Hutchins and Greenhalgh's (1997) study showed that approximately 35 percent of UK respondents did not identify the label or the certification body on the organic products and the consumers confused organic products with other kinds of labels such as vegetarian or healthy food. Giaanakas (2002) agreed that many consumers in Western countries were ambiguous about organic labels due to mislabelling and misrepresentation of conventional products. The degree of confidence in organic labels was low and uncertain among Italian consumers (Canavari et al., 2002).

Consumers' lifestyle

Consumers' lifestyle has been recognized as one important factor influencing consumers' decision to purchase organic products. For example, Williams and Hammitt (2000) used a consumer survey to identify the main difference between consumers purchasing organic and conventional food products in terms of lifestyle characteristics, attitudes and beliefs about food safety in the Boston area. The results showed that personal lifestyle characteristics were likely to be different between organic and conventional buyers, whereas organic buyers were more likely to be vegetarian, recycle household rubbish and purchase "environmentally friendly' products. Consumers in the United States who consumed more natural foods and on a vegetarian diet were associated with the regular consumer buying of organic products (Onyango et al., 2007). Similar findings were reported by Cicia et al. (2002) studying consumers' preferences in purchasing of organic olive oil in Italy. They were more likely to be vegetarians, and medical practitioners such as naturopaths and diet-based therapies than consumers of conventional products. Moreover, consumers' lifestyle in purchasing grocery and food products at natural or health food stores was often associated with health foods and tends to prefer organic products compared with conventional products. The authors found that 64 per cent of consumers who had shopped at specialized food stores, such as health food stores or environmentally friendly product stores, were more likely to purchase organic products on a regular basis (at least once a week) (Cicia et al., 2002). Dining out (or consuming take-away food) is a feature of consumer lifestyle that influences the choice of organic products (Huang et al., 1999; Vanit-Anunchai, 2006). Vanit-Anunchai (2006) concluded that a Thai's lifestyle, whether they dined out or not, significantly affected consumers' decision-making in purchasing environmentally friendly produced vegetables. Consumers in Thailand have changed their lifestyle from preparing food at home to buying prepared foods or dining out as a result of urbanization and increasing income.

Consumers' socio-demographics

Socio-demographic characteristics have been used to understand how consumers behave. According to previous studies, examining the relationship between socio-demographics and consumers' decisions to purchase organic products, socio-demographic characteristics significantly affected the decision to purchase organic products. In general, gender, age, education, marital status, occupational class, household size, presence of children, income and location significantly influenced consumers' decision to purchase organic products (see Davies et al., 1995; Loureiro & Hine, 2002; Onyango et al., 2007; Zepeda & Li, 2007). These socio-demographic variables vary across most organic consumer behaviour. For example, Davies et al. (1995) studied organic consumers' characteristics in Northern Ireland and indicated that women with high disposable income, between age 30 and 45 with children in the family influenced the likelihood of purchasing organic food whereas An Bord Bia (2000) found that middle-aged married women with middle to upper incomes in a small to medium sized household were more likely to be purchasers of organic products. In addition, consumers in the United States with no religious affiliation, higher education level, and youth were more likely to buy organic food products (Zepeda & Li, 2007). According to Onyango, Hallman, and Bellows (2007), US consumers who purchased organic products on a regular basis were typically young females with a high education level.

In several studies, gender of consumers found to be a important factor affecting decisions to purchase organic products. For example, McEachern and McClean (2002) and Ureña, Bernabéu and Olmeda (2008) showed women were likely to purchase organic produce more regularly than men. Similarly, Buzby, Skees and Ready (1995) showed that organic product purchasers were mostly women, who purchased larger quantities more frequently than men. This is partly due to the fact that women generally had a greater concern with health issues than men (Lea, 2001). Some studies mention a positive relationship between education and consumers' purchase decisions. Families with a higher education level have more interest in food safety (Jolly, 1991). In addition, Magnusson, Arvola, Hursti, Aberg and Sjoden (2001) concluded that women with a university-level education have positive attitudes towards purchasing organic products and their intention to purchase organic products was stronger than men's. In contrast, Christos and Athanasios'(2002) study found that education level between purchasers and non-purchasers in California was not significant in explaining consumers' purchase decisions on organic products.

Numerous studies have demonstrated the relationship between age range and the decision to purchase organic products but these findings are not consistent. Several studies found that older consumers were more likely to purchase organic products than younger consumers and consumers in the middle age were the most likely purchasers. For example, Briz and Ward (2009) found age 25-44 years were more likely to be purchasers of organic products than consumers below age 25 and over age 45. This was because consumers between 25 and 44 years old had more knowledge and positive awareness of organic products than other age groups. In addition, Onyango (2007) indicated that consumers aged 18-32 were the most likely to purchase organic food and consumers over age 52 were negatively associated with purchasing organic products. Similarly, Thompson (1998) mentioned that the lowest percentage of consumers purchasing organic products were aged over 60 and the most likely aged 18-29 and 40-49 years old. Furthermore, Lockie et al. (2004) found that Australian consumers who are older and more educated are less likely to eat organic food. Younger purchasers seem willing to purchase more organic products due to their environmental consciousness (Goktolga, Bal, & Karkacier, 2006). However, younger purchasers often lacked the purchasing power to purchase organic products and were more likely to purchase organic products less often than older purchasers (Magnusson et al., 2001).

The importance of occupation and marital status in determining the purchase of organic products was confirmed by several studies. For example, Jolly and Dhesi (1989) found that consumers who chose to purchase organic poultry tended to belong to white-collar occupations. Similarly, Jolly (1991) reported that California consumers in white-collar occupations were more likely to be purchasers of organic produce. It also appeared that consumers who resided in cities or urban areas showed a greater tendency to purchase organic products. Zanoli et al. (2004) found consumers who resided in large cities or urban areas and had a higher economic status were more interested in purchasing organic products. Radman (2005), who had similar findings to Zanoli (1989) found that Croatian consumers who grew up in cities and were living in urban areas were regular purchasers of organic products.

Some studies mentioned the presence of children and the number and ages of children in the household increased the likelihood of organic product purchase. However, the effect of these variables has been mixed (see Davies et al., 1995; Hutchins & Greenhalgh, 1997; Thompson & Kidwell, 1998). Thompson and Kidwell's (1998) study revealed that parents with children under 18 years old were more likely to buy organic food products. Stobbelaar et al.'s (2007)

study strongly confirmed Thompson and Kidwell's (1998) finding that school children aged 15-16 years, especially young children, influenced the purchasing behaviour of their parents. The main reason influencing parents to purchase organic products is children's health (Hutchins & Greenhalgh, 1997). A couple of studies did not confirm these findings. Millock et al. (2004) and Davies *et al.* (1995) found that the presence of children in the family did not relate to the probability of organic food purchase. However, women with higher income and having a children over six years old is related to purchasing of organic products (Davies et al., 1995).

In several studies, income has been found to be a significant factor influencing the purchase of organic products (see Davies et al., 1995; Azucena Gracia & Magistris, 2008; Jolly, 1991; Millock et al., 2004; Torjusen et al., 2001). The household's income characterizes the social class of a consumer. According to the household production theory, an increase in the budget available to the household persuades an increase in demand for leisure and market goods and services (Becker, 1976). In general, the income of the household has been shown to positively influence the probability of purchasing organic products, implying that consumers with higher incomes are more likely to be purchasers of organic products. For example, Torjusen et al. (2001) studying consumers' choice of organic produce in Norway, found that household income was passively associated with the likelihood of purchasing organic produce but other socio-demographic variables were not statistically significant. Similarly, the consumer's income was found to positively influence the probability of purchasing organic food (Millock et al., 2004). In contrast, some studies found that income was not statistically significant in explaining the purchase of organic products (see Durham & Andrade, 2005; Onyango et al., 2007; Zepeda & Li, 2007). For example, the result of investigating the variables determining consumers' purchase of organic meat in the Netherlands was that middle and high income households had no relationship to both the purchase and frequency of purchase of organic meat. It was concluded that consumers with higher household incomes were not necessarily more entrenched organic buyers than consumers with lower household incomes (Onyango et al., 2007; Verhoef, 2005).

2.2.2.2 Literature on consumers' willingness to pay (WTP) for organic products

Product price can predict future product demand and influence product success (Krystallis & Chryssohoidis, 2005). A price premium is defined as the difference between the market price for general products and the price that consumers pay for the particular attributes in the

product, such as chemical free, environmentally friendly and brand name (Tse, 2001). A consumer's willingness to pay (WTP) is the maximum amount of money that the consumer is willing to pay in order to obtain a product or exchange a product with certain characteristics (e.g. conventional product) for another product with other characteristics (e.g. organic product) (Norwood & Lusk, 2008). The significant difference between willingness to pay (WTP) and current price premiums is that organic prices constitute a major obstacle to the organics market (Durham & Andrade, 2005; Magnusson et al., 2001; Thompson, 1998). Rodríguez et al.(2007) said that consumers in Argentina would increase their organic consumption levels if organic products were lower priced.

Many studies have estimated the price premium that consumers are willing to pay (see Table 2.3). North American and EU researchers agree that consumers are willing to pay extra for organic products and are generally willing to pay a premium of 10-40 percent for organic products. For example, the willingness to pay of Spanish consumers is in the range of 20-40 percent (Sanjuán et al., 2003). Japanese consumers would pay a price premium of 8-22 percent for certified organic vegetables (Sakagami, Sato, & Ueta, 2006). Vladicka and Cunningham (2002) reported that most Canadian respondents were willing to pay a 10 percent price premium for organic products but Argentinean consumers were willing to pay more, between 6 and 200 percent more (Rodríguez et al., 2007). However, the extra price that consumers are willing to pay for organic products above the price of conventional products does not follow a pattern but differs among countries, consumer segments, product types, and consumer behaviour (Bonti-Ankomah & Yiridoe, 2006). For example, Millock, Hansen, Wier and Andersen (2002) showed that respondents were willing to pay the highest extra price (40%) for an organic potato but organic minced meat was the smallest extra (19%). Krystallis and Chryssohoides (2005) estimated Greek consumers' WTP for 16 organic product types including fresh and processed food. They found that at least 60 percent of the respondents showed their willingness to pay for all product categories above the conventional price. In general, most consumers were willing to pay 30 percent over the standard price. However, the consumers were unwilling to pay more than the standard price for organic processed food products, such as tinned food, pasta, cheese, biscuits, bread and milk. On the other hand, only a quarter of the respondents indicated their unwillingness to pay more for fresh organic products, such as vegetables, fruit, poultry, and meat. Rodríguez et al. (2007) estimated consumers' willingness to pay for organic products in Argentina and revealed that consumers with high income levels were willing to pay 110 percent more for organic

aromatic herbs, 20 percent more for organic fresh chicken, 78 percent more for organic leafy vegetables and 12.2 percent more for organic milk when compared with conventional prices. Gil et al. (2000) and Meier-Ploeger and Woodward (1999) reported that consumers pay higher price premiums for organic vegetables and fruit, followed by animal products.

Consumer studies often elicit consumers' WTP for organic over conventional product prices and the variables relating to the WTP decision (see Table 2.3). A review of existing studies related to consumers' WTP for organic products found that socio-demographic characteristics influenced the consumers' WTP. Socio-demographic variables have been widely explored as WTP predictors for organic food products (Canavari et al., 2002; Davies et al., 1995; Hutchins & Greenhalgh, 1997; Roddy, Cowan, & Hutchinson, 1996; Worner & Meier-Ploeger, 1999). However, in most cases, gender, education, marital status, income levels, presence of children in household, and location significantly determined consumers' willingness to pay for organic products. Female consumers with higher income and higher education are more likely to pay for organic products. It is interesting that several studies found females were willing to pay more for organic products than men but females were willing to pay a lower premium than males (Soler et al., 2002; Ureña et al., 2008). Govindasamy and Italia (1999) estimated consumers' willingness to pay for fresh organic produce in New Jersey and highlighted that young women with high incomes who often purchased fresh organic produce had a greater tendency to pay a price premium but consumers with large households were less likely to pay a price premium for fresh organic produce. The relationship between education level and WTP is contradictory. For example, Canavari et al. (2002) showed that higher education was positive and statistically significant in consumers' willingness to pay for eliminating pesticides but Groff and Kreider (1993) revealed that consumers with low education levels considered fresh organic products of higher quality than conventional products and, therefore, were willing to pay for fresh organic products with higher prices. Similarly, Van Ravenswaay (1995) asserted that higher educated respondents were not willing to pay more for organic products. The reason was that they could easily get information on food risks and benefits and they were less worried about these health related issues.

A consumer who has an experience in purchasing organic products is another significant factor influencing consumers' decision to pay a price premium for organic products. Govindasamy and Italia (1999) and Vanit-Anunchai (2006) studies show that consumers who were purchasers or purchasers on a regular basis of organic products were willing to a price

premium for organic products. This was confirmed and supported by Goldman and Clancy's (1991) findings that purchasers who frequently purchase organic products are less price sensitive than other purchasers when they made a decision to purchase organic products.

Various studies investigated consumers' attitudes and the factors potentially facilitating and impeding the acceptance of organic products in order to elicit the consumers' willingness to pay a premium for them. Rodríguez, Lacaze and Lupín (2007) used the contingent valuation method (CVM) to evaluate consumers' willingness to pay for organic products (milk, leafy vegetables, whole wheat flour, fresh chicken, aromatic herbs) in Argentina. Their results showed that consumers were willing to pay a premium for organic products because of better quality, such as packaging, nutritional benefits, nutritional information, continuously available varieties in the market and the credibility of the organic certification system. It is not surprising that consumers revealed scarcity and higher price of organic products the most important constraints in expanding the Argentineans' organic consumption.

Govindasamy, DeCongelio, and Bhuyan (2005) used the logit model to investigate the factors involved in the willingness to pay for reduced pesticide produce and organic produce by north-eastern consumers in the US. The authors reported that consumers who often checked ingredient labels when purchasing food and had heard about integrated pest management produce, reported that the quality of fresh produce affected where they shopped and were more likely to pay a premium for organic produce, especially, fruits and vegetables.

Krystallis and Chryssohoidis (2005) studied the factors affecting Greek consumers' WTP for organic products in different food categories using factor analysis. They found that socio-demographic factors had a less important role in the prediction of WTP for all organic product categories. On the other hand, the factors that were statistically significant in defining WTP for most organic product categories were "food quality and security" and "trust in the certification". This means that consumers are unwilling to pay more than conventional prices if they are not completely sure that the products they purchase are organic as labelled and the organic food certifications are authentic.

Loureiro and Hine (2002) studied consumers' preferences for local (Colorado) organic and GMOs-free potatoes by extracting the WTP for those labelled value-added products. The authors used contingent valuation (payment card) and the multiple bounded probit methods in their analyses. Consumers were willing to pay 6.64 cents/lb for organic potatoes, but they were willing to pay 9.37 cents/lb for locally produced potatoes. However, wealthier

consumers with higher education levels preferred organic potatoes compared with local potatoes. In addition, the age of respondents negatively impacted on the WTP for organic food products.

Botonaki, Polymeros, Tsakiridou, and Mattas (2006) elicited Greek consumers' attitudes and WTP for organic products and the products produced under integrated management (SIM). They used principal component analysis (PCA) with varimax rotation to analyse their survey data. They asserted that consumers who place health as important often consumed organic fruit or vegetables and obtained food and nutrition information from health specialists. Consumers who were married, regular organic buyers and regularly consuming fruit or vegetables were willing to pay more for the products produced under the SIM method. The authors concluded that inadequate promotion and low availability of certified products (organic and SIM) could be the major factors affecting consumers' attitudes and WTP for both products.

Canavari et al. (2002) employed linear regression analysis to examine consumers' attitudes and their willingness to pay for organic apples. Most consumers were willing to pay a price premium to eliminate pesticides. Some consumers were not willing to pay for the free-of-pesticide produce because they believed consumers should not have to pay for food safety. This study found that higher education, amount of fruit consumed and perceived environmental effects of organic agriculture impacted consumers' WTP.

Onozaka, Bunch and Larson (2006) investigated consumer preferences and WTP for organic fresh produce. The authors used choice experiments to elicit the specific key attributes of organic products, including presence of pesticide residues, use of genetic modification, use of environmentally friendly production techniques, and unit price. The authors concluded that households with children were positive and significant only for regular organic buyers but age was negatively significant for irregular buyers. The "personal health benefit" drove non-regular buyers' WTP whereas "no GMOs" or "environmentally friendly" attributes had no influence. Irregular organic buyers were willing to pay considerably more for all attributes; improved environmental quality and personal health were the highest WTP attributes. This result implies that consumers who purchase organic products occasionally are mainly motivated by the private benefit (e.g. improved health) whereas consumers who purchased

organic products regularly had both private and public motivations (e.g. improved or protected environment).

Ara (2003) used choice experiments to study Philippines consumers' WTP for multiple attributes of organic rice and the study found that socio-demographic characteristics and risk perceptions were the main determinants of the consumers' WTP. The study also found that consumers who lived close to local production sites were more aware of the environment and had a lower demand for certified organic rice whereas consumers living further from production sites had a higher demand for certified organic rice. In addition, consumer income determined whether people preferred to choose one certification over another.

Huang et al. (1999) applied both the probit and ordered probit models to examine consumers' concerns for food safety and their WTP for safer food in Taiwan. Hydroponically grown vegetables (HGV) were used to represent free of pesticide residue products. According to their study, consumers with small children and high education levels had a positive influence on the probability of purchasing HGV. However, these factors did not significantly influence the magnitude of price premium that consumers were willing to pay. The premium a consumer was willing to pay was positive and significantly correlated with families with health problems (i.e. suffering from a chronic disease), households with higher incomes and the age of the consumers. It is interesting that consumers who dined out more than three times a week and weighed the price of product as an important factor in their decision to purchase had a low likelihood of purchasing the HGV. They found that the premium a consumer was willing to pay for certified residue-free products or alternative products differed from other related studies because of different social and cultural aspects of host countries.

2.2.3 A proposed model of consumers' purchase decisions and consumers' willingness to pay for organic products

This study developed the models of consumers' decisions to purchase and willingness to pay for organic products in Thailand based on the EBM model, the Bonti-Ankomah and Yiridoe model (see Bonti-Ankomah & Yiridoe, 2006) and previous literature on consumers' purchase decisions and willingness to pay for organic products. The key factors influencing the consumers' purchase decisions and willingness to pay for organic products are (see Figure 2.3 and Table 2.2):

1. Attitudes towards health, food safety, ethics and environment (Hammitt, 1990; Harper & Makatouni, 2002; Magnusson et al., 2003; Schifferstein & Oude Ophuis, 1998; Soler et al., 2002) .

2. Knowledge about organic products (Cicia et al., 2002; Davies et al., 1995; Demeritt, 2002; Gifford & Bernard, 2006; Azucena Gracia & Magistris, 2008).

3. Personal lifestyle. Three variables have significantly explained as important factors in previous research including vegetarian diet, often purchasing groceries at natural/health food stores and often dining out (Huang et al., 1999; Onyango et al., 2007; Vanit-Anunchai, 2006; Williams & Hammitt, 2000).

4. Perception of organic product attributes including quality (nutritious, taste, appearance), health, environment and availability of product and information and price of the products (Demeritt, 2002; Lea & Worsley, 2005; O' Donovan & McCarthy, 2002; Radman, 2005; Sylvander, 1995; Zhao et al., 2007).

5. Socio-demographic characteristics including gender, education, age, occupation, marital status, children in household, household income, and household location (Bord Bia, 2000; Azucena Gracia & Magistris, 2008; Jolly, 1991; Magnusson et al., 2001; Onyango et al., 2007; Stobbelaar et al., 2007; Zanoli et al., 2004; Zepeda & Li, 2007).

.

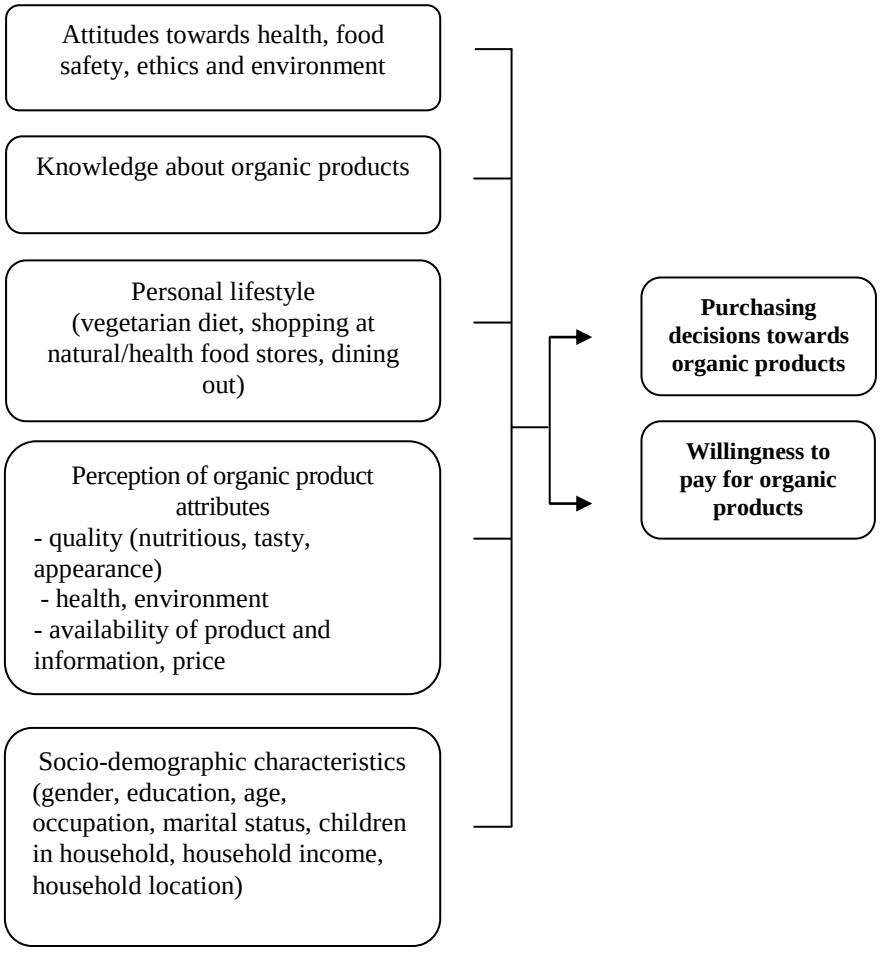

Figure 2.3 Conceptual model for consumers' purchase decisions and willingness to pay for organic products in Thailand

Table 2.2 Summary of the key findings from studies on consumers' purchase behaviour towards organic products

Author(s)	*Country of research*	*Methods*	*Topics*	*Findings*
Goldman and Clancy (1991)	U.S.	Surveyed food co-op shoppers	Relationship between organic produce purchases and attitudes related to pesticide use and food costs	Regular purchasers of organic produce highly concerned about food safety and are less concerned about price, insects, and surface blemishes. There is no relationship between income and frequency of purchasing organic products.
Jolly (1991)	U.S. California	Questionnaire, analysis of variance	Attitude and perception of consumers to organic food and patterns of purchasing organic products	The demographic variables that influence California's consumers in purchasing organic horticultural products are occupation, age, size of community while attitudinal variables are concerns related to chemical residues, radiation by-products, salt and sugar. Safety, freshness, general health benefits, nutritional value, environmental effect, flavor, and appearance of product were important in choosing organic foods
Davies et al. (1995)	Ireland	Interviews and survey	A profile of consumers who purchase organic products	Health, environment and taste are key reasons for purchasing organic products. Major reasons for not purchasing organic products are availability and price. The increased probability in purchasing organic food was associated with female, level of disposable income, age and children in the household. Environmental concern does not necessarily lead to organic purchasing behaviour.
Huang (1996)	U.S.	Mail survey	Consumer preferences and attitudes toward organic grown products	Nutritionally conscious and pesticide use concern are important for purchasing organically grown produce. The most significant in enhancing marketing potential are testing and certification, sensory qualities and pricing competition.
Hutchins and Greenhalgh (1997)	United Kingdom	Survey	Organic confusion	Consumers were commonly confused about the meaning of term organic. Health, and children are most important reasons for organic purchasers. The availability of organic produce in supermarkets is desired. Consumers are willing to pay higher premiums for organic meat than for other produce.
Schifferstein and Ophuis (1998)	Netherlands	Survey	Relationship between health-related factors and organic food consumption	Organic food purchasers considered themselves more responsible for their health and were more likely to undertake preventive health action. Health was a more significant motive for occasional consumers than regular consumers. In addition, wholesomeness, absence of chemicals, environmental friendliness, and taste were important factors that affect the demand for organic food.

Table 2.2 Summary of the key findings from studies on consumers' purchase behaviour towards organic products (continued)

Author(s)	*Country of research*	*Methods*	*Topics*	*Findings*
Thompson and Kidwell (1998)	U.S. Arizona	Survey	Consumers' choice of organic and conventional produce in specialty and co-op retail outlets	Store choice influenced the probability of purchasing organic products. Propensity to purchase organic and level of income predicted store choice. Higher income households were the more likely to choose a specialty grocer but less likely to choose organic products. Presence of children in households increased, and higher- educated consumers decreased, the probability of purchasing organic products.
Magnusson et al. (2001)	Sweden	Mail survey	Swedish consumers attitudes towards organic products	Most respondents have a positive attitude toward organic products, but they are rarely purchased. "Good taste" is the most important criterion and ''organically produced'' is the least important when purchasing food. Organic foods are perceived to be more expensive and healthier than conventional food.
O'Donovan and McCarthy (2002)	Ireland	Interview questionnaire	Irish consumers' perceptions of organic meat	Organic meat purchasers were concerned about food safety and health and they believed organic meat was superior in terms of quality, safety, labeling, production methods, and value. 70 per cent of Irish consumers were not willing to pay more for organic meat. The main factors that deterrent the consumers from purchase of organic meat were product availability and price. Higher socio-economic consumers had a higher probability of purchasing organic meat.
Harper and Makatouni (2002)	U.K.	Focus group	Consumer perception of organic food production and farm animal welfare	U.K. consumers confuse organic and free-range products. The main motivations in purchasing organic food are health and food safety concerns. Animal welfare is used as an indicator of other product attributes, such as safety and health.
Zanoli and Naspetti (2002)	Italy	Interviews - used means-end chain models	Link product attributes to consumer needs.	Occasional consumers for organic food attracted by personal satisfaction; important values are ''accomplishment and pleasure'' and ''to get the most from life''. Regular consumers of organic food are guided by the values of ''altruism/relationship with others'' and ''ecology, harmony with the universe and sustainable future''.
Fotopoulos and Krystallis (2002)	Greece	Qualitative interviews	Related wine choice to consumers' value structures	The attributes of values of searching for pleasure in life, healthiness-long life, and the pursuit of quality are significant in purchasing organic wine. The significant motivational benefits of purchasing wine are healthiness, quality, information, attractiveness, and good taste.

Table 2.2 Summary of the key findings from studies on consumers' purchase behaviour towards organic products (Continued)

Author(s)	*Country of research*	*Methods*	*Topics*	*Findings*
Durham and Andrade (2005)	U.S.	Web-based questionnaire	Health and environmental motivation in organic preferences and purchases	Results of the binary choice model for organic fresh fruit and vegetables in Oregon indicated that both health and the environment are the main factors for purchasing organic products but in the model of higher levels of organic purchases was found that the environment is more influential than health. Price, and to a lesser extent, demographic variables, also explain the buying decision.
Onyango, Hallman and Bellows (2007)	U.S.	Logistic regression	Purchasing organic food in U.S.	Food naturalness aspect (no artificial flavours or colourings), vegetarian-vegan identity and US production location considerations are important factors explaining the regularity of organic food purchases. Food familiarity aspect has a negative impact on organic food purchases. Young female consumers, more politically liberal and moderately religious are more likely to buy organic food on a regular basis.
Gracia and Magistris (2007)	Italy	A pilot study for urban consumers. A multivariate limited dependent variable model	Factors that influence organic food purchases, intention, and knowledge of urban consumers in the South of Italy	The purchase intention of organic products depends on attitudes and knowledge of organic product. The most significant factors influencing the purchase intention and the final decision are consumers' attitudes towards health and environmental benefits. Income and organic knowledge positively impact on the final decision to buy organic products.
Hamzaoui and Mehdi (2008)	Italy	Questionnaire, structural equation modelling approach	Consumers' decision-making process for organically produced foods	Consumer' attitudes towards health and environment attributes are the most important factors explaining consumers' decision to choose organic products. Availability of organic information influences consumers' attitudes towards organic food products. Consumers who try to follow a healthy diet and balanced life are likely to have more positive attitudes towards organic food products and influence the intention to purchase organic foods.

Table 2.3 Summary of key findings from existing studies on consumers' willingness to pay a premium for organic products

Author(s) (year)	*Country of research*	*Method*	*Topics*	*Findings*
Huang, et al. (1999)	Taiwan	A joint probit and ordered probit model	Consumers' food safety preferences and WTP for certified residue-free produce	Families with health problems (i.e. suffering from a chronic disease), the higher household incomes and age of consumers are a positively significant in the amount of the premium a consumer is willing to pay. Consumers' willingness to pay a price premium is influenced by the household having small children and high education. In contrast, dining out more than three times a week and household income are less significant in consumer WTP for HGV.
Gil et al. (2000)	Spain	Contingent valuation method	Market segmentation and WTP for organic products.	Actual consumers and likely consumers buying organic products had a positive attitude and were willing to pay for organic products. Meat, fruits and vegetables were considered to pay more compared to other products.
Canavari et al. (2002)	Italy	Linear regression analysis	Increased awareness of food safety can influence consumer behaviours and consumer WTP regarding organic fruit	Most respondents were willing to pay a premium to eliminate pesticides for organic apples. Three factors impact WTP: higher education, amount of fruit consumed, and perceived environmental effect of organic agriculture.
Loureiro et al. (2002)	U.S.	Survey	Consumers' apple choices	Female, with children under 18 in the household, higher food safety, and environmental concerns increased the probability that consumers would pay a price premium for organic apple.
Loureiro and Hine (2002)	U.S.	CVM-payment card and the multiple bounded probit method	Consumers' preference for local, organic and GMO-free potatoes	Consumers were willing to pay for locally produced potatoes with a higher premium than for organic potatoes. However, wealthier and more educated consumers preferred organic potatoes to local potatoes. Respondents' age was negatively associated with the estimated WTP for organic foods.
Soler et al. (2002)	Spain	Experimental auction market	Consumers' WTP for organic food	The accuracy of and way information is offered increased the WTP. Individuals' environmental or food safety concerns affected the decision to purchase organic products. Socio-economic variables determined the amount that consumers were willing to pay. 70 per cent of consumers were willing to pay a price premium.

Table 2.3 Summary of key findings from existing studies on consumers' willingness to pay a premium for organic products (continued)

Author(s) (year)	*Country of research*	*Method*	*Topics*	*Findings*
Ara (2003)	Philippines	Choice experiment	Consumers' WTP for the multiple attributes of organic rice.	Consumer income levels determined whether people prefer to choose one certification over another. Moreover, consumers who lived close to local production sites are more aware of the environment and have a lower demand for certified organic rice.
Corsi and Novelli (2003)	Italy	Contingent valuation method	Consumers are WTP for organic beef meat	Double-bounded probit was employed to estimate the WTP. The maximum premium consumers' willing to pay for roast and minute steak are 25 per cent and 20 per cent, respectively.
Govindasamy, DeCongelio and Bhuyan (2005)	U.S.A.	Logit model	Factors affecting the WTP for reduced pesticide produce and organic produce	It is found that consumers who often check ingredient labels when purchasing food and have heard about integrated pest management produce, mention that quality of fresh produce affects where they shop and are more likely to pay a premium for organic produce, especially, fruits and vegetables.
Krystallis and Chryssohoidis (2005)	Greece	Factor analysis	Factors affect the WTP for organic products and the difference of WTP on the product type	Most organic product categories found that "quality and security" and "trust" factors significantly influenced WTP. Types and magnitude of affected factors vary according to the organic product categories.
Botonaki, Polymeros, Tsakiridou and Mattas (2006)	Greece	Principal component analysis (PCA) with varimax rotation	Attitudes and WTP for organic products and products grown under the system of integrated management (SIM)	Health, consume organic fruits/vegetables and get food and nutrition information from health specialist are the main factors influencing consumers' WTP for organic products. While the significant factors affecting consumers' WTP for SIM are consumers who are married, regular organic buyers and regularly consuming fruits or vegetables.
Onozaka, Bunch and Larson (2006)	U.S.	Choice experiment	Consumer preference for organic produce and WTP for key attributes.	Regular buyers were influenced by environmental quality and private health benefit to purchase organic produce while only private health benefit drives non-regular buyers to buy organic produce. Different products yielded different WTP.
Rodríguez, Lacaze and Lupín (2007)	Argentina	Contingent valuation method	Consumers' WTP for organic products (milk, leafy vegetables, whole wheat flour, fresh chicken, aromatic herbs)	Consumer are willing to pay a premium for organic products to gain better quality products, to have continually available a variety of organic products in the market, and to have credible quality of the organic certification system. Consumers reveal that scarcity and higher price of organic products are the most important obstructions for expanding Argentineans' organic consumption.
Urena, Bernabeu and Olmeda (2008)	Spain	Logit models	The differences of men's and women's attitudes and WTP towards organic food	Women have a more favourable attitude (an indication of their life style) to purchase and consume organic products than men. However, men were disposed to pay a higher increase in price than women.

Chapter 3
Research methodology

This chapter discusses the theoretical framework and methodology used to gather the relevant data to answer the research objectives. The chapter is divided into two sections. The first section provides the theoretical and conceptual framework. The second section details the research design for obtaining the data. This section provides an overview of the design and structure of the questionnaire process, the pre-test process, sample selection, the procedure to collect the data and the methods used to analyse the data.

3.1 Economic consumer theory

The introduction of organic food products to the market or the success of production depends on consumers' acceptance of the credence products or quality-enhanced products that depend on understanding the possible future demand for and willingness to pay to acquire the products. To determine consumers' demand and WTP for the organic products requires an exploration of consumer theory. This section outlines the economic theoretical background that underlies the empirical models used in this study.

3.1.1 Theoretical framework for consumer choice

Economists use the term 'utility' to describe the satisfaction from the consumption of the bundle of commodities (goods and services). Consumer choice theory assumes that consumers face choices in the consumption of commodities and choose different consumption levels of alternative commodities leading them to maximize their overall satisfaction. A 'choice set' is only an affordable alternative from choices in the universe of consumption. The choice set can be continuous or discrete. However, discrete choices are more realistic of the choice situation consumers face (e.g. the choice of which food to purchase). Assuming that consumers act rationally, they allocate their constraints (i.e. the limited budget and time) among a variety of commodities in a way that "maximizes their utility" (see Briz & Ward, 2009; Train, 2003).

Lancaster (1966) argued for consumer theory by introducing the idea that each commodity in the choice set consists of a group of characteristics or attributes. He pointed out that

consumer preferences for goods are indirect. Consumers typically make a decision among goods, having compared the attributes of other goods, and choose the goods that possess the combination of attributes that maximizes their utility. Thus, the utility is derived from the attributes of the goods rather than from goods themselves. For example, the purchase decision of goods is based on attributes of the goods, which can be physical attributes (i.e. colour, freshness, texture of goods), or quality attributes (i.e. health benefits, environmental awareness, ethics) or added attributes (price, promotion and place).

Consumers' choice decisions between alternative goods and services represent the discrete choice situation that is based on random utility theory. The random utility maximization theory (RUM) assumes that individuals choose the alternative that yields the highest utility (maximizes utility subject to income and budget). Secondly, the RUM is consistent with Lancaster's theory in that consumers derive their utility from the attributes of choices. The last assumption of RUM is that every choice decision is independent which means that the last decision has no impact on the current decision. The true utility an individual derives from the product attributes is not observable because not all the attributes are known to and measurable by the researcher. Thus, a random utility function of the individual is typically formulated with the sum of two parts including the deterministic component or observable aspects of the utility consisting of the attributes of products and the individual's characteristics, v_{ij}, and the unobservable aspects, ε_{ij}. The unobservable aspects are assumed to have all the attributes of the products and characteristics of the individual that may be unknown or unobserved, which are treated as a random component (Becker, 1976).

The RUM states that an individual i, receives utility, U_{ij}, from choosing an choice j from a finite set of choices, C (Becker, 1976). The individual's utility of choice can be written as follows:

$$U_{ij} = v_{ij} + \varepsilon_{ij} \qquad (3.1)$$

where: U_{ij} is the utility of individual i in choosing a choice j

v_{ij} is an indirect utility, the systematic component or the observable component; and

ε_{ij} is the stochastic or random component representing unobservable factors, such as unobservable variations in preference, random individual behaviour, and measurement error.

v_{ij} becomes the explainable portion of the variance in choice, which is used to explain and predict individual's choices. v_{ij} can be expanded to be a linear function of n attributes for a specific alternative as follows:

$$V_{ij} = \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + ... + \beta_n x_n = \beta X_n \qquad (3.2)$$

where: X_n is a vector of n attributes for choice j.

$\beta' s$ is a vector of unknown parameters associated with attributes.

The key assumption is that an individual i will choose an alternative j over another alternative k, if and only if, the utility associated with j is greater than utility from alternative k, given $j, k \in C$ where C is the set of choices. This can be written as:

$$U_{ij} > U_{ik} \text{ for all } j \neq k \qquad (3.3)$$

So equation (3.3) can be written as:

$$V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik} \qquad (3.4)$$

Rearranging to observable (indirect function) and un-observable (random component) yields:

$$V_{ij} - V_{ik} > \varepsilon_{ik} - \varepsilon_{ij} \qquad (3.5)$$

However, in practice it is difficult to observe ($\varepsilon_{ik} - \varepsilon_{ij}$), and hence one cannot determine whether $V_{ij} - V_{ik} > \varepsilon_{ik} - \varepsilon_{ij}$. Since we cannot observe the true utility function, a probabilistic utility function is used in the estimation process. The analyst has to calculate the probability that ($\varepsilon_{ik} - \varepsilon_{ij}$) will be less than ($V_{ij} - V_{ik}$) (Train, 2003). The probability that alternative j is chosen is given by:

$$prob(j) = prob(V_{ij} - V_{ik} > \varepsilon_{ik} - \varepsilon_{ij})$$

$$P_i(j \mid C) = P_i(V_{ij} - V_{ik} > \varepsilon_{ik} - \varepsilon_{ij}), \qquad \forall j \neq k \in C \qquad (3.6)$$

In this study, estimating consumers' decisions to purchase organic products, individuals are asked to choose between two alternative products (e.g. organic or conventional products). Organic products are available in the market with conventional products. To make a purchase decision between the two products, consumers have to compare the attributes embodied in

the organic products (i.e. health benefits, environmental awareness, ethics) that make the product different from conventional products. Thus, a binary choice model is applied in this study. The choice set contains the two alternatives j and k, $C = (j,k)$. Following the random utility theory mentioned above, the probability of choosing alternative j is given by:

$$P_i(j) = P_i(V_{ij} - V_{ik} > \varepsilon_{ik} - \varepsilon_{ij}) \qquad (3.7)$$

And the probability of choosing alternative k is given be

$$P_i(k) = P_i(V_{ik} - V_{ij} > \varepsilon_{ij} - \varepsilon_{ik}) \qquad or$$

$$P_i(k) = 1 - P_i(j) \qquad (3.8)$$

Random utility models (binary choice models) are obtained by specifying a probability distribution of the two disturbances ($\varepsilon_i = \varepsilon_{ik} - \varepsilon_{ij}$). The two most commonly used forms are the normal distribution and logistic distribution. If it is assumed that $\varepsilon_i = \varepsilon_{ik} - \varepsilon_{ij}$ is a standard normal distribution function that leads to the probit model. On the other hand, if $\varepsilon_i = \varepsilon_{ik} - \varepsilon_{ij}$ is identically and independently distributed as a type I extreme value, which follows the logistic distribution that leads to the logit model. The cumulative distribution function (CDF) of both models has symmetric and bell-shaped densities, although the logistic density has heavier tails than the standard normal. As the distributions are similar, the results derived using the two models will be quite similar. Typically, the logit models is used for analysing dichotomous choice data because the underlying logistic distribution allows for more convenient estimation compared with other choice models (Greene, 2008). Thus, the logit model was chosen to estimate the factors affecting consumers' decision to purchase organic products in this study.

As the assumption of the difference between the two random components ($\varepsilon_i = \varepsilon_{ik} - \varepsilon_{ij}$) is logistically distributed, the cumulative distribution function (CDF) of the logit model has the form:

$$F(\varepsilon_i) = \frac{1}{1 + e^{-\mu\varepsilon_i}} \qquad (3.9)$$

Where: $F(\cdot)$ is the cumulative distribution function and μ is a positive scale parameter.

Thus, the probability of choosing alternative j is given as:

$$P_i(j) = \frac{1}{1+e^{-\mu(V_{ij}-V_{ik})}} \quad (3.10)$$

As stated previously, the expressions in Equation (3.2) define v_{ij} as a linear function of n attributes for alternative j. Thus, the probability is given as (Train, 2003)

$$P_i(j) = \frac{1}{1+e^{-\beta(X_{ij}-X_{ik})}} \quad (3.11)$$

3.1.2 The theoretical framework of consumers' willingness to pay

3.1.2.1 Choice theory in Measuring Welfare Change

The willingness to pay (WTP) approach is a type of cost-benefit analysis (CBA) in policy-making. CBA provides a framework to estimate the economic evaluation for welfare changes of both costs and benefits in monetary terms. An attempt to place a monetary value on goods and services can be justified by cost and/or benefit in which the cost of the improvements must equal the benefits to society. Benefits can be measured by individual preferences, which are identified by presenting individuals with different choices of goods. If the individual places the value of the good (received benefit) above the market price, the individual are willing to pay for a good (positive preference), the so-called consumer surplus (Pearce & Turner, 1990). In Marshall's demand theory, consumer surplus (CS) is the benefit received measured by the difference between the maximum an individual is willing to pay and the market price for a good. The Marshallian demand curve holds income constant while utility varies along the curve, thus consumer surplus cannot be defined in terms of the underlying utility function (Varian, 1992). Researchers are generally interested in the Hicksian consumer surplus theory to measure the benefits of public goods because the Hicksian demand curve holds utility constant as the level of income varies with each change in price (Mitchell & Carson, 1989). Hicks (1993) first classified the consumer surplus measurement into two different categories, compensating variation and equivalent variation.

Compensating variation (CV) and equivalent variation (EV) are used as monetary measures of changes in welfare (Freeman, 1993). CV is the amount of money (compensation), paid or received, that makes an individual remain at the initial level of welfare after a change in prices (it can also describe a change in product quality). EV is the amount of money, paid or received, that makes the consumer as well off with the change, that is at the new level of utility (Varian, 1992).

The variations can be shown algebraically. Consider an individual who derived utility from the quantities of two market commodities, $U(x,q,z)$, where x is a vector of private goods, and q is a vector of public goods. Assuming the individual's maximum utility is subject to a budget constraint (given the level of prices and income), it can be written as an indirect utility function as $v(p,q,y,z)$, where p is the vector of the prices of the market commodities, z is the individual's characteristics and y is their income. We conventionally assume that $U(x,q,z)$ is increasing and quasi-concave in x, which implies that $v(p,q,y,z)$ satisfies the standard properties with respect to p and y; but we make no assumptions regarding q. If we consider q as a "good" then $U(x,q,z)$ and $v(p,q,y,z)$ will both be increasing in q; if we consider q as a "bad," then $U(x,q,z)$ and $v(p,q,y)$ will both be decreasing in q (Carson & Hanemann, 2005).

As q changes from q_0 to q_1, the individual's utility changes from $U_0 = v(p,q_0,y,z)$ to $U_1 = v(p,q_1,y,z)$. If $U_1 > U_0$, this change is considered an individual's welfare improvement but this change is considered an individual's welfare decline if $U_1 < U_0$. The monetary value of the change is represented by the two Hicksian measures, the compensating variation (C) and the equivalent variation (E), which can be written as (Carson & Hanemann, 2005):

$$v(p,q_1,y-C,z) = v(p,q_0,y,z), \qquad (3.12)$$

and:

$$v(p,q_1,y,z) = v(p,q_0,y+E,z) \qquad (3.13)$$

If the change (e.g. improved environmental quality) is considered an improvement (C>0 and E>0), then C measures the individual's maximum WTP to secure the change and E measures the individual's minimum WTA to forgo it. If the change is considered as worse (C<0 and C<0), then C measures the individual's WTA to endure the change, and E measures the individual's WTP to avoid it (see Table 3.1) (Carson & Hanemann, 2005).

Table 3.1 Relationship between Compensating variation, Equivalent variation, Willingness to pay and Willingness to accept

Welfare measure	*Utility increases*	*Utility decreases*
Compensating Variation (CV) (In the status quo)	WTP to obtain	WTA to accept
Equivalent Variation (EV) (In the change)	WTA to forgo	WTP to avoid

Source: Freeman (2003)

In the case of organic products, the products refer to an enhanced, environmentally friendly and health-positive method of farming and processing foods compared with conventional products (FAO, 2002). Hence, organic products refer to the change in q from q_0 to q_1 as an improvement in quality. Compensating variation (CV) is the appropriate measurement for determining the amount of WTP for organic products that an individual places on this improvement. In the other words, an individual's WTP for organic products is some amount of income taken away from total income while keeping the individual's utility unchanged. This is represented as

$$v(p, q_1, y - WTP, z) = v(p, q_0, y, z) \tag{3.14}$$

Similarly, considering the assumption of expenditure minimization subject to a given level of utility, the monetary value an individual places on the change in q is:

$$WTP = m(p, q_0, U_0) - m(p, q_1, U_0) \tag{3.15}$$

3.1.2.2 Measurement of willingness to pay (WTP)

To date, several economic valuation methods have been used to elicit economic value for goods. The appropriate method in each study depends on the data; whether the sources of the collected data are from actual choices or hypothetical choices, the so-called Revealed and Stated Preference approaches, respectively.

Traditionally, understanding the factors affecting a consumer's purchase decisions relied on actual consumer behaviour, that analyses the Revealed Preference (RP) data collected from decisions on behavioural choices made by consumers in the actual market (e.g. consumer expenditure survey, supermarket scanner data, etc.). This is known as the indirect method (Freeman, 2003). The advantage of RP data is validity because they are based on actual

decisions; thus, there is no need to assume that the consumer will respond to simulated product markets as they do in actual market situations. The disadvantage with RP data is that they can be collected only from an existing product in the market. Thus extrapolating consumers' demand for a new product not available in the market cannot be accomplished with this technique. The common methods for estimating consumers' WTP based on revealed preference data are the Hedonic Price method and the Travel Cost method, which are indirect methods (Freeman, 2003).

An alternative approach, the Stated Preference (SP) technique, which uses direct methods such as a survey, gathers data from consumers based on hypothetical choices. Thus, SP data can be collected for either available products or those that are not available. The SP technique has the advantage that it is useful in helping policy makers or researchers understand how consumers respond and to predict demand for novel goods and services where existing data from actual markets are necessarily unavailable. It is done by considering the value that consumers place on goods or services (Lee & Hatcher, 2001). Originally, the SP approach was commonly used in the economic valuation of non-market goods and services (i.e. environmental resources and transport) but, during the last decade, this approach has been increasingly applied in marketing and food economics. It is also widely used to estimate the consumers' preference or WTP for new products and new products' attributes (i.e. quality of food products). To date, a variety of stated preference approaches has been developed and introduced. The common approaches include the Contingent Valuation method, the Choice Experiments method and the Experimental Auctions method (see Chang & Zepeda, 2005; Loureiro et al., 2002; Lusk, 2003; Lusk & Schroeder, 2004). In this study, the stated preference method is used because organic products in Thailand comprise a very small market; there are no revealed data for evaluating the monetary amount that a consumer would be willing to pay for organic products.

3.1.2.3 Stated Preference techniques

Within the SP techniques, choice modelling (CM) and the contingent valuation method (CVM) have been widely used by previous researchers. Both CM and CVM are generally considered by researchers as the most appropriate methods to elicit consumers' WTP and are commonly applied in marketing research because they are easy and cheap to carry out. Moreover, these methods use the random utility model (RUM), based on Lancaster consumer theory, which states that consumers make choices derived from their preferences for good

attributes. Thus, these methods can use discrete choice models to derive the average WTP, and the product attributes and factors influencing WTP (Lusk & Hudson, 2004).

Choice Modelling (CM) comprises choice experiments, contingent ranking and conjoint analysis that seeks the consumer's preferences for the multiple characteristics/attributes of the goods and services. There are no direct questions about the valuation. For example, choice experiments require the respondent to select her/his preferred option from a choice set made up of alternative bundles of products. Choice experiments predict the consumer's choice by determining the relative importance of various attributes in the consumer's choice process (Hanemann & Kanninen, 1998). A large number of marketing studies have used choice experiments to elicit the differences in consumers' preferences for organic product attributes. For example, Ara (2003) used conjoint analysis to evaluate consumers' preference for organic rice attributes in the Philippines, including price, reduced health risk level, environmental quality, eating quality, type of organic certification and fair trade. Lusk and Schroeder (2004) estimated consumers' preferences for beef rib eye steak with different quality attributes using choice experiments. In addition, Onozaka et al. (2006) used the choice experiment method to elicit consumers' WTP a premium for specific attributes of organic fresh products, such as bananas, fuji apples, broccoli, and red leaf lettuce.

Choice experiments are useful in the economic valuation of multiple attributes or characteristics of goods and services but this method asks the individuals the same type of questions repeatedly, which involves greater concentration by the respondents to reveal their preferences compared with the CVM. Inconsistent responses are thus common. The literature indicates that inconsistent responses increase as the number of choices increases. Furthermore, complex survey designs are required, which can create some difficulties (Hanemann, Loomis, & Kanninen, 1991; Lusk & Hudson, 2004). Another major drawback is that choice experiments do not allow the respondent to perceive all potential options/scenarios of the products under evaluation in their response. Instead, under choice experiments, respondents are offered some specific choice options/scenarios and then they are asked to state her/his WTP for the choices. In contrast, the CVM technique does not have such restriction.

Contingent Valuation Method (CVM), the most common stated preference method, has been extensively used to determine the monetary valuation of non-market goods and services, and is now widely used to evaluate the WTP for credence products. The primary objective of the

CVM is to obtain an accurate estimate of the benefits (or cost) of a change in the quality or quantity of non-market goods such as environmental improvements. Responding to the absence of market prices for non-market or credence goods, the CVM proposes a hypothetical market created for the respondent to operate in by asking the respondent directly how much he/she would be willing to pay (contingent) in a specific hypothetical scenario by using a survey questionnaire to acquire information. The values generated by the hypothetical questions are treated as estimates of the value of the non-market good or service. The characteristic of CVM is that it reveals consumers' preference for non-existing goods and services as a bundle of characteristics or the whole good (Carson & Hanemann, 2005). In general, the CVM can be used to value attributes/characteristics of goods with only a few attributes each time. However, there are limitations in situations where a variety of attributes is being measured because the questionnaire can became burdensome and too demanding for respondents (Lusk & Hudson, 2004). Thus, CVM is a more appropriate method than CM for evaluating the product of interest as a whole because it is unacceptable to use CM to assume that the value of the whole product is equal to the sum of the product's attributes. On the other hand, CM is preferable when the values for characteristics/attributes are required.

The CVM is the only feasible method to elicit consumers' true WTP (Mitchell & Carson, 1989). Compared with other methods, CVM is flexible, easy and less expensive to apply for monetary evaluation of different product attributes (Van Ravenswaay & Wohl, 1995). Therefore, the CVM has been a popular technique to evaluate consumers' willingness to pay for different types of food attributes, considered as credence attributes, since the quality of credence goods cannot be observed either before or after the purchase of the good, and may not be widely available in the market. A number of studies have applied CVM to evaluate consumers' preferences for food safety in terms of avoidance of pesticides, residue free products (Batte, Hooker, Haab, & Beaverson, 2007; Buzby et al., 1995) and genetically modified products (Grimsrud, McCluskey, Loureiro, & Wahl, 2004). Other CVM studies focusing on environmentally friendly products and organic products include Sanjuán et al. (2003), Gil et al. (2000), Lusk (2003), Vanit-Anunchai (2006) and Rodríguez et al. (2007).

This study uses CVM to elicit the consumers' WTP for organic products in Thailand. CVM allows us to use a hypothetical market since the organic products market in Thailand is relatively small and the products are not available in all retail shops. Secondly, since organic products contain various attributes (i.e. food safety, environmental concerns and ethical attributes) embodied in the products and not sold separately, the CVM is a practical method

to collect primary data that are nonexistent in the market. Thirdly, CVM directly asks the consumers about their WTP so the net value of WTP for the products can be directly estimated.

3.1.2.4 Contingent valuation formats

The CVM includes a variety of elicitation formats to elicit consumers' willingness to pay for goods and services and each format greatly influences the results,

Open-ended question: An open-ended question evaluates an individual's WTP by asking the maximum amount of money that an individual would be willing to pay for goods and services. The respondent gives a straightforward answer of his/her WTP amount, which forms continuous data so this format is not involved with anchoring bias (see Table 3.2). However, open-ended questions are used less often because a respondent may have difficulty in answering the questions, which leads to large non-response rates, zero answers and places very low values on goods, resulting in bias and missing values for WTP (Mitchell & Carson, 1989).

Iterative bidding question (bidding game): A respondent is presented with an initial randomly chosen dollar value (starting point) and then the respondents respond 'yes' or 'no' to the amount. The researcher repeatedly raises (or lowers) the value until the respondent agrees to pay a certain amount. The final amount is interpreted as the respondent's WTP. However, the iterative bidding approach potentially has anchoring or starting point bias. The starting point bid (first bid) presented to the respondent influences the finally reported WTP (Mitchell & Carson, 1989). It may also lead to the 'yea saying' problem where the respondent agrees to pay the value presented to avoid the socially embarrassing position of having to say 'no' (Bateman et al., 2002). A large number of outliers occur because of respondents' exhaustion from repeated questioning, which may cause the respondent to say 'yes' or 'no' in the hope of ending the interview.

Payment card approach: The respondent is shown a card with a range of different money amounts and asked to pick or circle the largest amount on the cards that the respondent would be willing to pay for a particular good. An individual's WTP is the amount chosen on the payment card. This format was developed as an improved alternative to the open-ended and bidding formats in order to avoid starting point bias and reduce the number of outliers. However, the answers can be influenced by the money that the respondent has already spent

on other goods or services and the range of the numbers used on the cards, which is a potential anchoring problem (Bateman et al., 2002; Mitchell & Carson, 1989).

Single-bounded dichotomous choice question (SB DC): It is also called the closed-ended question, which is an adapted version of the iterative bidding approach. Basically, the respondent is asked whether he/she would be willing to pay a given price for goods or services and the answer must be 'yes' or 'no' (take-it or leave-it), which is a binary response (see Table 3.2). This approach is simple for the respondent to understand because it mimics the consumers' purchase decision in the market in daily life, accepting or refusing the bid proposed. This format minimises non-responses and avoids outliers (Bateman et al., 2002). The format is, nevertheless, notoriously imprecise in that the resulting survey responses reveal only if an individual's WTP resides above or below the value of the threshold (Haab & McConnell, 2002). As a result, it is statistically less efficient and a high number of observations is required for a given level of precision to estimate the individual's WTP, which may lead to a high cost of doing the survey (Hanemann et al., 1991; Mitchell & Carson, 1989).

Double-bounded dichotomous choice (DB DC): This format, another dichotomous format, was proposed by Hanemann (1985) and Carson (1985) and was applied in order to improve the precision of mean and median WTP estimates and circumvent the inefficiency of single-bounded dichotomous choice questions. Basically, the respondent is offered a series of bid amounts including two bids rather than only one bid and is asked whether her/his WTP is above or below the amount treated as a threshold. When the respondent responds to the first dichotomous choice question (initial bid amount), the second bid (the follow-up bid amount) which is greater or lower than the first bid depending on the first response, is presented to the respondent. The data collected from this elicitation format have a smaller interval than the data collected from the single-bounded format (see Table 3.2). The approach uses a sequence of questions to narrow the range of the respondent's true WTP (Hanemann et al., 1991). The drawback of this double-bounded dichotomous format is that an individual's response to the second bid may be influenced by the first bid proposed, which raises starting-point bias (Lusk & Hudson, 2004).

Table 3.2 Types of WTP questions and the data collected using Contingent Valuation surveys

Elicitation Question	*Description*	*Data Type*
• Open-ended • Bidding game	Each respondent reveals one amount that represents their maximum WTP.	Continuous
• Single-bounded discrete choice	Each respondent reveals whether their maximum WTP is above or below a given amount.	Binary
• Double-bounded discrete choice • Multiple-bounded discrete choice • Payment card (and similar approaches)	Each respondent reveals two amounts: one greater than and one less than their maximum WTP.	Interval

Source: Bateman I. J. *et al.(2002), p.177.*

Each of the question formats reviewed above has advantages and disadvantages. In practice, dichotomous (discrete) choice formats in CVM are more extensively used to elicit consumers' WTP for non-market goods. It has been strongly recommended by a number of researchers who compared elicitation methods to estimate WTP, such as The National Oceanic and Atmospheric Administration (NOAA) panel (Hanemann & Kanninen, 1998) and Ready, Buzby, and Hu (1996). Haab and McConnell (2002) revealed that the sample required to reach a level of precision in the open-ended format questions is smaller than for the dichotomous choice format. Open-ended questions may lead to overestimated responses for many respondents and is inherently less consistent. Furthermore, the information obtained from the dichotomous choice format is more reliable than the open-ended format due to realistic purchase decisions. Empirical studies, such as Lusk and Hudson (2004) and Ready, Buzby, and Hu (1996) found that the estimated value of the individual's WTP obtained from the dichotomous choice procedure was significantly larger than estimates from open-ended formats.

Among the discrete dichotomous choice elicitation methods, double-bounded dichotomous choice has gained increasing popularity in estimating WTPs. Many applications found that the double-bounded dichotomous format (a follow-up valuation question) was more information intensive and gained more statistical efficiency compared with the single-bounded method (Cameron & Huppert, 1991; Hanemann et al., 1991; Lusk & Hudson, 2004). Hanemann et al. (1991), for example, showed that the double-bounded format yielded greater precision for coefficient estimates (i.e. mean and medium WTP) and lower mean squared error, leading to much tighter confidence intervals around the WTP estimates. Cooper and

Hanemann (1995) found that adding one or more additional follow-up questions produced estimation efficiency with relatively small gains. In addition, Hanemann et al. (1991) claimed that the double-bounded model can solve the problem of starting point bias, anchoring effect and yea-saying that have been criticized in CVM methods. The double-bounded model can avoid the starting point bias because this method has only one follow-up question unlike the bidding game, so respondents are not weary. The anchoring problem may not occur because values presented in between first and second bids are very different. The response in the second bid is bounded by the value equal to or higher than the first bid so that the yea-saying problem in the second bid is less likely to occur (Cuccia, 2003).

However, there is a limited information problem with the double-bounded approach compared with other methods (such as the bidding game) because the interval containing the true WTP value from the double-bounded approach is bounded by the second bid, which limits the WTP distribution. In order to gain more information about the true WTP distribution, the proposed initial bids should vary across the respondents when implementing the survey (Bateman et al., 2002). This study used the double-bounded dichotomous format to elicit consumers' WTP (see Section 3.2.3.2).

3.2 Research design

The purpose of this study is to determine the factors influencing consumers' decision to purchase organic products and their WTP a price premium for such products. The study aims to obtain consumers' general attitudes related to health, food safety, ethics and the environment and perceptions about organic products and to understand consumers who purchase and do not purchase organic products. In addition, if consumers are given all information about the meaning of organically grown products, the study tests whether they are willing to pay and how much they are willing to pay for organic products.

In order to achieve these objectives, a structured questionnaire was used to collect relevant data from consumers. The structured questionnaire obtained information in a systematic way for variables that are not easy to observe and also allowed for relatively inexpensive access to consumers. This study focused more on three organic food products: vegetables, rice and meat. Unprocessed organic food products were selected because they are widely available. To estimate the consumers' willingness to pay for organic food products, three specified products, including jasmine rice, Chinese kale and pork, were selected to provide examples

of unprocessed organic food products. These three specified products were examined in this study because they are frequently consumed in Thailand. Rice is an everyday food in Thailand, Chinese kale is in the first range of vegetables purchased daily and 46 percent of the respondents ate pork at least once a week (Roitner-Schobesberger, Darnhofer, Somsook, & Vogl, 2008).

3.2.1 Instrumentation

3.2.1.1 Design and structure of questionnaire

Information for the development of the questionnaire was formulated from a review of the relevant literature of food consumer studies and consumers' WTP (Fotopoulos & Krystallis, 2002; Gil et al., 2000; Huang et al., 1999; Loureiro et al., 2002; Sanjuán et al., 2003). The questionnaire collected information related to Thais' preferences for food attributes considered important in their purchase decision, general attitudes (related to health, food safety, ethics and environment), knowledge and awareness of food products and WTP a price premium for organically grown produce. The survey measurement employed open-ended questions and close-ended questions with checklists, Likert scales and rating scales, depending on the purpose of each question. The questionnaire was translated into the Thai language. Three versions of the questionnaire (versions A, B, and C) were used in the study and the difference between each version is the measurement of the respondents' WTP for organic products section (see details in Section 3.2.1.3). The complete questionnaire consists of five sections (see Appendix A).

The first section of the questionnaire was designed to obtain information about grocery shoppers' behaviour for the household, shopping patterns and food purchases. The family's dietary habits were also assessed by asking the respondents to indicate their household's behaviour towards home-prepared food and non-home-prepared food (including take-away food). The questions used in this section were derived from a previous study (Fotopoulos & Krystallis, 2002). However, respondents were first asked a question to clarify whether they were the primary grocery shopper in their household. Respondents who were not the primary grocery shopper were not surveyed.

The next question in this section solicited information regarding the consumer's preference for food product attributes/characteristics that influenced their choice of food products. These preferences can determine whether organic products meet qualities required by consumers.

An ordinal ranking was used. The respondents were asked to rank seven food product attributes when deciding to purchase food, using 1 to 7, with 1 being 'the most important' and 7 being 'the least important'. The product attributes included quality, price, availability, absence of pesticide residues, produced in an environmentally friendly way, produced without using genetically modified organisms (GMOs), and country of origin. These seven attributes were selected because they had been identified as the most important purchase criteria in previous studies on product preferences (Baker, Thompson, Engelken, & Huntley, 2004; Fotopoulos & Krystallis, 2002). The last question in this section assessed the consumer's general attitudes related to health, food safety, ethics and environment, where 13 items were adapted from previous studies on consumer attitudes (Lindeman & Väänänen, 2000; Sanjuán et al., 2003). Interval ranking was used. Each attitude item was measured on a five-point Likert-type scale ranging from 5 'strongly agree' to 1 'strongly disagree'.

The second section of the questionnaire inquired about the typical consumer's approach to organic products. The questions were designed to measure the level of credence food knowledge, perception of organic products, information sources, reasons for purchase, purchase place, types of organic certification related to purchase and percentage of consumer purchases that was organic. These questions were adapted from Fotopoulos and Krystallis (2002) and Ureña, et al. (2008). To measure the consumer's knowledge and understanding of organic and credence products and production, respondents were first asked to indicate their self-reported knowledge of three types of specific food products: consisting of organic, genetically modified and hygienic food products with five-point Likert scale that ranged from 1 (not at all knowledgeable) to 5 (very knowledgeable). The 'not answered' response was coded as zero. The average response to the three food products was calculated as the knowledge of credence food product score. The second question asked the respondents to indicate their self-assumed knowledge of organic products. The next part of this section measured the consumer's perception of organic products compared with conventional products. The perception items were adapted from Gil et al. (2000) and Fotopoulos and Krystallis (2002). Respondents were asked to score 12 items on a five-point Likert scale with 1 'strongly disagree' and 5 'strongly agree'. The perception statements regarding organic products compared to conventional products consisted of visual appearance, nutrition and health, availability, price and the environmental impact of organic production.

The last part in this section attempted to elicit the respondent's decision to purchase organic products. The questions discriminated between respondents who do or do not purchase

organic products as well as identifying the factors influencing their purchase decision. Thus, information was collected on how organic products were viewed compared with conventional products. These questions were adapted from Fotopoulos and Krystallis (2002). The questions asked whether the respondents had purchased organic products during the past year. If 'no', the following question asked their reasons and factors that might persuade them to purchase the products. Conversely, if the respondents had purchased organic products, the follow up question inquired about the respondent's main reason they purchased the products, and frequency of purchase, places where they purchased often, factors that influenced them to purchase more often and the certified organic products they purchased most often. The last question in this part required the respondents to indicate in each organic product category they purchased and the percentage of money spent on each organic product category compared with the total money spent on the product category. Seven product categories were included: rice, vegetables, eggs, meat, milk and dairy products, seafood products, and spices and herbs.

The third section of the questionnaire focused on the respondent's purchase decision on three specific products: vegetables, rice, and meat. Questions for each product started with the respondents' preference of the product attributes when decided to purchase. The respondents were asked to evaluate the importance of each attribute using a 1 to 5 Likert scale, with 1 being 'very unimportant' and 5 being 'very important'. The product attributes included freshness, price, absence of pesticide residues, produced in an environmentally friendly way, produced without using genetic modification, and availability. These attributes were derived from previous studies (Lindeman & Väänänen, 2000; Sanjuán et al., 2003). Following this, the respondents were asked whether they ever purchased organic vegetables, rice and meat. The respondents who answered 'yes' were asked to specify the frequency of purchasing those products, the types of vegetables, rice and meat they purchased often, and the brands (logos) they purchased often. The purpose of these questions was to extract more specific information about what influenced the respondent's choices.

The fourth section was specific to the WTP for organic products questions. This study used the double-bounded dichotomous CVM method to extract information regarding the respondent's WTP for three specific organic products: Chinese kale, jasmine rice, and pork. Before the WTP questions, this section began with a brief introductory description of the objectives of this section and requested the respondents to read and clearly understand the meaning of organic products. This part attempted to minimise the effect of strategic bias and

clearly defined the organic products, which was suggested by Mitchell and Carson (1989). After the descriptive part, the respondents were asked whether they would be willing to pay for organic products if offered at a price higher than conventional products. If the respondent's response was "no", all the rest of questions in section four were skipped. If the respondents answered "yes" to this question, a follow-up question was asked to indicate the percentage premium for organic products relative to the conventional products. This question can provide a value of organic products given by consumers. The next part was the double-bounded question to measure the consumer's WTP for the organic Chinese kale, followed by the organic jasmine rice and then organic pork. First, the respondents were offered retail prices of conventional products and then they were presented with the first bid of organic products and asked whether they would be willing to purchase. Those who accepted the first bid were presented with a second bid with higher prices that was greater than the first bid. If the respondents responded 'no', then they were presented with a second bid with lower prices that were less than the first bid. Then, the open-ended questions were applied to ask for additional information from respondents in order to get the precise the value of the WTP. This assists in reducing the major problems of hypothetical and information bias in CV (see Mitchell & Carson, 1989). The bidding process is discussed is detail in Section 3.2.1.3.

The questionnaire concluded with a series of questions to seek information regarding the consumers, and the household socio-economic and demographic characteristics. These questions were located in the last section in order to minimise the possibility that respondent alienation would influence the purchasing behaviour and WTP. In this study, the socio-demographic variables investigated comprised the respondent's gender, age, education, occupation, status, household income, having children under 18 years old in household and location of the household. This information was included and thought likely to influence the respondent's purchasing behaviour and WTP for organic products as reported in previous studies (Canavari et al., 2002; Azucena Gracia & Magistris, 2008; O' Donovan & McCarthy, 2002; Zepeda & Li, 2007).

3.2.1.2 Pre-test procedure

A pre-test of the survey questionnaire was conducted in order to ensure the content validity and assess the adequacy of the bid design before the main survey was administered in order to enhance the study's reliability. The pre-test result helped to determine the appropriate length of the questionnaire to minimize fatigue on the part of respondents as well as to detect

weaknesses in the design and instrumentation such as double-barrelled questions, unclear questions and instructions, and question-order bias. Twenty-eight questionnaires were completed in the pre-test survey during 1-15 October, 2008 with Thai students at Lincoln University and the University of Canterbury who had been in New Zealand not more than 3 years, were 18 years or older and mainly purchased grocery products for their household. The final version of the questionnaire is shown in Appendix A.

3.2.1.3 Bid design of the WTP part of the questionnaire

The bid design used in the WTP section of the questionnaire was initially based on the distribution of the WTP estimated from the open-ended questions assessing the WTP of organic products in the pre-test questionnaire. In the pre-test questionnaire, the respondents were first asked whether they would be willing to pay a premium for organic products compared to the price of conventional products. If the respondents answered "Yes', then a follow-up question was asked of the respondents to indicate the amount of money that they were willing to pay for three specified organic products including Chinese kale, jasmine rice and pork against the average conventional retail prices of three products at 30 baht/kg, 140 baht/5 kg and 90 baht/kg[3], respectively. The information obtained from an open-ended question of the WTP for organic products was used to determine the possible distribution of the respondent's WTP for organic products. Table 3.3 shows the three highest frequencies or modes of the offered prices for the three specified organic products. These three prices were used as three different starting bids (first bids) for the double-bounded dichotomous question in the final questionnaire. This study offered three ranges of starting bids in order to guard against starting point bias.

According to the three starting bids created in the bid design, this study provided three versions of the final questionnaire (versions A, B and C) (see Table 3.4); each version has a different starting bid. To avoid question order bias, the three questionnaires were randomly assigned to the respondents.

[3] The average conventional retail prices of three organic products were collected from the Department of Internal Trade, Ministry of Commerce.

Table 3.3 Three highest frequencies of responded WTP amounts from the pre-test survey

Organic Chinese kale		*Organic jasmine rice*		*Organic pork*	
Amount	*Frequency*	*Amount*	*Frequency*	*Amount*	*Frequency*
45	9	210	6	135	6
60	5	240	4	150	4
75	4	270	3	165	4
Total	28	Total	28	Total	28

Source: pre-test survey

Table 3.4 Dichotomous choice questionnaire for eliciting a consumer's WTP

Types of products	*Questionnaire versions*	*Conventional prices*	*First bid (Baht/kg)*	*Second bid (Baht/kg)*	
				Lower amount	*Higher amount*
Chinese kale	A	30	45	37.5	52.5
	B	30	60	50.0	70.0
	C	30	75	62.5	87.5
Jasmine rice	A	140	210	175.0	245.0
	B	140	240	200.0	280.0
	C	140	270	225.0	315.0
Pork	A	90	135	112.5	157.5
	B	90	150	125.0	175.0
	C	90	165	137.5	192.5

Source: pre-test survey

3.2.1.4 Sample Selection

The target population of this study was people who were currently the primary shopper for groceries and foodstuffs for their household and resided in Greater Bangkok[4]. The Bangkok metropolitan area was chosen for two reasons: Bangkok is the capital city of Thailand with a population of 12 million representing 15 per cent of the population in Thailand. Secondly, Bangkok is the biggest concentrated market of organic products and the products are most prominently sold compared with other provinces (Eischen et al., 2006). The sampling frame was primary purchasers of food products for their household and aged 18 or older. According

[4] The greater Bangkok, also known as the Bangkok Metropolitan Area, is including of Bangkok, Nonthaburi, Samut Prakan, Pathum Thani, Samut Sakhon and Nakhon Pathom Provinces.

to the Population and Housing Census of Thailand in 2000, the household size of Bangkok was 1,676,172 households. The sample size for this study was calculated from Mendenhall et al.'s (1992) formula:

$$n = \frac{NZ^2_{\alpha/2}pq}{(N-1)e^2 + Z^2_{\alpha/2}pq}$$

where:

n is the sample size,

N is the population size,

$NZ^2_{\alpha/2}$ is the critical value of a two-tailed Z test at a 1-α confidence level,

e is the tolerable error level for estimation (5%), and

pq is component of sample proportion variance estimate.

To calculate the sample size, we used a critical value of 1.96 to obtain the 95 per cent confidence level in the survey. Furthermore, since the population variance was unknown, we assigned the maximum possible variation p=0.5 and q=0.5. Thus, the minimum sample size required for this study was:

$$n = \frac{1{,}676{,}172(1.96)^2(0.5)(0.5)}{1{,}676{,}172(0.05)^2 + (1.96)^2(0.5)(0.5)}$$
$$n = 384.072$$

Based on the formula the minimum sample size required for this study was estimated to be approximately 384 respondents. According to the Batte et al. (2007) study on consumers' WTP for multi-ingredient processed organic products in US national grocery chain stores, a valid response rate was 37 per cent. Williams and Hammitt's (2000) study used a take-home questionnaire to elicit consumers' perceived food safety risks in the consumption and production of organic and conventional products at food stores in the Boston area that yielded a 70 per cent response rate. We assumed the response rate for the survey would be approximately 55 per cent, based on an average response rate from previous studies. Therefore, 699 (=384/0.55) questionnaires were distributed randomly. According to the three

versions of the questionnaire (versions A, B and C), each version was assigned 233 questionnaires.

3.2.2 Data Collection

3.2.2.1 Sampling method

Convenience sampling was employed to select the sample for the study due to the practical difficulties in detecting the target population. Convenience sampling is the easiest way to get samples when the researcher wishes to describe a particular group and uses whatever respondents are available rather than selecting from the entire population. This study used a self-administered survey instrument to collect the data from consumers. In order to solicit essential information from respondents, the store intercept survey with a self-administered questionnaire was used to collect the data. This method has advantages over other methods because it limits interviewer bias, it has a minimal staff requirement further limiting interviewer bias, is the lowest-cost option, is less time consuming, and is suitable for a large population (D. R. Cooper & Schindler, 2008). However, the mail survey method was applied to data collection in some cases where respondents could not complete the questionnaire on the spot.

The survey targeted respondents at retail food stores where organic or conventional products were sold. Five store characteristics involved in this study consisted of stores, hypermarkets, supermarkets, convenience stores (i.e. natural and health food stores) and traditional retail markets (i.e. fresh markets) (see Table 3.5). Figure 3.1 shows the location of the selected stores. These stores were selected to increase the variability of selected households (e.g. household income, consumer education and occupation), and store characteristics (e.g. hypermarket/supermarket/fresh market[5], presence/absence of a dedicated organic section). To broaden the information gathered in the survey, three versions of the questionnaire were distributed equally in each store.

[5]A traditional market, also called a fresh market or wet market, mainly sells fresh food: fruit, vegetables and meat, and dry grocery products such as rice, while a supermarket (i.e. TOPS, Home fresh mart) is a self-service store offering a wide variety of food and household merchandise. Currently, supermarkets located in the department stores are increasing compared with stand-alone supermarkets. Larger supermarkets fully providing consumers with all the basic needs in one area are known as a hypermarkets (i.e. BigC, Carrefour, Tesco/Lotus) (Schaffner, Bokal, Fink, Rawls, & Schweiger, 2005).

Table 3.5 Selected Bangkok and metropolitan area food stores for the survey

Surveyed Place	*Types of shop*	*Location*
Home Fresh Mart-The mall	Supermarket (located in the department store)	Bangkapi (no. 6)
Tops supermarket-Future Park Rangsit	Hypermarket (located in the shopping complex[6])	Rangsit
Aden shop	Natural and health food stores	Bangsue (no. 29)
Ying Charoen Market	Fresh market	Bangkhen (no. 41)
Wongwian Yai Market	Fresh market	Khlong San (no. 18)

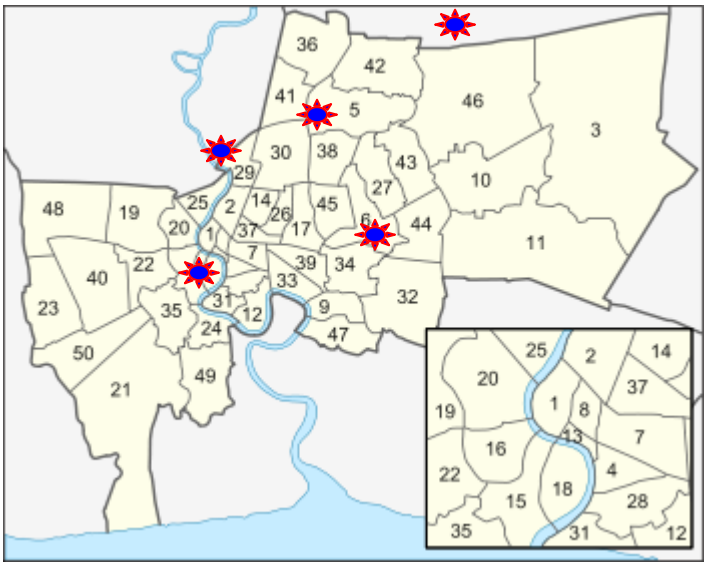

Figure 3.1 The locations of the selected food stores in the Bangkok and metropolitan area

Note: ✸ Selected stores

The surveys were conducted during 10-30 January, 2009. In order to minimize selection bias, the respondents were randomly selected as they entered the stores. Respondents were handed one of the three randomly selected versions of the questionnaire package (A, B or C); the only difference was the starting bid (low, medium, and high) in the WTP for organic products

[6] The shopping complex is a big shopping centre combined with various department stores and supermarkets.

part. The questionnaire package consisted of the self-administered questionnaire and the research information sheet (covering letter) detailing the purpose of the study and the voluntary participation applying to the study. Once the respondents completed the questionnaire, they returned the questionnaire to the researcher at the survey spot. However, if the respondents did not have time to complete the survey and preferred to do so later at home, a mail survey was issued. In this case, they were provided with package with the covering letter, the questionnaire and an addressed, stamped, return envelope. The respondents then mailed the questionnaire before mid February, 2009. A mail survey at this stage can minimise the low response rate of respondents who decline to be participate.

3.2.3 Data analysis

3.2.3.1 Data analysis techniques

The data analysis in this study focused on two main areas: descriptive analysis and analysis of estimation models. SPSS 15.0, LIMDEP, and SAS 9.21 software were used for the estimations.

3.2.3.1.1 Descriptive analysis

Descriptive statistics were used to describe the basic features of the data. Frequency and Pearson Chi-square tests were performed to determine the distribution of the socio-demographic profiles of the respondents, food shopper behaviour, family dietary habits, food attributes of the respondents' preferences and the rationale for respondents purchasing or not purchasing organic products. Measures of central tendency of distribution, such as mean and standard deviation (SD), were used to analyse the respondents' knowledge about organic products, preferences in food products, attitudes related to health, food safety, ethics and environment, and perceptions about organic products. The independent-samples *t*-test analysis was used to determine the mean difference in these variables between respondents who purchase and who do not purchase organic products (purchasers and non-purchasers of organic products).

This study used Likert Scale (1 to 5) to measure attitudes is unchallenged in social science research. What is arguably ordinal measure to treat as interval measure is a common practice in social sciences. In social science research anchored Likert scales are assumed to be interval in nature and we can use the mean, standard deviation etc. This practice has been done in marketing for attitudinal research for decades.

There should be no problems with the statistical analysis if we follow the same exploratory factor analysis process and ranked the marginal effects the same way as documented in Kinnear and Taylor (1991), Clemes, Gan, & Kao (2008), Clemes, Gan, & Zhang (2010).

3.2.3.1.2 Exploratory factor analysis

An exploratory factor analysis (EFA) more specifically Principal Component Analysis, was used to condense the large number of consumers' general attitudes related to health, food safety, ethics and environment and perceptions about organic products items into the smallest set of factors while maintaining the highest amount of information. According to the attitude and perception questions, the questionnaire provided a multidimensional measure. Those items associated with each question could be valued whether different or similar by respondents. If the bundled attitude and perception items had a strong correlation in which respondents valued those items similarly, it would be appropriate to summarise and re-call them into one factor (Hair, Black, Babin, Anderson, & Tatham, 2006). By doing so, a principal component approach, one EFA, was used to determine the number of the underlying factors and also reveal associated items for each factor. The purpose of principal component analysis is to derive a small number of linear combinations of a large set of items by retaining as much as information as possible about the variables. The Latent root criterion (eigenvalue) was used to determine the number of factors to be retained. An eigenvalue (variance) that is greater than one has been most commonly used to determine the optimal number of factors extracted.

The two basic types of rotation investigated to assist in the interpretation of the factors in this study were the Orthogonal and Oblique methods. The objective of rotation is to simplify the rows and columns of the factor matrix to facilitate interpretation. Orthogonal rotation (VARIMAX) assumes the rotation of the factors would have a 90 degree angle to the axes so that factors are not correlated whereas the oblique rotation (OBLIMIN) allows the factor axes more flexibility in degree of angles so the set of items in each factor may be correlated.

When interpreting the factors, decisions must be made regarding which factor loadings are worth considering. Sample size can determine the significance of factor loadings (see Table 3.6). The criterion for significance of factor loading considered in this study was the factor loading of greater ±0.50 which is considered very significant, $p \leq 0.05$. Although factor loadings of ±.30 to ±.40 are minimally acceptable, but values greater than ±.50 are generally considered necessary for practical significance (Hair et al., 2006). Statistical tests of

significance for factor loading are generally conservative and should be considered only as starting points need for including a variable for further consideration.

Table 3.6 Guidelines for Identifying Significant Factor Loadings

Factor Loading	*Sample Size Needed for Significance*
0.30	350
0.35	250
0.40	200
0.45	150
0.50	120
0.55	100
0.60	85
0.65	70

Source: Hair et al. (2006).

Several assumptions had to be examined to assess the appropriateness of applying EFA with the data set of this research. First, the correlation coefficients of the data matrix of general attitudes items would have a number of correlations greater than 0.30, which indicates a similarity of the items. Then, the Kaiser-Meyer-Olkin measure of sampling adequacy (MSA), which quantifies the degree of intercorrelations among the variables should be above 0.7 while the Bartlett's test of sphericity measures the statistical probability that the correlation matrix has significant correlations among at least some of the variables (Hair et al., 2006). In addition, the internal consistency of each factor was then examined by estimating the Cronbach's alpha coefficient (Botonaki et al., 2006).

To use the identified factors from the factor analysis results in subsequent analysis, we can calculate the summated scales or factor scores. The significant difference between the summated scales and factor scores is that the factor score is computed based on the factor loadings of all variables on the factor for which the items have higher values of factor loading, resulting in a higher factor score, whereas the summated scale is formed by combining only selected items into single composite measure. Summated scales are easily replicated across studies because they preserve the variation in the data. In addition, summated scales represent the multiple aspects of a concept in a single measure while reducing measurement error (Hair et al., 2006). Therefore, summated scales of the integral component are preferred to factor score for subsequent analysis.

3.2.3.1.3 Binary logistic regression

One objective of this study is to estimate the empirical models of consumers' purchase decisions. Logistic regression (logit model) was used to answer this research objective.

3.2.3.1.3.1 Econometric model

In this study, a binary choice was used to ask consumers whether they chose to purchase organic products or not. Thus it is assumed that each consumer (individual) chose to purchase the particular product, with particular product attributes. The logit model is based on the cumulative logistic probability function for the probability that the individual makes a choice and assumes that the probability to purchase the products (P_i) for individual i , depends on a vector of explanatory variables (X_i), and vector of unknown parameters β . Thus, following equations 3.16 and 3.17, the logit model predicting the probability to purchase organic products is given as (Greene, 2008; Maddala, 1983):

$$P_i(Y_i = 1) = \frac{1}{1 + e^{-\beta X_i}} \qquad (3.16)$$

where: Y_i is the dichotomous choice, in which Y_i = 1 if the individual purchase organic products and Y_i = 0 if the individual do not purchased organic products,

P_i is the probability the individual purchases organic products and $(1 - P_i)$ is the probability the individual does not purchase organic products,

X_i is the vector of explanatory variables (see Table 3.7),

β is the parameters to be estimated, and

the probability the individual does not purchase organic products $(1 - P_i)$ is expressed as:

$$(1 - P_i) = 1 - \frac{1}{1 + e^{-\beta X_i}} = \frac{1}{1 + e^{\beta X_i}} \qquad (3.17)$$

Equations (3.16) and (3.17) can be shown as an odds ratio of choice as:

$$\frac{P_i}{1 - P_i} = e^{\beta X_i} \qquad (3.18)$$

Taking the logarithm of the odds ratio in equation 3.18. Thus, the logistic regression equation can be presented as:

$$\log\left(\frac{P_i}{1-P_i}\right) = Z_i = \beta X_i \qquad (3.19)$$

where Z_i is the logarithm of the odds ratio, often called a log-odds ratio, which is a linear function of the explanatory variables (Maddala, 1983). This form provides a more simplistic description of the probabilistic relationship of the variables and the outcome.

Since the dichotomous dependent variable in the logistic regression can not predict a numerical value and violates the assumptions of homoskedasticity, linearity, and normality, the use of ordinary least squares (OLS) estimates for the best fit approach of minimising the sum of squared distances is inefficient (Maddala, 1983). To overcome inefficient parameter estimates, the maximum likelihood estimation (MLE), which maximises the log-likelihood is applied in the logistic regression to estimate the regression coefficients ($\hat{\beta}_i$). The likelihood function for the model is given as (Maddala, 1983):

$$L = \prod_{Y_i=1} P_i \prod_{Y_i=0} (1-P_i) \qquad (3.20)$$

The estimated coefficients ($\hat{\beta}_i$) from logistic regression do not directly represent the marginal effects of the explanatory variables on the probability P_i. The marginal effects for continuous variables and binary variables are interpreted differently. Based on the calculation of the marginal effects, the continuous variables can be used in a partial derivative approach of the non-linear probability function to determine the magnitude of effects that relate to a unit change in a given independent variable. Therefore, the estimated marginal effects of each independent variable can be straightforwardly interpreted; for example, the magnitude of the marginal effect (M_j) is a unit change in the independent variable that will result in an increase or decrease in the predicted probability (Greene, 2008).

$$M_j = \frac{\partial P_i}{\partial x_{ij}} = \beta_j P_i (1-P_i) \qquad (3.21)$$

In the case of the marginal effects associated with the binary independent variables, the partial derivatives cannot be applied. The marginal effects can be calculated as the difference

in the probabilities of each choice of the binary-independent, obtained when the independent variable equals '1', and equals '0'. The marginal effect for binary-independent variables can be expressed as follows (Greene, 2008).

$$\frac{\partial P_i}{\partial x_{ij}} = [P_i(Y=1) \mid x_{ij} = 1] - [P_i(Y=1) \mid x_{ij} = 0] \qquad (3.22)$$

3.2.3.1.3.2 Goodness-of-fit

To assess of overall model fit in the logistic regression, several goodness-of-fit tests were used to examine whether the estimated models fitted the data well. Four goodness-of-fit tests were used in this study including the likelihood ratio test, the McFadden pseudo R^2, the Hosmer-Lemeshow test and a predictive ability measure.

The likelihood ratio (LR) test is related to probability distribution and is an asymptotically distributed χ^2 statistic. The LR was used to test the overall model fit where the null hyphothesis is that all estimated coefficients were jointly equal to zero. This measure serves a purpose analogous to the $F-statistic$ of regression analysis. Thus, if the likelihood ratio test rejects the assumption, it can be concluded that the overall estimated model fitted the data. The likelihood ratio is twice the difference in log likelihoods calculated as:

$$LR = -2(LL_{null} - LL_{model}) \sim \chi^2,\ df(J)$$

where: LL_{null} is the log likelihood value computed with only a constant term (restricted model) and LL_{model} is the maximised value of the log likelihood function of the model that contains the independent variables (unrestricted model).

The McFadden pseudo R^2 measure is an analogous to R^2 in multiple regression in that it represents the overall model fit. The McFadden pseudo R^2 ranges from zero to one and its value increases with the explanatory power of the model and the greater model fit. McFadden (1974) stated that the McFadden pseudo R^2's value tended to be smaller than the R^2 value and that values of between 0.2 and 0.4 are considered a good fit. This measure for a logit model can be calculated as:

$$Pseudo\ R^2 = \frac{-2LL_{null} - (-2LL_{model})}{-2LL_{null}} = 1 - (\frac{LL_{model}}{LL_{null}})$$

If the log likelihood value (LL) decreases, the pseudo R^2 will increase and if the value of LL equals zero, then the pseudo R^2 equals one indicating that the estimated model has a perfect fit with all the independent variables (Hair et al., 2006; Maddala, 1983).

The Hosmer-Lemeshow test is a Pearson χ^2 type test of goodness-of-fit. This measure is to compare expected values to observed values of the dependent variable (the event outcome) by group. The null hypothesis is that there is no difference between these two values for all the groups. Thus, if the differences are small with support from a $p-value$ greater than 0.05, we fail to reject the null hypothesis indicating that the estimated model is acceptable fit for the data. To calculate the Hosmer-Lemeshow test, the observations are grouped into k ordered groups based on the values of the estimated probability from the smallest to the greatest, where $k = 1,....., g$ (LIMDEP uses 10 groups as the default) and n'_k is the number of observations in group k . In each group, the expected values are analysed separately by the event outcome (i.e. $y = 1$ and $y = 0$), and their values are calculated by summing the estimated probabilities of an event outcome in each group. This statistical measure can be calculated as: $HL = \sum_{k=1}^{g} \frac{(O_k - n'_k \bar{\pi}_k)^2}{n'_k \bar{\pi}_k (1 - \bar{\pi}_k)} \sim \chi^2, \ \ df(k-2)$ where O_k is the total number of the event outcomes in group j , and $\bar{\pi}_k$ is the average of the estimated probabilities (the expected values) in group j (Hosmer & Lemeshow, 2000).

Predictive ability is another measure for assessing a model's fit. This measure shows the improvement in predictive ability of the model by comparing the predictive ability of the unrestricted model with the restricted model. For a logit model, the predictive ability of the unrestricted and restricted models can be calculated by tabulating the the number of correct and incorrect predictions based on a rule such as $\hat{y} = 1$ if $P(y_i = 1) > 0.5$ and $\hat{y} = 0$ otherwise and compared to the actual observed responses for the dependent variable. Generally, the results of the predictive ability analysis will report the percent correctly predicted and the percent gain in predicting responses in the unrestriced model compared with the restricted model.

3.2.3.2 Double-bounded contingent valuation method (CVM)

Estimating models of consumers' WTP for organic products is another main objective of this study. Currently, organic products in Thailand are not widely available in the marketplace and some organic products are not available. Consumers' WTP a premium cannot be easily

observed. To determine consumers' preferences and consumers' WTP for organic product attributes, the double-bounded dichotomous choice method was applied to estimate the models.

3.2.3.2.1.1 Econometric model

Following the theoretical discussion in section 3.1.2.1, we assume only quality regular products q_0 (i.e. conventional products) are available in the market and the products with quality q_1 (e.g. organic products) are introduced. If the individual considers the change in product quality is a benefit or improvement, the RUM indirect utility function can be expressed as (Bateman et al., 2002; Hanemann et al., 1991):

$$v(p, q_1, y, z) \geq v(p, q_0, y, z) \qquad (3.23)$$

The single-bounded dichotomous choice can be used as an example. The individual is presented with an amount of money (B) for organic products that change q from q_0 to q_1, and is asked whether he/she would pay some given amount (to secure a given improvement in environmental quality). If the individual responds "yes", the indirect utility function can be written as $v(p, q_1, y - B, z) \geq v(p, q_0, y, z)$, and "no" otherwise. Thus, the probability of "yes" is:

$$\Pr(response\ is\ "yes") = \Pr(v(p, q_1, y - B, z) \geq v(p, q_0, y, z)) \qquad (3.24)$$

According to equation (3.12), the compensating variation, which is an individual's WTP for an improvement can be presented as:

$$v(p, q_1, y - WTP, z) = v(p, q_0, y, z) \qquad (3.25)$$

Solving for WTP yields:

$$WTP = F(p, q_0, q_1, z, y) \qquad (3.26)$$

where WTP is the individual's maximum WTP for the quality change from q_0 to q_1, and z is the individual's characteristics. Thus, equation 3.24 can be expressed as:

$$P(response\ is\ "yes") = P\left[F(p, q_0, q_1, y - WTP, z) \geq B\right] \qquad (3.27)$$

In the case of the classical double-bounded dichotomous choice CVM, the i^{th} respondent is presented with two bids (see Figure 3.2). First, the respondent is asked to indicate whether he/she is willing to pay an initial offer price (B_i) for organic products. Then, the level of a follow-up price of the second bid is contingent upon the respondent's response to the first bid. If the individual responds "yes" to the first bid meaning that he/she is willing to pay the amount of the initial offer price, he/she is presented with the second bid (follow-up price) with some amount greater than the first bid (B_i^u). On the other hand, if the respondent respond "no" to the first bid, meaning that he/she is not willing to pay the amount of the initial price, he/she is offered the second bid of some amount smaller than the initial price (B_i^d). The four possible responses to the first and second bids can be: (1) 'Yes' to both bids (Yes/Yes), (2) 'Yes' followed by 'No' (Yes/No), (3) 'No' followed by 'Yes' (No/Yes), and (4) 'No' to both bids (No/No). The double-bounded dichotomous format is unobservable of the true WTP but does reveal four possible ranges of the maximum WTP with the value of lower and upper bounds. With regard to the bid designs estimating the WTP for organic products in Table 3.7, the respondents' true WTP lies on only in the range of positive values $(0, +\infty)$.

Thus, the four possible outcomes can be represented as the binary-valued indicator variables: $d_i^{yy}, d_i^{yn}, d_i^{ny}$ and d_i^{nn}, where the binary-valued indicator variables equal one denoting the occurrence of that particular outcome and zero otherwise (Bateman et al., 2002; Hanemann et al., 1991):

d_i^{yy} = the i^{th} respondent responds 'Yes' to the first bid (B_i) and 'Yes' to the second bids with higher amount (B_i^u), denoted as 'YY', and their WTP lies in $B_i^u < WTP < \infty$,

d_i^{yn} = the i^{th} respondent responds 'Yes' to the first bid (B_i) and 'No' to the second bids with higher amount (B_i^u), denoted as 'YN', and their WTP lies in $B_i < WTP < B_i^u$,

d_i^{ny} = the i^{th} respondent responds 'No' to the first bid (B_i) and 'Yes' to the second bids with lower amount (B_i^d), denoted as 'YN', and their WTP lies in $B_i^d < WTP < B_i$,

d_i^{nn} = the i^{th} respondent responds 'No' to the first bid (B_i) and 'No' to the second bids with lower amount (B_i^d), denoted as 'NN', and their WTP lies in $0 < WTP < B_i^d$.

Under the assumption of a utility maximization respondent, the cumulative density functions (CDF) of the probability distribution of the four possible outcomes, denoted by Y^{yy}, Y^{yn}, Y^{ny}, Y^{nn}, are obtained as follows:

$$Y^{yy}(B_i, B_i^u) = \Pr(B_i \le WTP_i \text{ and } B_i^u \le WTP)$$

$$= \Pr(B_i \le WTP_i \mid B_i^u \le WTP) \Pr(B_i^u \le WTP)$$

$$= \Pr(B_i^u \le WTP)$$

since, with $B_i^u > B_i$, $\Pr(B_i \le WTP_i \mid B_i^u \le WTP) \equiv 1$, then

$$Y^{yy}(B_i, B_i^u) = 1 - G(B_i^u; \theta), \tag{3.28}$$

$$Y^{yn}(B_i, B_i^u) = \Pr(B_i \le WTP_i \le B_i^u) = G(B_i^u; \theta) - G(B_i; \theta) \tag{3.29}$$

$$Y^{ny}(B_i, B_i^d) = \Pr(B_i \ge WTP_i \ge B_i^d) = G(B_i; \theta) - G(B_i^d; \theta) \tag{3.30}$$

$$Y^{nn}(B_i, B_i^d) = \Pr(B_i > WTP_i \text{ and } B_i^d > WTP)$$

$$= \Pr(WTP_i < B_i^d) = G(B_i^d; \theta) \tag{3.31}$$

where WTP is the maximum WTP,

$G(B_i^\bullet; \theta)$ is a random cumulative probability distribution function (CDF), where $B_i^\bullet$ denotes the value of first bid or second bid, and θ is the unknown parameters to be estimated.

To form the four possible outcomes above, the log-likelihood function for the double-bounded model takes the form as, where N is the total sample of respondents:

$$\ln L^D(\theta) = \sum_{i=1}^{N} \begin{Bmatrix} d_i^{yy} \ln Y^{yy}(B_i, B_i^u) + d_i^{yn} \ln Y^{yn}(B_i, B_i^u) \\ + d_i^{ny} \ln Y^{ny}(B_i, B_i^d) + d_i^{nn} \ln Y^{nn}(B_i, B_i^d) \end{Bmatrix} \tag{3.32}$$

Then, the set of parameters, θ, can be estimated by maximising log-likelihood function subject to a specified probability distribution which can be written as (Bateman et al., 2002):

$$\frac{\partial \ln L^E(\theta)}{\partial \theta} = 0$$

3.2.3.2.1.2 Mean and median WTP

The mean and median WTP[7] can be calculated by using the estimated parameters from the constant-only bid function, which restricts all the exploratory variables except the bid variable. Thus, the parameter estimates are contained in the constant (intercept: a) and bid variable (scale: σ)[8] in the model. However, to calculate the mean and median WTP, it is necessary to assume the cumulative probability distribution of WTP responses, CDF. The families of distribution that various studies used to estimate the double-bounded CVM include the normal, logistic, log-normal, log-logistic distributions. Since, the possible values of WTP for organic products are positive $(0, +\infty)$, the probability distributions that fit the log-likelihood function are limited to the non-negative distribution, including log-normal, log-logistic and Weibull (Bateman et al., 2002). In order to select the appropriate probability distribution with the WTP data, that is, the one with the better goodness of fit to the sample data, the value of the log-likelihood function in the restricted model leaving only the constant and bid terms was used (Hanemann et al., 1991).

3.2.3.2.1.3 The double-bounded followed-up with the open-ended model

This study also aimed to explore the use of the classical double-bound dichotomous choice combined with the additional open-ended elicitation questions to assess the WTP in order to improve the statistical efficiency of WTP estimates. With respect to the economic theory of the classical double-bounded model, the respondents were asked their WTP with the first and second bids of the dichotomous choice question which can indicate their WTP by interval-censoring data as mentioned above. Therefore, the upper bound in the highest range (Yes/Yes response) of the interval-censoring model is infinity ($+\infty$) and the lower bound in the lower range (No/No response) is equal to zero (Model 1: lower, upper) (see Table 3.7).

In this study, after the respondents responded to the classical double-bounded question they were asked an open-ended question to indicate their maximum WTP for particular organic

[7] Mean and Median WTP can be calculated by the following formulas (Bateman et al., 2002):

Distributions	***Mean WTP***	***Median WTP***
Log-normal[a]	$e^{(a+0.5\sigma^2)}$	e^{a}
Log-logistic[b]	$e^{(-\alpha/\beta)}\dfrac{\pi/\beta}{\sin(-\pi/\beta)}$	$e^{(-\alpha/\beta)}$
Weibull[a]	$e^{a}\Gamma(1+\sigma)$	$e^{a}(\ln 2)\sigma$

[8] The bias is occurred in the parameter estimates when included variables in the willingness to pay model.

products (see Figure 3.2). Regarding the extra information obtained from the open-ended question, truncating the upper bound values in the highest interval range (Yes/Yes response) can be applied to the WTP estimates. It is assumed that the respondents' true WTP would consider the income constraint, which is consistent with economic theory. This method should lead to more reliable and reasonable WTP estimates (Haab & McConnell, 2002). This study applied two different types of truncated values in order to test the efficiency of the truncation approach. First, in case of respondents providing the Yes/Yes response to the first and second bids, the highest respondents' WTP obtained from the open-ended question was chosen to represent the upper bound in the highest interval range (Max) (Model 2). For Model 3, the upper bound of the four interval ranges was used for each individual's highest amount of money obtained from the open-ended question (Max_i) (Model 3). The truncation approach was also applied to the lower bound in the lowest interval range (No/No response). It is assumed that the true respondents' WTP for organic products should be not lower than the conventional alternative. Thus, to avoid the problem of unrealistic bid values, the lower bound value in the lowest interval range is truncated as equal to the conventional price (Bateman et al., 2002; Haab & McConnell, 2002). Hence, the respondents' true WTP is bounded between the conventional price and the highest amount of money WTP (min, max) in Model 2 while in Model 3 the respondents' true WTP is bounded between the conventional price and each individual's highest WTP (min, max2) (see Table 3.7).

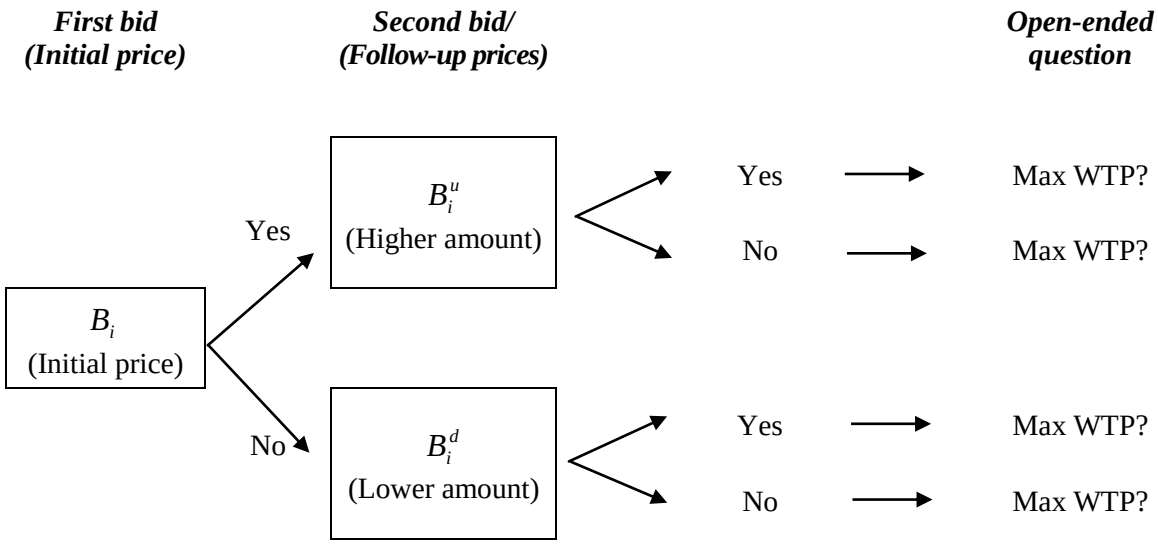

Figure 3.2 The bidding sequence for the double-bounded dichotomous choice

Table 3.7 WTP ranges of the double-bounded dichotomous choice model

Possible outcomes (First bid/second bid)	*Model 1 (lower, upper)*		*Model 2 (min, max)*		*Model 3 (min, max2)*	
	Lower bound	*Upper bound*	*Lower bound*	*Upper bound*	*Lower bound*	*Upper bound*
Yes/Yes	B_i^u	∞	B_i^u	*Max*	B_i^u	Max_i
Yes/No	B_i	B_i^u	B_i	B_i^u	B_i	Max_i
No/Yes	B_i^d	B_i	B_i^d	B_i	B_i^d	Max_i
No/No	0	B_i	*Min*	B_i	*Min*	Max_i

3.2.4 The empirical implementation (economic models)

Three main empirical models were constructed from the survey data. The first two models regarded consumers' purchase decisions and consumers' purchase of organic products regularly, in general, and three specified organic products: vegetables, rice and meat. The third empirical model was the estimation of consumers' WTP for organic products and for three specified organic products including Chinese kale, jasmine rice and pork.

As discussed in the literature chapter, these three empirical models are functions with explanatory/independent variables shown in Table 3.8. The explanatory variables of these

models were specified as both dummy variables and continuous variables. The continuous variables include ‘health consciousness’, ‘food safety’, ‘food ethics’, ‘environmental concerns’, ‘availability, information and price barriers’, ‘quality and health benefits’ and ‘environmental benefits’, which are the summated scale variables obtained from factor analysis. The dummy variables consisted of “consumers’ knowledge about organic products”, “the frequency of purchasing food at natural/health stores”, “the presence of vegetarians in households” and socio-demographic variables included gender, education level, occupation, marital status, children in the households, household income and household location.

The consumers’ decision to purchase organic products model (Model 1) is:

*PURCHASE, PURCHASV, PURCHASR = f(*HEALTH, FSAFETY, ETHICS, ENVIRON, QBENEFIT, AIPRICE, EBENEFIT, NSTORE, VEGETARI, DINEOUT, K_OR, FEMALE, HIGHEDU, WCOLLAR, MARRIED, CHILDREN, MIDAGE, ELDERLY, LOWINC, HIGHINC, CITY)

The consumers’ decision to purchase organic products on a regular basis model (Model 2) is:

*REGULAR, REGULARV, REGULARR = f(*HEALTH, FSAFETY, ETHICS, ENVIRON, QBENEFIT, AIPRICE, EBENEFIT, NSTORE, VEGETARI, DINEOUT, K_OR, FEMALE, HIGHEDU, WCOLLAR, MARRIED, CHILDREN, MIDAGE, ELDERLY, LOWINC, HIGHINC, CITY)

The consumers’ WTP for organic products model is:

*WTP = f(*PURCHASE , HEALTH, FSAFETY, ETHICS, ENVIRON, QBENEFIT, AIPRICE, EBENEFIT, NSTORE, VEGETARI, DINEOUT, K_OR, FEMALE, HIGHEDU, WCOLLAR, MARRIED, CHILDREN, MIDAGE, ELDERLY, LOWINC, HIGHINC, CITY)

The definition and hypothesis sign of the exploratory variables used in the empirical models were explained in Table 3.8.

Table 3.8 Description and hypothesized signs of variables for consumers' purchase decisions and willingness to pay for organic products models

Variable name	*Description of variables*	*Hypothesized sign*	
		Purchase decisions	*Willingness to pay*
Dependent variables (Model 1)			
PURCHASE	1 = if the respondent purchases organic products for home consumption; 0 = otherwise.		
PURCHASV	1 = if the respondent purchases organic vegetables for home consumption; 0 = otherwise.		
PURCHASR	1 = if the respondent purchases organic rice for home consumption; 0 = otherwise.		
Dependent variables (Model 2)			
REGULAR	1= if the respondent regularly purchases organic products (often or always); 0 = otherwise.		
REGULARV	1 = if the respondent regularly purchases organic vegetables (often or always); 0 = otherwise.		
REGULARR	1 = if the respondent regularly purchases organic rice (often or always); 0 = otherwise.		
Independent variables			
PURCHASE	1 = if the respondent purchases organic products for home consumption; 0 = otherwise.	(NA)	+
HEALTH	Health consciousness (summated scale).	+	+
FSAFETY	Food safety concern (summated scale).	+	+
ETHICS	Food ethical concern (summated scale).	+	+
ENVIRON	Environmental concern (summated scale).	+	+
QBENEFIT	Quality and health benefits (summated scale).	+	+
AIPRICE	Availability, information and price barriers (summated scale).	-	-
EBENEFIT	Environmental benefits (summated scale).	+	+
NSTORE	1=if the respondent often purchases grocery products at natural/health food stores; 0=otherwise.	+	+
VEGETARI	1=if the household has a family member who is on a vegetarian or vegan diet; 0=otherwise.	+	+

Table 3.7 Description and hypothesized signs of variables for consumers' purchase decisions and willingness to pay for organic products models (continued)

Variable name	*Description of variables*	*Hypothesized sign*	
		Purchase decisions	*Willingness to pay*
DINEOUT	1=if the respondent's family dine out or consume take-away food always to often; 0= otherwise.	-	-
K_OR	1=if the respondent is knowledgeable and very knowledgeable about organic products; 0=otherwise.	+	+
FEMALE	1= if respondent is female; 0=Male	+	-
LOWEDU*	1=if respondent has completed below a bachelor degree; 0=otherwise.	-	+,-
HIGHEDU	1=if respondent has completed a bachelor degree or higher; 0=otherwise.	+	+,-
WCOLLAR	1=if respondent is a white-collar worker (civil servant, private officer and self employed); 0=otherwise (housewife, retired, blue-collar, other).	+	+
MARRIED	1= if respondent is single; 0=otherwise (married, divorced, other).	+	+
CHILDREN	1=if household has children aged less than 18; 0=otherwise.	+	+
YOUNG*	1= if respondent is aged between 18 and 34; 0=otherwise.	+,-	+,-
MIDAGE	1= if respondent is aged between 35 and 54; 0=otherwise.	+,-	+,-
ELDERLY	1= if respondent is aged 55 and older; 0=otherwise.	+,-	+,-
LOWINC	1=if monthly household income is less than 30,000 baht, 0 = otherwise.	-	-
MIDINC*	1=if monthly household income is between 30,000-60,000 baht, 0 = otherwise.	+	+
HIGHINC	1=if monthly household income is greater than 60,000 baht, 0 = otherwise.	+	+
CITY	1=if respondent resides in the city; 0=otherwise.	+	+

Note: * indicates the reference category, dropped from the models to avoid perfect collinearity.

Chapter 4
Descriptive Statistics and Factor Analysis – Results and Discussion

This chapter presents the preliminary results based on the survey data. Descriptive statistics are used to characterize the study sample including response rates and the respondents' socio-demographics. Bivariate analysis, including the chi-square test and the independent-samples *t*-test, is used to determine the relationship between the respondents' group (purchasers and non-purchasers of organic products). In addition, this chapter reports the procedure and the results of factor analysis of the respondents' general attitudes toward health, food safety, ethics and environment and perception of organic products.

4.1 The number of respondents and the response rates

The survey sample size was deemed to be acceptable for the purposes of this research. A total of 700 questionnaires were distributed to Thai consumers aged 18 years and older and 526 were returned. From the returned questionnaires, 502 were complete and useable, yielding a response rate of 71 per cent. There was a slight different between numbers of responses among the three versions of the survey questionnaire (A, B and C). The results were 34.1 per cent for Version A, 34.3 per cent for Version B and 31.7 per cent for Version C. Based on the questionnaires distributed, approximately 41.2 per cent of the respondents completed the questionnaire at supermarkets (The Mall and Future Park Rangsit), over 38 per cent completed them at fresh markets (Ying Charoen and Wongwian Yai markets) and 20.2 per cent completed them at a natural/health food store (Aden shop) (see Table 4.1).

Table 4.1 Number of the respondents (classified by questionnaire versions and survey places) for a use of organic products survey

	No. of responses	*Percentage*
Versions of the questionnaire		
Version A	171	34.1
Version B	172	34.3
Version C	159	31.7
Total	502	100
Places of the survey		
Home Fresh Mart-The Mall	93	18.5
Tops Supermarket-Future Park Rangsit	114	22.7
Aden Shop	101	20.2
Ying Charoen Market	109	21.7
Wongwian Yai Market	85	16.9
Total	502	100

4.2 Socio-demographic profiles of the respondents

A description of the socio-demographic characteristics of the respondents is presented in Table 4.2. The profiles for all sample respondents are presented first. Following this, the responses between purchasers and non-purchasers of organic products[9] are statistically compared based on the types of data[10].

From the total of 502 surveyed respondents, 242 (48.2 per cent) of the respondents claimed they purchased organic products (purchasers of organic products) compared with 260 (51.8 per cent) of respondents who did not purchase organic products (non-purchasers of organic products). The main food purchase decision makers were dominated by females (78.9 per cent). This result is not unexpected due to Thais' household characteristics. Females still commonly undertake grocery shopping for their household (see Table 4.2). Of the 242 purchasers of organic products, 200 (82.6 per cent) were female compared with 196 (from a

[9] Purchasers of organic products refer to respondents who have bought organic products during last year while non-purchasers of organic products refer to respondents who have not bought organic products during the last year.

[10] In case of metric data (continuous scale), the independent-samples *t*-test was used to differentiate the mean groups of the respondents between purchasers and non-purchasers of organic products. The Pearson chi-square test (χ^2) or Fisher exact test were employed to examine the significant relationships between the two groups if the data collected are non-metric data (nominal and ordinal scale).

total 260) females (75.4 per cent) non-purchasers of organic products. The chi-square test (χ^2) showed that there was a significant difference in gender between purchasers and non-purchasers of organic products indicating that the households having females responsible for their households' food and grocery purchases were more likely to purchase organic products.

The age of respondents in years was not obtained from the survey data. The age of the respondents was categorized equally into six levels, ranging from 18 years old to over 65 years old. The age distribution of the respondents was skewed towards middle age groups between 25 and 34 (29.9 per cent) and 35 and 44 (29.5 per cent) years old (see Table 4.2). The result of the age distribution categories across the purchasers and non-purchasers of organic products showed that the majority of the purchasers of organic products (33.1 per cent) fell in the 35 to 44 years old category followed by the 45 and 54 years old category (31.4 per cent) whereas most of the non-purchasers of organic products (36.2 per cent) were in the 25 to 34 years old category followed by the between 34 and 44 years old category (26.2 per cent). There was a significant difference in age distribution between the purchasers and non-purchasers of organic products, $p < 0.01$. This suggests that purchasers of organic products were likely to be older than non-purchasers of organic products.

The respondents' education level was categorized into five categories (see Table 4.2). The results show most respondents were highly educated, since 59 per cent of the respondents had completed a bachelor's degree (undergraduate degree) and 21 per cent held a master's degree or higher (postgraduate). Only 1.6 per cent of the respondents had completed only primary school. It is hypothesized that respondents who purchased organic products were more likely to have higher education level than respondents who never purchase organic products. As shown in Table 4.2, there was a significant difference between education level and the respondents' group ($p < 0.01$); 87.2 per cent of the purchasers of organic products had a bachelor degree compared with 73.4 per cent of non-purchasers of organic products. In terms of occupation, 35.8 per cent of the respondents worked as private officers, followed by government officers (32.6 per cent) and self-employment (10.8 per cent). The remaining occupations accounted for only 20.8 per cent. The chi-square test was statistically significant between occupation and the respondents' group ($p < 0.05$).

The breakdown of marital status showed that more than half of the respondents (53.8 per cent) were married or in de facto relationships and 41.1 per cent of the respondents were single (see Table 4.2). Furthermore, the result showed 64.0 per cent of the purchasers of

organic products were married or in de facto relationships followed by single category (32.2 per cent). In contrast, the majority (50 per cent) of non-purchasers of organic products were single, followed by married or in de facto relationships (44.2 per cent). The marital status difference between purchasers and non-purchasers of organic products was significant at the 1 per cent level of significance. The results indicate that respondents who were married or in de facto relationships were more likely to be purchasers of organic products.

Table 4.2 shows that the proportion of the households with children (45.0 per cent) and without children (55.0 per cent) under 18 years of age in the family is fairly equal. The results also show 20.5 per cent of the households had children aged less than 7 years old and 32.8 per cent had children aged between 7 and 17 years old. The chi-square test was insignificant for households with children under 18 years old, households with children aged less than 7 years old and households with children aged between 7 and 17 years old. This indicates that the households with children were not independently an important factor in consumers' decision to purchase organic products.

The households' monthly income was divided into 10 categories (see Table 4.2). The highest frequency of households' monthly income was between 30,001 and 40,000 baht (18.3 per cent) followed by between 40,001 and 50,000 baht (17.3 per cent). The difference in distribution of households' income between the two groups of respondents was significant at the 1 per cent level. The results indicate that the households with high income were more likely to purchase organic products. For example, 4.6 per cent of households with the highest monthly income (over 150,000 baht) were purchasers of organic products compared with 1.9 per cent non-purchasers of organic products.

With respect to household location, 55.4 per cent of the respondents lived in the city, and 45.6 per cent lived in suburbs. There was a significant difference between the household location and the respondents' group ($p < 0.01$). The majority (64.0 per cent) of consumers who purchased organic products resided in the city but of consumers who did not purchase organic products (52.7 per cent) lived in the suburbs. This indicates that respondents who lived in the city were more likely to purchase organic products.

Table 4.2 Socio-demographic profile of respondents to a survey on the purchase of organic products

	Purchasers of organic products[a] (%) (n=242)	*Non-purchasers of organic products[a] (%) (n=260)*	*Total (%) (n=502)*	χ^{2} [b]	*Census (%)*
Gender				*3.97***	
Female	82.6	75.4	78.9		50.8[c]
Male	17.4	24.6	21.1		49.2[c]
Age				*27.35****	
18 – 24	0.8	7.3	4.2		22.3[c]
25 – 34	23.1	36.2	29.9		23.3[c]
35 – 44	33.1	26.2	29.5		22.3[c]
45 – 54	31.4	21.9	26.5		14.8[c]
55 – 64	9.5	7.3	8.4		9.3[c]
65 and older	2.1	1.2	1.6		8.1[c]
Education level				*19.53****	
Primary school	0.8	2.3	1.6		
Secondary school	6.2	13.5	10.0		
Technical/Vocational school (2 years)	5.8	10.8	8.4		
Bachelor degree	60.3	57.6	59.0		
Masters degree or higher	26.9	15.8	21.0		
Occupation				*16.85***	
Government officer	37.6	28.1	32.6		
Private company officer	32.6	38.7	35.8		
Self-employed	13.6	8.1	10.8		
Farmer	0.4	0.0	0.2		
Housewife/husband	10.7	7.7	9.2		
Labourer	0.4	8.5	4.6		
Retired	2.2	3.1	2.6		
Unemployed	0.0	2.3	1.2		
Other(s)	2.5	3.5	3.0		
Marital status				*20.39****	
Single	32.2	50.0	41.1		31.1[d]
Married/de facto relationship	64.0	44.2	53.8		60.2[d]
Divorced/separated/widowed	3.7	5.4	4.6		8.4[d]
Other(s)	0.0	0.4	0.2		0.3[d]
Households with children					
Children aged 0 to <7	23.6	17.7	20.5	*2.64*	
Children aged 7 to <18	35.5	30	32.8	*1.75*	
Children aged 0 to <18	48.8	41.5	45.0	*2.64*	

Table 4.2 Socio-demographic profile of respondents to a survey on the purchase of organic products (Continued)

	Purchasers of organic products[a] (%) (n=242)	*Non-purchasers of organic products[a] (%) (n=260)*	*Total (%) (n=502)*	χ^{2} [b]	*Census (%)*
Household income				*37.80****	
Less than 10,000 baht	0.0	2.3	1.2		46.4[e]
10,001 – 20,000 baht	7.0	14.2	10.8		39.9 [e]
20,001 – 30,000 baht	9.5	15.0	12.4		
30,001 – 40,000 baht	15.7	20.8	18.3		8.1[e]
40,001 – 50,000 baht	15.7	18.8	17.3		
50,001 – 60,000 baht	12.8	10.4	11.6		
60,001 – 80,000 baht	14.0	6.9	10.4		4.4[e]
80,001 – 100,000 baht	10.4	6.5	9.4		
100,001 – 150,000 baht	9.4	3.1	4.6		1.1[e]
More than 150,000 baht	4.6	1.9	4.2		
Area of household location				*14.22****	
City	64.0	47.3	55.4		32.8[c]
Suburb	36.0	52.7	44.6		67.2[c]

Note: [a]Purchasers of organic products refer to respondents who have bought organic products during last year while non-purchasers of organic products refer to respondents who have not bought organic products during the last year.
[b]Chi-square test is the test of independence. The number is the value of a Pearson chi-square.
*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively, and ^{NS} indicates non-significant.
[c]National Statistical Office (NSO); The 2000 Popuation and Housing Census Whole Kingdom.
[d]National Statistical Office (NSO); The 2000 Popuation and Housing Census Whole Kingdom, the population 13 years of age and above.
[e]National Statistical Office (NSO); Houshold Socio-Economic Survey, 2006.

4.3 Food purchasing behaviour

4.3.1 Households' food preparation and shopping patterns

With regard to food preparation for family members, 26.9 per cent of the households indicated that they 'often' prepared breakfast, 17.0 per cent 'often' prepared lunch at home and 53.4 per cent 'often' prepared dinner at home (see Table 4.3). Furthermore, the majority of the households (55 per cent) 'often' dined out or consumed take-away food (non-home-prepared food/ready-to-eat food). The results imply that Thai people preferred non-home-prepared food. This finding is consistent with the study by Yasmeen (1997), which shows 90 per cent of people in Bangkok went out for non-home meals. The habit of purchasing prepared food in Bangkok is not only found in the high or middle-class but also the poor people. As a result of the faster pace of life, especially in urban areas (e.g. Bangkok), convenience and advantageous service, for example, daily diets that take less time to prepare,

are highly demanded. Therefore, eating out at restaurants and purchasing ready-to-eat food at street stalls for the household is common for all Thai people. This eating habit is more convenient and costs less than preparing food at home.

There are significant differences at the 5 per cent level between the respondents' group and the frequency of dining out, the frequency of preparing breakfast, lunch and dinner at home. This implies that households who had not experience in purchasing organic products were more likely to rely on the non-home prepared food but households who had experience in purchasing organic products consumed more home prepared food. For example, the proportion of households who had not experience in purchasing organic products 'often' dining out or buying ready-to-eat meals from food shops or street stalls was 60.4 per cent, far more than households who had experience in purchasing organic products (34.7 per cent). In addition, purchasers of organic products 'often' prepared breakfast (34.7 per cent), lunch (21.9 per cent) and dinner (64.4 per cent) at home compared with 19.7 per cent, 12.3 per cent, and 43.1 per cent, respectively for non-organic households.

In regard to the dietary restrictions, the results show households having a family member who was on a vegetarian diet were more likely to purchase organic products. For example, 35.5 per cent of the households that purchased organic products reported that their family members were vegetarian compared with 20.0 per cent who do not purchase organic products. Nearly 30 per cent of households claimed that their families had experienced nutrition related health problems and had more concerns about the daily diet (e.g. diabetes, cancer, etc.). The percentage of the family members experiencing nutrition related health problems between the organic households and the non-organic households were 26.9 per cent and 30.8 per cent, respectively, and the difference is statistically insignificant.

The results show that approximately 40 per cent of purchasers of organic products and non-purchasers of organic products frequently visited the supermarket when purchasing groceries followed by the wet market/farmers' markets (24.5 per cent and 26.5 per cent, respectively). In addition, 15.5 per cent of purchasers of organic products frequently visited natural/health food stores compared with 5.7 per cent of non-purchasers of organic products (see Table 4.3).

Table 4.3 Food preparation and food purchasing behaviour of respondents

	Purchasers of organic products (%) (n=242)	*Non-purchasers of organic product (%) (n=260)*	*Total (%) (n=502)*	$\chi^{2\,b}$
Family dine out or consume take-away food (non-home prepared food)				*10.137***
Always	19.8	30.8	25.5	
Often	28.5	29.6	29.1	
Sometimes	43.4	33.8	38.4	
Rarely	7.4	5.4	6.4	
Never	0.8	0.4	0.6	
Family prepare breakfast at home				*21.191****
Always	19.0	13.5	16.1	
Often	15.7	6.2	10.8	
Sometimes	32.2	31.5	31.9	
Rarely	16.9	22.3	19.7	
Never	16.1	26.5	21.5	
Family prepare lunch at home				*12.120***
Always	9.1	5.0	7.0	
Often	12.8	7.3	10.0	
Sometimes	35.1	31.2	33.1	
Rarely	21.9	27.7	24.9	
Never	21.1	28.8	25.1	
Family prepare dinner at home				*27.719****
Always	41.3	22.7	31.7	
Often	23.1	20.4	21.7	
Sometimes	26.9	39.2	33.3	
Rarely	5.4	10.0	7.8	
Never	3.3	7.7	5.6	
Family members are on a vegetarian diet	*35.5*	*20.0*	*27.5*	*15.179****
Family members have nutritional related health problem	*26.9*	*30.8*	*28.9*	*0.933*
Place to purchase groceries often [a]				
Supermarkets	42.1	43.0	42.6	
Natural/health food stores	15.5	5.7	10.6	
Grocery/covenience stores	16.3	23.2	19.7	
Wet market/farmers' market	24.5	26.5	25.5	
Other(s)	1.6	1.6	1.6	

Note: [a]Multiple responses. Percentage is compared with the number of the total responses.
[b]Chi-square tests is the test of independence. The number is the value of a Pearson Chi-Square.
*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively.
NS indicates non-significant.

4.3.2 Food attributes/characteristics

In order to investigate the preference of respondents towards food attributes, respondents, when shopping, were asked to rank a list of food attributes using an ordinal scale (1= most important to 7 = least important). Table 4.4 shows the average rank of each food attribute revealed by the respondents. The most important attribute is the quality of food products (e.g. freshness, colour, nutrition) followed by being pesticide residue free. Price and availability of products were ranked third and fourth most important attributes. Country of origin (source of origin of the food products) and food products grown GMOs-free were ranked as the least important attributes. In general, respondents considered the private attribute benefits (for example, quality, price, availability, etc) more important than the public attribute benefits (for example, friendly environment or GMOs-free products) when they purchased food products. Price of product was perceived as one of the most important attributes before making a purchase decision, especially for the non-purchasers of organic products. Country of origin and the products grown without using genetically modified seeds were not perceived as important attributes by the respondents.

The rank order results of both groups of the respondents are quite similar. The only difference is that the purchasers of organic products considered chemical-free more important than price but price was regarded more important than chemical-free by the non-purchasers of organic products. The finding supports the results from Williams and Hammitt's (2000) study that reported that consumers who purchased organic, fresh produce ranked 'pesticide residue free label' more important than 'price' than those who purchased conventional fresh produce.

Table 4.4 Respondents' ranking of food product attributes when purchasing food products

Attributes	*Purchasers of organic products*				*Non-purchasers of organic products*				*Total*			
	Ranking as (%)		*Mean ranking*		*Ranking as (%)*		*Mean ranking*		*Ranking as (%)*		*Mean ranking*	
	most important	*least important*	*score*[a]	*Implied ranking*	*most important*	*least important*	*score*[a]	*Implied ranking*	*most important*	*least important*	*score*[a]	*Implied ranking*
Quality (e.g. freshness, colour, nutrition)	57.8	1.6	1.78	1	59.6	0.4	1.77	1	58.7	1.0	1.77	1
Price	7.5	4.1	3.60	3	12.7	2.7	2.99	2	10.2	3.4	3.28	3
Availability	7.9	7.4	3.88	4	11.5	3.1	3.38	4	9.8	5.2	3.62	4
Absence of pesticide residue	24.3	2.1	2.63	2	12.7	1.1	3.17	3	18.3	1.6	2.91	2
Produced in an environmentally friendly way	0.8	14.9	5.08	5	0.0	15.3	5.33	5	0.4	15.1	5.21	5
Produced without using genetically modified organisms (GMOs)	1.3	36.2	5.54	7	0.8	41.8	5.93	7	1.0	39.0	5.74	7
Country of origin	0.4	33.7	5.52	6	2.7	35.6	5.48	6	1.6	34.7	5.50	6
Total	100.0	100.0	-	-	100.0	100.0	-	-	100.0	100.0	-	-

Note: [a]Mean rank score is calculated with values of 1 for most important through to 7 for least important. Therefore, the lowest mean rank score indicates the most important attribute.

4.3.3 Respondents' attitudes towards health, food safety, ethics and the environment

The respondents' general attitudes towards statements related to health, food safety, ethics and the environment were calculated using the mean scores and standard deviations of the individual statement (see Table 4.5) and the frequency of responses (see Appendix B1). The significance of these attitudes between purchasers of organic products and non-purchasers of organic products was tested using the independent-samples *t*-test.

Table 4.5 shows that respondents had the highest concerns towards food safety attributes. Most respondents strongly agreed that 'the use of growth/red meat stimulants in livestock production is harmful' with a mean score at 4.6 (scale – 5 is "strongly agree" to 1 is "strongly disagree") and 'the pesticide residues in food cause cancer and other disease' (mean score 4.3) (see Table 4.5 and Appendix B1). Concerns about well-being (health consciousness) were also strongly held by the respondents. The results show that respondents strongly agreed that they 'avoid buying food with artificial additives and preservatives' (mean score 4.6). Similarly, most respondents agreed that they 'check quality label before buying a new food product' (mean score 4.1), 'often eat healthy food' (mean score 3.9), 'well-balanced work and family/life' (mean score 3.8), and 'exercise regularly' (mean score 3.7) (see Table 4.5).

In addition, most respondents had concerns about the environment. Most respondents strongly agreed that the 'pesticide and herbicide residues on farms would cause negative effect on environment' (mean score 4.3) and agreed that they were 'likely to buy environmental friendly products' (mean score 3.7). However, most respondents neither agreed nor disagreed (neutral) with 'separating recyclable garbage' and 'using reusable shopping bag' with mean scores of 3.5 and 3.3, respectively. The results indicate that respondents understood the importance of protecting the environment but were not necessarily proactive in protecting the environment. In addition, respondents who were concerned for the environment manifested slightly lower attitudes towards food safety and health consciousness. The attitudes related to ethical concerns showed a 'neutral' response (neither agreed nor disagreed). For example, the mean scores were 3.5 for 'buying animal welfare friendly food products if they are available' and 2.7 for 'genetically modified (GM) foods are reasonably safe for human consumption' (see Table 4.5 and Appendix B1).

The significance of the mean differences revealed a greater variation of attitudes between the two groups of respondents with regard to health, food safety, ethics and environment were

evaluated separately. Purchasers of organic products reported higher scores in the health, food safety, ethics and environment attitudes than non-purchasers of organic products. Purchasers and non-purchasers of organic products were significantly different at the 10 per cent level, except for the items ‘well balanced work and family/life’ and ‘buy animal welfare friendly products if they are available’. Thus, we can conclude that the responses between purchasers and non-purchasers of organic products organic are different with regard to health, food safety, ethics and environment attributes.

Table 4.5 Respondents' attitudes towards health, food safety, ethics and environment

Statements	*Purchasers of organic product (n=242)*		*Non-purchasers of organic product (n=260)*		*Total (n=502)*		*Significance of difference* [b]
	Mean[a]	*SD*	*Mean*[a]	*SD*	*Mean*[a]	*SD*	
I exercise regularly	3.89	1.037	3.51	1.269	3.70	1.177	3.694***
I well balance work and family/life	3.87	0.804	3.79	0.804	3.83	0.804	1.104 [NS]
I often eat healthy food	4.07	0.889	3.64	0.929	3.85	0.935	5.322***
I often read/check quality label before buying a new food product	4.28	0.790	3.98	0.894	4.12	0.857	3.921***
I avoid buying food with artificial additives and preservatives	4.48	0.724	4.00	0.979	4.23	0.898	6.321***
I believe that pesticide residues in food cause cancer and other diseases	4.68	0.527	4.37	0.768	4.52	0.679	5.212***
I believe that the use of growth/red meat stimulants in livestock production is harmful to humans	4.71	0.529	4.46	0.726	4.58	0.651	4.559***
I certainly buy 'animal welfare friendly' food products if they are available	3.65	0.843	3.53	0.872	3.59	0.859	1.561[NS]
I certainly believe that genetically modified foods are probably not safe for human consumption[c]	3.41	1.118	3.21	1.027	3.31	1.076	-1.993*
I like to buy products prepared in an environmentally friendly way	3.88	0.928	3.58	0.911	3.73	0.930	3.599***
I believe that pesticide and herbicide residues on farms would cause negative effect on environment	4.39	0.733	4.14	0.867	4.26	0.813	3.373***
I separate the rubbish that can be re-used and put in recycle bin	3.66	1.111	3.32	1.004	3.49	1.069	3.550***
I use reusable bag when I shop	3.40	1.166	3.13	1.116	3.26	1.147	2.598***

Note: [a]Mean score is calculated with values of 5 for 'strongly agree' through to 1 for 'strongly disagree' and excluded 'don't know' or 'not answered' response.
[b]Independent-samples *t*-test is used to test the significance of difference between the groups. The number is the value of the *t*-test.
[c]The negative statement has been reversed from 'I certainly believe that genetically modified foods are reasonably safe for human consumption to be "I certainly believe that genetically modified foods are probably not safe for human consumption"
*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively.
[NS] indicates non-significant.

4.3.4 Perception of organic products

This section describes the perceptions of respondents with respect to organic products. In order to determine whether organic products were acceptable to respondents, they were asked to indicate their agreement or disagreement with organic attributes. Ten respondents who did not purchase organic products skipped this section and several items were not indicated by the respondents. This may be a result of the respondents having less experience with organic products.

The mean scores and the frequency of responses of respondents' perceptions of organic products are presented in Table 4.6 and Appendix B2, respectively. Most respondents perceived that organic products contained more health benefits than conventional products. Over 75 per cent of the respondents agreed that 'organic products have less chemical residue than conventional products' and this item had a high mean score 4.1. Similarly, 'eating organic products are more beneficial to my health than conventional products' generated a mean score of 4.1. About half of the respondents agreed that 'organic products have more nutrients than conventional products' (mean score 3.7). However, the respondents' perceptions about the sensory attributes (i.e. taste and appearance) of organic products were mixed. The results showed that a similar proportion of the respondents reported 'agree' and 'neutral' (39.8 per cent and 33.9 per cent, respectively) that 'organic products have better appearance than conventional products'. Conversely, 34 per cent of respondents agreed that 'organic products are more tasteful than conventional products' compared with 44 per cent who reported a 'neutral' response. The responses regarding the sensory attributes of organic products compared with conventional products were neutral with mean scores of 3.4 and 3.3, respectively.

Overall, respondents perceived that organic products were better for the environment than conventional products. About 70 per cent of the respondents agreed with the statements that products grown organically 'are obtained from sustainable resources and less polluted discharges into air, water and soil' and 'are more ecologically sound than grown conventionally, with mean scores of 4.1 and 4.0, respectively.

Respondents agreed that there was a lack of availability of organic products, lack of information and higher price compared with conventional products. Respondents considered that: organic products 'are much more expensive' than conventional products (mean score

4.0); there was a ‘lack of availability of organic product information’ (mean score 4.0); organic products ‘are not easily found in grocery store’ (mean score 3.8); you ‘do not have a wide range of choices’ (mean score 3.8) and the ‘price of organic products is a barrier to decision to buy’ (mean score 3.7) compared with conventional products (see Table 4.6 and Appendix B.2).

Table 4.6 shows that the purchasers of organic products reported higher mean scores than non-purchasers of organic products in most perceptions of organic products (i.e. availability, information and price barriers, quality and health benefits, and environmental benefits). However, purchasers of organic products had a lower mean score than non-purchasers of organic products on ‘availability of information’, ‘products’ availability’, ‘products’ variety’, and ‘high price’. The results of the independent-samples t-test indicate a significant difference between purchasers and non-purchasers of organic products for the perceptions of organic products at the 10 per cent level, except ‘for ‘products’ availability’, ‘products’ variety’, and ‘high price’. Therefore, we can conclude that the purchasers of organic products perceived that the organic products were ‘tastier’, had ‘better appearance’, ‘more nutrients’, ‘less chemical’, were ‘more beneficial to health’, ‘more ecologically sound’, and ‘more sustainable resources’ than the conventional products. On the other hand, the non-purchasers of organic products perceived the lack of organic products’ information and the price as the barriers to purchase organic products. Both purchasers and non-purchasers of organic products perceived that organic products were expensive, lack of product’ variety, and availability.

Table 4.6 Respondents' perceptions of organically grown products

Statements	*Purchasers of organic product (n=242)*		*Non-purchasers of organic product (n=260)*		*Total (n=502)*		*Significance of difference*[b]
	Mean[a]	*SD*	*Mean*[a]	*SD*	*Mean*[a]	*SD*	
Organic products are tastier than conventional products.	3.56	0.903	3.19	0.908	3.37	0.923	4.350***
Organic products have better appearance than conventional products (e.g. freshness, colour, texture).	3.91	0.931	2.67	0.939	3.29	1.121	14.569***
Organic products have more nutrients than conventional products (e.g. vitamins and minerals).	3.87	0.998	3.53	1.011	3.70	1.019	3.746***
Organic products have less chemical residue than conventional products.	4.29	0.876	3.98	0.969	4.13	0.937	3.723***
Eating organic products are more beneficial to my health than conventional products.	4.25	0.814	3.86	0.963	4.05	0.912	4.755***
Organic products are not easily found in grocery stores compared with conventional products.	3.80	1.105	3.91	0.977	3.86	1.043	-1.152 NS
Organic products do not have a wide range of choices compared with conventional products.	3.83	1.001	3.88	1.008	3.86	1.004	-0.557 NS
There is lack of availability of organic product information compared with conventional products	3.92	1.030	4.09	0.894	4.01	0.966	-1.959*
Organic products are much more expensive than conventional products.	4.09	0.917	4.00	0.896	4.04	0.907	1.501 NS
Price of organic products is a barrier to decision to buy compared with conventional products	3.44	1.113	3.93	0.989	3.69	1.079	-5.076***
Products grown organically are more ecologically sound than grown conventionally.	4.11	0.833	3.97	0.842	4.04	0.839	1.758*
Products grown organically are obtained from sustainable resources and less polluted discharges into air, water and soil than grown conventionally.	4.23	0.870	4.02	0.840	4.13	0.861	2.733***

Note: [a]Mean score is calculated with values of 5 for 'strongly agree' through to 1 for 'strongly disagree' and excluded 'don't know' or 'not answered' response.
[b]Independent-samples *t*-test is used to test the significance of difference between the groups. The number is the value of the *t*-test.
*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively.
NS indicates non-significant.

4.3.5 Knowledge of organic and other credence products

The survey solicited information regarding respondents' self-reported knowledge and understanding of organic and other credence products including hygienic and genetically modified (GM) products. Overall, respondents reported that they had the highest knowledge of hygienic product rather than organic and GM foods. The mean scores on the respondents' knowledge about the hygienic and organic products were 3.1 and 3.0 (on a scale of 1 to 5), respectively, and only 2.4 for GM products (see Table 4.7). The differences in mean scores on knowledge about the organic, hygienic and GM products between purchasers and non-purchasers of organic products were significant at the 1 per cent level. The finding indicates that the purchasers of organic products appeared to be more knowledgeable about organic, hygienic and GM products than the non-purchasers of organic products. In addition, the respondents were asked about the main sources of information about organic products. Magazines/newspapers (print media) were the most prominent source (30.0 per cent) followed by radio/television (audio or audio-visual) accounting for 23.5 per cent of the total responses. The result also shows that non-purchasers of organic products relied on both the print media (27.5 per cent) and audio or audio-visual media (25.2 per cent) but purchasers of organic products relied more on print media sources (32.7 per cent).

For a self-assumed knowledge of organic products, respondents were asked to select the definition of the organic products from the multiple choices provided. The finding shows that respondents did not have a well-defined concept of products grown organically, especially among non-purchasers of organic products. The majority (72.7 per cent) of respondents gave the correct answer for the definition of 'organic products'. However, 15.7 per cent of respondents interpreted the term 'organic product' as 'hygienic product' defined as products grown using synthetic chemicals and meeting the safety requirements. About 3.2 per cent of respondents interpreted organic products as 'GM-free products' defined as the products grown without the use of genetically modified organisms. In addition, 67.3 per cent of non-purchasers of organic products correctly chose the definition of 'organic products' compared with 78.5 per cent of purchasers of organic products. Roitner-Schobesberger (2008) reported similar findings in his study where more than half of the surveyed consumers thought that the products labelled 'hygienic food' and 'pesticide-safe food' were products grown by organic agriculture.

Table 4.7 Respondents' knowledge of and sources of information about organic and other credence products

Statements	*Purchasers of organic product (n=242)*		*Non-purchasers of organic product (n=260)*		*Total (n=502)*		*Significance of difference*[c]
	Mean[a]	*SD*	*Mean*[a]	*SD*	*Mean*[a]	*SD*	
Self-reported knowledge[a]	*3.13*	*0.746*	*2.56*	*0.832*	*2.84*	*0.841*	*8.119***
Organic product	3.33	0.946	2.61	1.002	2.96	1.040	8.343***
Genetically modified product	2.67	0.984	2.23	0.990	2.44	1.011	5.019***
Hygienic product	3.40	0.892	2.85	1.046	3.11	1.011	6.279***
	%		**%**		**%**		
Self-assumed knowledge of organic products							
Correct answers	78.5		67.3		72.7		
Incorrect answers	21.5		32.7		27.3		
-interpreting the organic product as the hygienic product	13.6		17.7		15.7		
-interpreting the organic product as the GM-free product	1.7		4.6		3.2		
-interpreting the organic product as other product	6.2		10.4		8.4		
Sources of organic knowledge[b]							
Relatives, friends or colleagues	5.8		7.5		6.7		
Experts (e.g. doctors, nutritionists)	2.9		1.9		2.4		
Retailer advertisement or in store handouts	13.6		15.5		14.6		
Agricultural fairs or exhibitions	17.5		17.4		17.4		
Magazine, newspaper	32.7		27.5		30.0		
Radio, television	21.7		25.2		23.5		
Other(s)	5.8		5.0		5.4		

Note: [a]Mean score is calculated with values of 5 for 'very knowledgeable' through 1 for 'not at all knowledgeable'.
[b] [a]Multiple responses. Percentage is compared with the number of the total responses.
[c]Independent-samples *t*-test is used to test the significance of difference between the groups. The number is the value of the *t*-test.
*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively.
NS indicates non-significant.

4.4 Organic product purchasing behaviour

Table 4.8 shows respondents' information regarding the purchase of the organic products. The proportion of respondents who purchased organic products regularly was low. Many purchasers of organic products purchased organic products only once a month (34.4 %) and only 14.6 per cent purchased organic products two or three times a week. The main factors

encouraging consumers to purchase organic products were health consciousness followed by environmental concerns. They purchased organic products because they were ‘free-pesticides or growth hormones’ (34 per cent), ‘containing more nutrients/vitamins’ (27.4 per cent) and ‘environmental friendly method’ (12.0 per cent) but only 8.9 per cent of the consumers said they wanted to ‘support organic local producers’ (see Table 4.8).

Consumers purchased organic products primarily from the supermarket (41.1 per cent) and the natural/health food store (29.6 per cent), where they were more available and sold at a price premium. The next available outlet was the wet/fresh market (15.2 per cent) followed by the cooperative shop (9 per cent). A small proportion of consumers purchased organic products at a grocery or convenience store (2.4 per cent) (see Table 4.8). The dominant factors why the consumers purchased organic products at different stores were variety of organic products (29.3 per cent) and convenient location (28.5 per cent). The consumers reported that they were willing to buy more if the products provided ‘certified organic’ labels, were more available in the market, and had lower prices (18.9 per cent, 18.4 per cent, and 16.0 per cent, respectively).

In addition, the respondents who had experience in purchasing organic products were asked to identify the certified organic label they most frequently purchased. The Organic Thailand label (37.9 per cent), which is a national organic label, and the ACT label (11.4 per cent), which is a private label, dominated the market. The result is not a surprise because these are the only two certified organic labels available in the market. The main reason for purchasing these certified organic labels was that they are well-known (33.1 per cent). It can also be noted that recognition of the certified organic labels was found poor since a large group of the respondents (30.7 per cent) said that they have never considered the certified organic label when they purchased organic products. This implies that the marketing tool to inform consumers about the quality assurance of the organic products using the certified organic label is not effective (see Table 4.8).

Table 4.9 presents the percentage of expenditure spent on unprocessed and less processed organic products compared with the total expenditure for each product category. The results show that the consumers were more likely to purchase organic vegetables and organic rice. Conversely, most consumers who had experience in purchasing organic products said they never or very seldom purchased organic meat, eggs, milk and dairy products, seafood products, and spices and herbs. For example, the majority (35.3 per cent) of consumer who

had experience in purchasing organic products spent between 26 to 50 per cent of their total expenditure on vegetables for organic vegetables. Likewise, approximately 24 per cent of the consumers spend 26 to 50 per cent of their total expenditure on rice products for organic rice. However, the consumers spent only to 25 per cent of their total expenditure on meat, eggs, milk and dairy products, seafood products and spices and herbs for each corresponding organic product.

As discussed earlier, 51.8 per cent (260 respondents) of the respondents indicated that they had never purchased organic products. The main reasons were high prices (25.4 per cent) and lack of the product availability in the stores (21.0 per cent). Organic products' lack of available information (16.7 per cent) and limited products' variety (12.5 per cent) were also mentioned as barriers to purchasing organic products. Other reasons deterring respondents from purchasing organic products included satisfaction with conventional food and lack of trust in production (see Table 4.10). The factors that could persuade non-purchasers of organic products to purchase organic products were availability of organic products (24.7 per cent), prices of organic products being cheaper than currently in the market (21.9 per cent), trust in organic certificates (14.5 per cent) and a wider range of organic products (13.1 per cent). Environmental concern (4.8 per cent) was the least important reason to persuade non-purchasers of organic products to purchase organic products (see Table 4.10).

Table 4.8 Respondents purchasing behaviour towards organic products

Statements	*Purchasers of organic products (%) (n=242)*
Frequency in purchasing organic products[a]	
More than once a week (Always)	14.6
Once a week (Often)	21.6
2 –3 times a month (Sometimes)	26.6
Once a month (Rarely)	34.4
Other(s)	2.9
Reasons of buying organic products[a]	
Healthier and contain more nutrients/vitamins	27.4
Free from pesticides/growth hormones	34.0
Taste better	6.1
No trust in conventional products	4.7
GMOs free	6.1
Environmentally friendly and sustainable production method	12.0
Support of smaller/local producers	8.9
Other(s)	.8
Places where buy organic products often[a]	
Supermarket (e.g. The Mall, Carrefour, Big C)	41.1
Natural/health food store (e.g. Lemon Farm, Aden)	29.6
Grocery/convenience store (e.g. Seven Eleven, Lotus Express)	2.4
Wet market/Farmers' market	15.2
Cooperative shop	8.9
Home delivery or internet	0.0
Other(s)	2.8
Reasons for choosing place to buy[a]	
Wide range of organic products	29.3
Convenient location	28.5
Supporting local farmers/products	12.8
Buying most of groceries there	21.1
Convenient opening hours	4.2
Cheaper prices	3.3
Other(s)	0.8
Factors persuade to buy organic products more	
Price cheaper	16.0
More readily available (all supermarkets, farmers' market)	18.4
Better appearance	8.8
Packaging (size: bigger, loose)	5.8
Environmentally friendly packaging, no plastic	4.8
Wide range of organic products	13.9
Trust in certification bodies	18.9
Evidence of quality or organic standards	13.0
Other(s)	0.4

Table 4.8 Respondents purchasing behaviour towards organic products (continued)

Statements	*Purchasers of organic products (%) (n=242)*
Certified organic labels often buy[a]	
Organic Thailand	37.9
ACT (Organic Agriculture Certification Thailand)	11.4
IFOAM (International Federation of Organic Agriculture Movements)	2.5
Organic standard-soil association	5.0
Bioagricert	2.5
Don't know	28.8
Never buy organic products that have 'certified organic' labels	1.9
Other(s)	10.0
Reasons for choosing the certified organic labels[a]	
Cheaper prices	7.5
Safer	28.0
Well-known	33.1
Easy to find	13.5
Higher quality	13.2
Introduced/Recommended by others	3.2
Other(s)	1.5

Note: [a]Multiple responses. Percentage is compared with the number of the total responses.

Table 4.9 Respondents proportion of expenditure on organic products compared with the total expenditure in each product category

Product categories	*Percentage*				
	Never buy	*1 – 25%*	*26 – 50%*	*51 – 75%*	*75 – 100%*
Organic vegetables	5.8	27.4	35.3	22.4	9.1
Organic rice	34.0	22.4	23.7	12.4	7.5
Organic eggs	79.7	12.9	6.6	0.4	0.0
Organic meat (e.g. pork, chicken, beef)	81.3	13.3	5.4	0.0	0.0
Organic milk and dairy products	95.0	3.7	0.4	0.8	0.0
Organic seafood products (e.g. prawn)	95.4	3.7	0.4	0.4	0.0
Organic spices and herbs	85.8	10.4	2.1	1.7	0.0

Table 4.10 Respondents' reasons for not purchasing organic products

Statements	*Non-purchasers of organic products (n=260)*
Reasons for not buying organic products[a]	
High price	25.4
Do not like the appearance	1.7
Lack of variety	12.5
Not available where I normally shop	21.0
Do not believe organic products are high quality	4.4
Do not like the taste	0.9
Do not trust that the products truly produced organically	6.0
Confused (about terminology, certification bodies, etc)	3.2
Satisfied with the quality of non-organically produced products	7.2
Insufficient information about organic products	16.7
Other(s)	1.0
Factors which would persuade to buy organic products[a]	
Price cheaper	21.9
More readily available (all supermarkets, farmers' market)	24.7
Better appearance	5.3
Packaging (size: bigger, loose)	4.5
Environmentally friendly packaging, no plastic	3.2
Wide range of organic products	13.1
Trust in certification bodies	14.5
Evidence of quality or organic standards	11.4
Other(s)	1.4

Note: [a]Multiple responses. Percentage is compared with the number of the total responses.

4.4.1 Purchasing organic vegetables

In order to generate more information about consumers' purchasing behaviour towards organic products, the respondents were asked to give more information about their behaviour in purchasing the three unprocessed products: vegetables, rice and meat.

Table 4.11 shows 277 of the respondents (55.2 per cent) had never purchased organic vegetables and 225 (44.8 per cent) had purchased organic vegetables during the year. About 22.1 per cent of the respondents indicated that they purchased organic vegetables 'sometimes' and 17.1 per cent of the respondents answer 'often'. The purchasers of organic vegetable prioritised freshness (mean scores 4.7 and 4.7, respectively) as the most important attributes when they purchased vegetables. Being pesticide-free and product availability were also rated as relatively important. The purchasers of organic vegetables reported price as the

least important attribute (mean score 3.7) when purchasing vegetables and the non-purchasers of organic vegetables considered the vegetables grown free of GMOs (mean score 3.6.) as least important. Overall, except for freshness, there was a significant difference between the purchasers and non-purchasers of organic vegetables for all vegetable attributes at the 10 per cent level (see Table 4.11). The price and availability attributes were negative and statistically significant between the two groups of respondents. The results indicate that purchasers of organic vegetables considered being pesticide-free, grown in an environmentally friendly way, and GMOs-free as important attributes compared with non-purchasers of organic vegetables who rated price and availability of vegetables as important attributes in their purchase decisions.

The results show that organic lettuces or salad leaves were the most popular purchase (20 per cent) followed by organic Chinese kale (18%), organic cabbages (15%) and Chinese water spinach (12%) (see Table 4.12). The brands of the organic vegetables frequently purchased by the purchasers of organic vegetables included Doi Kham/Doi Luang (34.2 per cent), followed by Lemon Farm (15.8 per cent), cooperative farmer groups (13.5 per cent), and the supermarket brands (e.g. TOPs, Macro, Big C, Carrefour) (10 per cent). These organic vegetable brands were chosen because they were easy to find well-known brands.

4.4.2 Purchasing organic rice products

The results show 167 (33.3 per cent) of respondents claimed to purchase organic rice for their households but 335 (66.7 per cent) of respondents declared themselves as non-purchasers of organic rice (see Table 4.13). Some respondents (17.9 per cent) indicated that they occasionally purchased organic rice. In terms of preference towards rice attributes, purchasers of organic rice rated the chemical-free attribute as the most important attribute when purchasing rice (mean score 4.4) followed by availability, product quality, and grown in an environmentally friendly way, with mean scores between 4.2 and 4.0. Price and GMOs-free were the least important attributes given by purchasers of organic rice with mean score of 3.8. Non-purchasers of organic rice said availability was the most important attribute (mean score 4.3), chemical-free was slightly lower, a mean score of 4.2, followed by the product's quality (mean score 4.1) and price (mean score 4.04). The GMOs-free attribute was expressed as the least important attribute by non-purchasers of organic rice (mean score 3.4). The results show significant differences between purchasers and non-purchasers of organic rice for all rice attributes, ($p < 0.01$). This indicates that consumers who had purchase

organic rice placed higher importance on chemical-free, grown in an environmentally friendly way and GMOs-free attributes when purchase rice products compared with consumers who had never purchased organic rice. In addition, consumers who had never purchased organic rice placed higher importance on availability and price when they purchase rice products ($p < 0.05$) (see Table 4.13).

Jasmine brown rice (52.8 per cent) and jasmine white rice (41.5 per cent) were the two organic rice products most-frequently purchased by purchasers of organic rice. Purchasers of organic rice often purchased supermarket brands (24.4 per cent) and cooperative farmer groups' brands (21.1 per cent), followed by Aden, Lemon Farm, Green Net and Thai Thai. Purchasers of organic rice purchased these organic rice brands because they were easy to find, well-known and of high quality (see Table 4.14).

4.4.3 Purchasing organic meat products

The results show 13.3 per cent of the respondents declared they purchased organic meat (see Table 4.15) compared with 86.7 per cent of the respondents who never purchased organic meat. With regard to the preference of the respondents and their shopping habits about meat attributes, both groups of respondents were more concerned about freshness when they purchased meat products, with a mean score of 4.7 and 4.6, respectively, followed by chemical-free (mean score 4.5 and 4.4, respectively). Purchasers of organic meat rated price as the least important attribute (mean score 3.9) but non-purchasers of organic meat expressed being GMOs-free as the least important attribute (mean score 3.4) when they purchased meat products. In addition, the results show significant differences between organic and non-purchasers of organic meat for the environmentally friendly and GMOs-free attributes at the 5 per cent level which indicate that purchasers of organic meat placed greater importance on environmentally friendly and free of GMOs than non-purchasers of organic meat.

The survey results also reveal that purchasers of organic meat frequently bought organic pork (81.5 per cent), followed by organic chicken (32.3 per cent) (see Table 4.15). In addition, organic meat certified as organic products by the National Standard for Organic Agriculture under the National Bureau of Agricultural Commodity and Food Standards (ACFS) was not found in the markets. Few non-certified meat organic products were sold in fresh markets and two meat product brands, produced closely following the organic standards, in supermarkets. The S-Pure brand, produced and distributed by the Betagro Group, represented a premium

meat product that was free of chemicals, antibiotics and animal welfare concerns. Currently, only two meat products, pork and chicken, are distributed through the market. The Charoen Pokphand group (CP) distributes the hygienic fresh pork through supermarket channels.

Table 4.11 Respondents view about important vegetable attributes when purchasing vegetables

Statements	*Purchasers of organic vegetables (%) (n=225)*			*Non-purchasers of organic vegetables (%) (n=277)*			*Total (%) (n=502)*			*Significance of difference*[b]
	Mean[a]	*N*	*SD*	*Mean*[a]	*N*	*SD*	*Mean*[a]	*N*	*SD*	
Important of vegetable attributes										
Freshness	4.72	225	0.513	4.65	277	0.628	4.69	502	0.580	1.367
Price	3.67	225	0.996	3.97	277	0.876	3.83	502	0.943	-3.594***
Absence of pesticide residues	4.66	225	0.606	4.45	277	0.714	4.55	502	0.675	3.518***
Produced in an environmentally friendly way	4.01	225	0.896	3.73	276	0.958	3.85	501	0.941	3.379***
Produced without using genetically modified organisms(GMOs)	3.71	224	1.106	3.44	263	1.120	3.56	487	1.120	2.613***
Availability	4.22	225	0.894	4.40	277	0.860	4.32	502	0.879	-2.226**
							%			
Frequency of buying organic vegetables										
Always							2.6			
Often							17.1			
Sometimes							22.1			
Rarely							3.0			
Never							55.2			

Note: [a]Mean score is calculated with values of 5 for 'strongly agree' through to 1 for 'strongly disagree'. Excluded 'don't know' or 'not answered' response.

[b]Independent-samples *t*-test is used to test the significance of difference between the groups. The number is the value of the *t*-test.

*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively.

Table 4.12 Respondents' purchasing behaviour towards organic vegetables

Statements	*Purchasers of organic vegetables (%) (n=225)*
Organic vegetables buy often	
Cabbages	14.8
Chinese kales	17.6
Chinese mustard cabbages	10.0
Chinese water spinach	12.3
Cucumbers	7.9
Tomato	9.1
Vegetable's salads, lettuces	20.2
Herbs	6.0
Other(s)	2.2
Brand labels of organic vegetables buy often	
Rai Pluk Ruk	2.1
Green net	7.9
Lemon Farm	15.8
Aden	7.3
Doi Kham/Doi Luang	34.2
Supermarket brands (e.g. TOPs, Macro, Big C, Carrefour)	10.0
Cooperative farmer groups	13.5
No brand name	3.0
Other(s)	6.2
Reasons of buying organic vegetables from a preferred brand	
Cheaper prices	6.2
Higher quality	15.9
Well known	18.9
Easy to find	19.0
Better appearance	7.6
Packaging (size)	3.8
Environmental friendly packaging, no plastic	1.5
Wide range of organic products	7.7
Evidence of quality or organic standards from a source can be trust	16.1
Introduced/Recommended by others	1.6
Others	1.6

Note: Multiple responses

Table 4.13 Respondents view about important rice attributes when purchasing rice

Statements	*Purchasers of organic rice (%) (n=167)*			*Non-purchasers of organic rice (%) (n=335)*			*Total (%) (n=502)*			*Significance of difference*[b]
	Mean[a]	*N*	*SD*	*Mean*[a]	*N*	*SD*	*Mean*[a]	*N*	*SD*	
Important of vegetable attributes										
Freshness	4.10	167	0.887	4.11	333	0.853	4.10	500	0.863	-0.112
Price	3.81	167	0.986	4.04	334	0.884	3.96	501	0.925	-2.486**
Absence of pesticide residues	4.41	167	0.730	4.20	332	0.901	4.27	499	0.853	2.855***
Produced in an environmentally friendly way	3.95	167	0.943	3.70	333	0.963	3.79	500	0.962	2.751***
Produced without using genetically modified organisms(GMOs)	3.81	166	1.084	3.37	319	1.169	3.52	485	1.158	3.977***
Availability	4.17	167	0.896	4.34	334	0.797	4.28	501	0.834	-2.051**
							%			
Frequency of buying organic rice										
Always							2.4			
Often							8.8			
Sometimes							17.9			
Rarely							4.2			
Never							66.7			

Note: [a]Mean score is calculated with values of 5 for 'strongly agree' through to 1 for 'strongly disagree'. Excluded 'don't know' or 'not answered' response.

[b]Independent-samples *t*-test is used to test the significance of difference between the groups. The number is the value of the *t*-test.

*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively.

Table 4.14 Respondents' purchasing behaviour towards organic rice

Statements	*Purchasers of organic rice (%) (n=167)*
Organic rice buys ofte	
Jasmine white rice	41.5
Jasmine brown rice	52.8
Mixed grain rice	4.7
Other(s)	1.0
Brand labels of organic rice buy ofte	
Great Harvest	1.5
Thai Thai	3.3
Green net	7.0
Lemon Farm	12.6
Aden	13.0
Supermarket brands (e.g. TOPs, Macro, Big C, Carrefour)	24.4
Cooperative farmer groups	21.1
No brand name	6.7
Other(s)	10.4
Reasons of buying organic rice from a preferred bran	
Cheaper prices	8.6
Higher quality	17.5
Well known	18.0
Easy to find	21.6
Better appearance	4.8
Packaging (size)	3.3
Environmental friendly packaging, no plastic	1.3
Wide range of organic products	4.3
Evidence of quality or organic standards from a source can be trust	15.7
Introduced/Recommended by others	2.5
Other(s)	2.3

Note: Multiple responses

Table 4.15 Respondents view about important meat attributes when purchasing meat

Statements	*Purchasers of organic meat (%) (n=67)*			*Non-purchasers of organic meat (%) (n=435)*			*Total (%) (n=502)*			*Significance of difference*[c]
	Mean[a]	*N*	*SD*	*Mean*[a]	*N*	*SD*	*Mean*[a]	*N*	*SD*	
Important of vegetable attributes										
Freshness	4.70	67	0.523	4.63	430	0.654	4.64	497	0.638	0.935
Price	3.90	67	0.956	4.07	430	0.855	4.05	497	0.870	-1.567
Absence of pesticide residues	4.54	67	0.636	4.45	429	0.755	4.46	496	0.740	1.046
Produced in an environmentally friendly way	4.12	67	0.879	3.83	429	0.937	3.87	496	0.934	2.464**
Produced without using genetically modified organisms(GMOs)	4.07	67	0.974	3.41	413	1.182	3.50	480	1.177	5.042***
Availability	4.25	67	0.766	4.33	430	0.827	4.32	497	0.818	-0.711
	%						%			
Frequency of buying organic meat										
Always							0.0			
Often							0.2			
Sometimes							6.8			
Rarely							6.4			
Never							86.7			
Organic meat buy often[b]										
Pork		81.5								
Chicken		32.3								
Beef		3.1								
Other(s)		4.6								

Note: [a]Mean score is calculated with values of 5 for 'strongly agree' through to 1 for 'strongly disagree'. Excluded 'don't know' or 'not answered' response.

[b]Multiple responses

[c]Independent-samples *t*-test is used to test the significance of difference between the groups. The number is the value of the *t*-test.

*, **, and *** indicate the significant difference between purchasers and non-purchasers of organic products at the 10, 5, and 1 per cent level, respectively.

4.5 Factor analysis

This section presents the results of the factor analysis. The exploratory factor analysis was used to identify the underlying dimensions in explaining the inter-relationships among the attitudes and perception items and to reduce the items into the smallest set of factors (Hair et al., 2006). The set of factors was then used to generate the summated scales for the regression analysis of consumers' purchase decisions and consumers' WTP for organic products.

4.5.1 Attitude towards health, food safety, ethics and environment

Principal component analysis was conducted on the consumers' general attitudes (13 related items) related to health, food safety, ethics and environment (see Table 4.16). The total of 502 respondents in our study meet the minimal factor number requirement recommended at 100 and 5 times the number of items. The results of the correlation matrix show the correlation coefficient was high, exceeded 0.30 (see Appendix D). Bartlett's test of Sphericity value was highly significant ($\chi^2 = 1631, df = 78, P < 0.0001$), which confirms that the correlation matrix had significant correlations among the variables. The measure of sampling adequacy (MSA) value of 0.817 is interpreted as meritorious. Thus, our data set was appropriate for performing factor analysis. The values were selected when a number of factors had been established after several trial solutions.

The four-factor solution was extracted from the 13 items with the eigenvalues (the Kaiser's criterion) greater than 1.00, which is significant and reliable (Hair et al., 2006) (see Table 4.16). The variance explained by the four factors was 60.19 per cent of the total variance, which is considered satisfactory in social sciences research (Hair et al., 2006). Following this, the factor matrix was rotated using orthogonal (VARIMAX) and oblique (OBLIMIN) rotations to obtain an estimate of the factor structure. In the data matrix, orthogonal and oblique rotations produced similar results when the same items were loaded with the same factors in both rotation solutions. Thus, the results are based on the orthogonal rotation because of their simpler interpretation. Table 4.16 shows the items included in the factor analysis with their factor loading.

The first factor, labeled *Environmental concern*, had the largest variance explained (31.2 per cent). The *environmental concern* factor was created from four items: 'I separate the rubbish that can be re-used and put in recycle bin,' 'I use reusable bag when I shop,' 'I like to buy

product prepared in an environmentally friendly way,' and 'I believe that pesticide and herbicide residues on farms would cause negative effect on the environment.'

Heath concern was the second extracted factor accounting for 10.5 per cent of the total variation. This factor corresponds to the statements 'I often eat healthy food,' 'I well balance work and family/life,' 'I exercise regularly,' 'I often read/check quality label before buying a new food product,' and 'I avoid buying food with artificial additives and preservatives.' The third factor was *Food safety*, comprising two items, namely 'I believe that the use of growth/red meat stimulants in livestock production is harmful to humans,' and 'I believe that pesticide residues in food cause cancer and other diseases' accounting for 10.1 per cent of the variance. The fourth factor, *Food ethics*, included two items, 'I certainly believe that genetically modified foods are probably not safe for human consumption,' and 'I certainly buy 'animal welfare friendly' food products if they are available,' which explained 8.4 per cent of the variance.

The reliability of the internal consistency among the items in the factors was calculated using the Cronbach's alpha. The Cronbach's alpha coefficients for the factors *Environment concern, Health consciousness, Food safety* and *Food ethics* were 0.78, 0.69, 0.78 and 0.36, respectively (see Table 4.16). A Cronbach's alpha coefficient between 0.60 and 0.70 indicates acceptable reliability and is generally considered as satisfactory for exploratory research: 0.80 or more is consider excellent (Hair et al., 2006; Nunnally & Bernstein, 1994). Therefore, the first three factors are reliable measures. The Cronbach's alpha for the *Ethics* factor was lower than 0.50. However, Pallant (2004) argued that the fewer the items and shorter the scales results in a lower Cronbach's Alpha coefficient, which can be less than 0.50. The mean inter-item correlation can be considered as the reliable measurement for the *Ethics* factor. The mean inter-item correlation is more appropriate for short scales with fewer than 10 items. With regard to satisfactory reliability, the inter-item correlation ranges from 0.20 to 0.40 (Briggs & Cheek, 1986). The *Ethics* factor has the mean inter-item correlation of 0.22 and is considered reliable.

To use the four extracted factors for further analysis, the score items associated with each factor were summed and averaged over the number of the items. The averaged scores were used as replacement scales.

4.5.2 Perception of organic products

The principal component analysis was conducted to examine the underlying factors on the 10 consumers' perception items towards organic products (see Table 4.17). The appropriateness of applying factor analysis with the data matrix was tested. The survey data were suitable for factor analysis because Bartlett's test of sphericity was statistically significant ($\chi^2 = 1286, df = 66, P < 0.0001$) and the MSA was defined as middling (MSA value = 0.741). The factor loading structure from the VARIMAX rotation with only three retained factors with eigenvalues greater than 1, was used for interpretation because its solutions are substantially similar to the OBLIMIN rotation. The three factors account for 54.70 per cent of the variance explained, which is considered satisfactory in the social sciences (Hair et al., 2006). The results show that the item 'Organic products have better appearance than conventional products' did not load on any factor (factor loading < 0.50). Moreover, the factor solution for the item 'Price of organic products is a barrier to decision to buy' was not meaningful for interpreting the results, because the factor loading was below 0.50 and the items had significant cross-loading on factors 2 and 3 with the factor loading over 0.40. However, the reliability was tested including and excluding these two items with other items. The results show that the coefficient of Cronbach's alpha increased when this item is excluded. As a result, these two items were deleted.

Following this, the 11 items were re-analysed using the principal component analysis with VARIMAX procedure for a second time. Three factors were extracted. The MSA decreased to 0.737 and Bartlett's test of Sphericity was highly significant ($\chi^2 = 1073, df = 54, P < 0.0001$), which shows that factor analysis is still the appropriate measurement. The percentage of variance explained increased to 60.87 with all remaining items loaded above 0.5. Table 4.16 shows the varimax-rotated factor loadings towards organic products after the appropriate factors were examined. The final three-factor solution was identified. The first factor had 30.62 per cent of the explained variance. It includes four items comprising 'organic products do not have a wide range of choices,' '…lack of availability information,' '...not easily found in grocery stores,' and '…much more expensive than conventional product.' To determine the conceptual meaning of this factor, *Availability, Information and Price barrier* was labelled. The second factor with an explained variance of 18.0 per cent was labelled as *Quality and health benefits.* This factor comprised four items: 'organic products have more nutrients than conventional products,' '…tastier …,' '…more beneficial to my health…' and '…less chemical residue….'. The third factor was called *Environmental benefits*. This factor had an explained variance of 12.2 per cent and included

'products grown organically are ecologically sound,' '…obtained from sustainable resources and reducing polluted discharges into air, water and soil.'

The internal consistency of items in each factor is presented in Table 4.17. The reliability test showed that the *Availability, Information and price barriers*, the *Quality and health benefits* and the *Environmental benefits* had Cronbach's alpha of 0.73, 0.70 and 0.75, respectively. These indicate that each factor is reliable. The scores of the items comprising the factors were calculated by averaging over the number of the items. These average scores were used in the subsequent analysis.

Table 4.16 Rotated component matrix for the respondents' general attitudes related to health, food safety, ethics and environment

Statements	*VARIMAX rotated loading*				*Communalities*
	F1	*F2*	*F3*	*F4*	
Factor 1: Environmental concerns					
I separate the rubbish that can be re-used and put in recycle bin.	0.794				0.689
I use reusable bag when I shop.	0.786				0.685
I like to buy product prepared in an environmentally friendly way.	0.702				0.585
I believe that pesticide and herbicide residues on farms would cause negative effect on the environment.	0.664				0.617
Factor 2: Health consciousness					
I often eat healthy food.		0.781			0.634
I well balance work and family/life.		0.636			0.423
I often read/check quality label before buying a new food products.		0.616			0.431
I exercise regularly		0.610			0.418
I avoid buying food with artificial additives and preservatives.		0.540			0.503
Factor 3: Food safety					
I believe that the use of growth/red meat stimulants in livestock production is harmful to humans.			0.853		0.766
I believe that pesticide residues in food cause cancer and other diseases.			0.839		0.776
Factor 4: Food ethics					
I certainly believe that genetically modified foods are probably not safe for human consumption.				0.875	0.770
I certainly buy 'animal welfare friendly' food products if they are available.				0.631	0.528
Eigenvalues	4.057	1.362	1.313	1.093	
Variance explained (%)	31.204	10.474	10.103	8.407	
Cumulative variance (%)	31.204	41.679	51.782	60.189	
Number of items (N=13)	4	5	2	2	
Cronbach's Alpha	0.775	0.694	0.775	0.356	
Inter-item correlation	0.468	0.320	0.633	0.222	

Note: Extraction method: principal component analysis with an orthogonal rotation (VARIMAX).

Table 4.17 Rotated component matrix for the respondents' perceptions of organic products

Statements	*VARIMAX rotated loading*			*Communalities*
	F1	*F2*	*F3*	
Factor 1: Availability, Information and Price barriers				
Organic products do not have a wide range of choices compared with conventional products.	0.842			0.743
It is lack of availability of organic product information compared with conventional products.	0.762			0.605
Organic products are not easily found in grocery stores compared with conventional products.	0.736			0.617
Organic products are much more expensive than conventional products.	0.564			0.367
Factor 2: Quality and health benefits				
Organic products have more nutrients than conventional products.		0.800		0.644
Organic products are tastier than conventional products.		0.750		0.566
Eating organic products are more beneficial to my health than conventional products.		0.683		0.573
Organic products are less chemical residue than conventional products.		0.623		0.455
Factor 3: Environmental benefits				
Products grown organically are more ecologically sound than grown conventionally.			0.848	0.769
Products grown organically are obtained from sustainable resources and less polluted discharges into air, water and soil than grown conventionally.			0.840	0.749
Eigenvalues	3.062	1.802	1.224	
Variance explained (%)	30.622	18.016	12.236	
Cumulative variance (%)	30.622	48.638	60.786	
Number of items (N=13)	4	4	2	
Cronbach's Alpha	0.726	0.696	0.754	
Inter-item correlation	0.395	0.364	0.605	

Note: Extraction method: principal component analysis with an orthogonal rotation (VARIMAX).

4.5.3 Summary

This chapter described the data collected from the survey questionnaire, which was used in this study. The chapter began with the descriptive profile of the respondents followed by information about the respondents' purchasing behaviour towards food. In addition, the

description of the respondents' attitudes and perceptions, and knowledge about organic products are also reported. All the descriptive results, the chi-square test and independent-samples *t*-test were used to differentiate between the respondents' groups (purchasers and non-purchasers of organic products). Furthermore, factor analysis was conducted to identify the factors underlying the consumers' attitudes and perceptions towards organic products. The results of the survey data were used to analyse the choice of organic products and the WTP for organic products. These are discussed in Chapter 5.

Chapter 5
Purchasing Behaviour and Willingness to Pay - Results and Discussion

This chapter discusses the models' estimates and empirical results of the study. The first section provides empirical models of consumers' purchase decisions for organic products including two sub-models: factors influencing consumers who purchase organic products and factors influencing consumers who purchase organic products regularly. Following this, the estimated means and medians of the consumers' WTP for organic products are investigated. Finally, the empirical models in explaining factors influencing the consumers' WTP for organic products are presented.

5.1 Empirical models of consumers' purchase decisions towards organic products

This section presents the empirical results of the model of consumers who purchase organic products (Model 1) and the model of consumers who purchase organic products on a regular basis (Model 2)[11]. The organic products in aggregate and the three organic products (vegetables, rice, and meat) were used in the regression models to evaluate consumers' purchase decisions. However, meat products were excluded from the regression analysis. The rationale for this exclusion was that the number of respondents who purchased organic meat was too small with a large amount of missing data. This small number of observations results from the unavailability of certified organic meat in the market.

Logistic regression was used to estimate consumers' decisions to purchase organic products in both models using maximum likelihood via LIMDEP software (Greene, 1992). The descriptive statistics of the variables used in the models are shown in Tables 5.1 and 5.2. Table 5.1 shows the number of observations for the dependent variables used in Models 1 and 2. Approximately 48.2 per cent of respondents claimed that they purchased organic products and 44.8 per cent and 33.3 per cent of respondents claimed that they purchased organic vegetables and organic rice, respectively. On the other hand, the percentage of respondents who claimed that they

[11] The consumers who purchase organic products are referred to as consumers who purchase organic products whereas the consumers who purchase organic products regularly are refer to consumers who claim to 'always' or 'often' purchase organic products.

purchased organic products regularly was 17.3 per cent; 19.5 per cent and 11.4 per cent of respondents regularly purchased organic rice and organic vegetables, respectively.

Before performing the logistic regression, the independent variables were tested for outliers and multicollinearity to confirm the surveyed data. The values of the outlying cases that involved errors in data recording or data entry were modified or deleted. The multicollinearity problem can be detected thorough correlation analysis and collinearity diagnostics tests. A correlation value above 0.80 is considered to be problematic (Pallant, 2004). The bivariate correlation analyses in this study are presented in Appendix D1. The Pearson correlation coefficients between pairs of independent variables showed low and moderate correlations ($r \leq 0.60$). In addition, the assessment of collinearity was further analysed thorough collinearity diagnostics tests. Two indicators can be used to detect collinearity: Tolerance and Variance Inflation Factor (VIF) values. A small value of the tolerance or a great value of the VIF reveals that the independent variable has a high linear combination of another independent variable. The acceptable cut-off value for a tolerance is less than 0.10 and a VIF value above 10 is considered as a relatively high degree of collinearity (Pallant, 2004). The collinearity diagnostics are presented in Appendix D.2. The tolerance values for all independent variables in our model were greater than 0.10 while the VIF value exceeded 10. Therefore, all independent variables in our model were considered not to have multicollinearity problems.

Table 5.1 Number of observations for the dependent variables used in Model 1 (purchase organic products) and Model 2 (purchase organic products on a regular basis)

Models		*Categories*		
		Products in aggregate level	*Vegetables*	*Rice*
Model 1	Consumers who purchase organic products	242 (48.2)	225 (44.8)	167 (33.3)
	Consumers who do not purchase organic products	260 (51.8)	277 (55.2)	335 (66.7)
Model 2	Consumers who purchase organic product regularly	87 (17.3)	98 (19.5)	57 (11.4)
	Consumers who do not purchase organic product regularly	415 (82.7)	404 (80.5)	445 (88.6)

Note: Numbers in parentheses represent per cent of total respondents.

Table 5.2 Descriptive statistics for dependent and independent variables

Variables	*Description of variables*	*Min*	*Max*	*Mean*	*S.D.*
Dependent variables (Model 1)					
PURCHASE	1 = if the respondent purchases organic products for home consumption; 0 = otherwise.	0	1	0.482	0.500
PURCHASV	1 = if the respondent purchases organic vegetables for home consumption; 0 = otherwise.	0	1	0.448	0.498
PURCHASR	1 = if the respondent purchases organic rice for home consumption; 0 = otherwise.	0	1	0.333	0.472
Dependent variables (Model 2)					
REGULAR	1= if the respondent regularly purchases organic products (often or always); 0 = otherwise.	0	1	0.173	0.379
REGULARV	1 = if the respondent regularly purchases organic vegetables (often or always); 0 = otherwise.	0	1	0.195	0.397
REGULARR	1 = if the respondent regularly purchases organic rice (often or always); 0 = otherwise.	0	1	0.114	0.318
Independent variables					
HEALTH	Health consciousness (summated scale).	1.40	5.00	3.946	0.632
FSAFETY	Food safety concern (summated scale).	1.00	5.00	4.551	0.601
ETHICS	Food ethical concern (summated scale).	1.50	5.00	3.449	0.759
ENVIRON	Environmental concern (summated scale).	1.25	5.00	3.682	0.771
QBENEFIT	Quality and health benefits (summated scale).	1.00	5.00	3.813	0.705
AIPRICE	Availability, information and price barriers (summated scale).	1.00	5.00	3.946	0.742
EBENEFIT	Environmental benefits (summated scale).	2.00	5.00	4.077	0.775
NSTORE	1=if the respondent often purchases grocery products at natural/health food stores; 0=otherwise.	0.00	1.00	0.213	0.410
VEGETARI	1=if the household having a family member who is on a vegetarian or vegan diet; 0=otherwise.	0.00	1.00	0.275	0.447
DINEOUT	1=if the respondent's family dine out or consume take-away food always to often; 0= otherwise.	0.00	1.00	0.546	0.498
K_OR	1=if the respondent has knowledgeable and very knowledgeable about organic products; 0=otherwise.	0.00	1.00	0.243	0.429
FEMALE	1= if respondent is female; 0=Male	0.00	1.00	0.789	0.409
LOWEDU*	1=if respondent has completed below a bachelor degree; 0=otherwise.	0.00	1.00	0.199	0.400
HIGHEDU	1=if respondent has completed a bachelor degree or higher; 0=otherwise.	0.00	1.00	0.801	0.400
WCOLLAR	1=if respondent is white-collar worker (civil servant, private officers and self employed); 0=otherwise (housewife, retired, blue-collar, other).	0.00	1.00	0.831	0.375
MARRIED	1= if respondent is single; 0=otherwise (married, divorced, other).	0.00	1.00	0.538	0.499

Table 5.2 Descriptive statistics for dependent and independent variables (continued)

Variables	*Description of variables*	*Min*	*Max*	*Mean*	*S.D.*
Independent variables					
CHILDREN	1=if households having children aged less than 18; 0=otherwise.	0.00	1.00	0.450	0.498
MIDAGE	1= if respondent has aged between 35 and 54; 0=otherwise.	0.00	1.00	0.560	0.497
YOUNG*	1= if respondent has aged between 18 and 34; 0=otherwise.	0.00	1.00	0.341	0.474
ELDERLY	1= if respondent has aged 55 and older; 0=otherwise.	0.00	1.00	0.100	0.300
LOWINC	1=if monthly household income is less than 30,000 baht, 0 = otherwise.	0.00	1.00	0.243	0.429
MIDINC*	1=if monthly household income is between 30,000-60,000 baht, 0 = otherwise.	0.00	1.00	0.472	0.500
HIGHINC	1=if monthly household income is greater than 60,000 baht, 0 = otherwise.	0.00	1.00	0.285	0.452
CITY	1=if respondent resides in the city; 0=otherwise.	0.00	1.00	0.554	0.498

Note: * indicates the reference category, dropped from the models to avoid perfect collinearity.

5.1.1 Empirical model: purchase and regularly purchase organic products

Model 1 (consumers purchase organic products) and Model 2 (consumers regularly purchase organic products) were estimated and the results of the maximum likelihood (ML) estimates, their *t*-values, the marginal effects and summary statistics are presented in Table 5.3.

Goodness-of-fit measures are used to examine how well the the estimated models fit the data. According to the summary statistics of the estimated models reported in Table 5.3, the estimated Models 1 and 2 fitted the data reasonably well and were suitable for further examination. The likelihood ratio chi-square test on the models rejected the null hypothesis indicating that the independent variables included in the both models were significant (Model 1: χ^2 =172.39, d.f.=21, $p \leq 0.01$ and Model 2: χ^2 =93.97, d.f.=21, $p \leq 0.01$). The Hosmer and Lemeshow test results were 8.82 and 5.34, respectively, with $p > 0.10$ in both models. The non-significant Hosmer and Lemshow test indicates that the each model fitted well with the data and there was no discrepancy between the observed and predicted classifications. The models' McFadden pseudo R^2 values of 0.248 and 0.203, respectively, are acceptable

for cross-sectional data. The proportion of correct predictions in the estimated models is 64.54 and 76.89 per cent, respectively, which indicated good predictive ability.

Table 5.3 shows the empirical results for consumers who purchase organic products (Model 1) and consumers who purchase organic products regularly (Model 2). The results show 10 variables were statistically significant ($p < 0.10$) in Model 1. These were: *HEALTH, FSAFETY, NSTORE, DINEOUT, KNOWLEDG, FEMALE, HIGHEDU, MIDAGE, HIGHINC, CITY*). Only seven veriables were statistically significant ($p < 0.10$) in Model 2: *HEALTH, QBENEFIT, AIPRICE, EBENEFIT, NSTORE, DINEOUT* and *K_OR*.

With regard to the consumers' attitudes towards health consciousness, holding other factors constant, the estimated coefficient of health consciousness (*HEALTH*) was positive and statistically significant in Model 1 ($p < 0.05$) and Model 2 ($p < 0.1$). This implies that the more conscious the respondents were about their health, the higher the probability that the respondents decided to purchase organic products and also the higher the probability that the respondents decided to regularly purchase organic products. Health-conscious consumers have a strong desire for perfect health and prefer a product with higher health benefits. Those consumers were more likely to purchase organic products because such products fulfill their needs. This finding is consistent with previous studies; for example, Thompson (1998) showed that consumers of organic products tended to be people who ate healthy food and had well-balanced lifestyles. In addition, the studies by Magnusson et al. (2003), Gracia and Magistris (2008) and Hamzaoui and Mehdi (2008) concluded that consumers' health considerations were important in affecting their decisions to purchase organic products.

The *FSAFTY* coefficient was positive and significant at the 10 per cent level in Model 1 but insignificant in Model 2 ($p > 0.10$). The result indicates that the greater the respondents' awareness of food safety issues, the more likely they were to be purchasers of organic products. With regard to food safety, consumers worry about the perceived food safety risk in the use of chemical fertilizers and pesticides and growth hormones in agricultural production. This may be a reason why organic products are demanded by consumers who are concerned about food safety. In addition, the results from the descriptive analysis in Chapter 4 (see Table 4.8) also support this finding whereby the consumers who purchase organic products indicated that the 'free from pesticides and growth hormones' attribute as the most important reason inspiring the choice of organic products. Furthermore, the finding confirms the

previous findings in that food safety influenced consumers' decisions to purchase organic products (Loureiro, McCluskey, & Mittelhammer, 2001).

The empirical results show the quality and health benefits *(QBENEFIT)* coefficient was significant and positive in Model 2 ($p < 0.10$) but insignificant in Model 1. The result implies that as respondents' perceptions towards organic products quality and health increased (i.e. better taste, nutritious, less chemical residue and healthy), they were more likely to purchase organic products regularly. The possible underlying reason for this phenomenon is that consumers who regularly purchased organic products have had good product experience, better sensory evaluation and some other intrinsic attributes of organic products (i.e. taste, nutritional value and healthy) than consumers who did not purchase or irregularly purchased organic products. The results confirm the findings of Millock (2004) that taste and health of organic products influenced respondents' likelihood of being consumers who frequently purchased organic products. In addition, Gracia and Magistris (2008) argued that consumers who believed that organic products are better quality than coventional products had a positive effect on their likelihood of being regular purchasers of organic products.

The perception of environment benefits (EBENEFIT) was significant in Model 2 with the expected sign but insignificant in Model 1($p = 0.17$). The probability respondents were regular purchasers of organic products increased if the perceived environmental benefits of organic products increased. The benefits of organic products corresponding to the environment refer to the organic production method produce with the use of natural resources resulting in a reduction in environmental pollution. Thus, if consumers are interested in the environmental properties of foods and organic production's method, they are easily persuaded to purchase organic products regularly.

The variety, information and price barrier *(AIPRICE)* coefficient was significant at the 1 per cent level in Model 2 but insignificant in Model 1 ($p = 0.13$). In addition, the signs were negative in both models as hypothesised. This implies that respondents who perceived that organic products lacked variety and information, and had a premium price compared with the conventional products, were less likely to be either purchasers or regular purchasers of organic products. However, the effect of this variable on the likelihood to purchase organic products regularly was stronger than the likelihood to purchase organic products. These results support the findings of previous researchers. Roddy, Cowan and Hutchinson's (1996)

and Thompson and Kidwell's (1998) studies showed that consumers identified high price, limited availability and variety of organic products in the shops as major constraints to regularly purchasing organic products.

The *NSTORE* coefficient was positive and significant in Model 1 ($p < 0.01$) and Model 2 ($p < 0.05$). This indicates that respondents who often shopped and purchased grocery products at natural/health food stores were more likely to be either purchasers or regular purchasers of organic products. The specialized stores (e.g. natural/health food stores) often promote particular products associated with ideology of consumption and natural environment such as healthy food, environmentally friendly products and organic products. Thus, natural/health food store customers had a greater probability of purchasing organic products. In addition, the result indirectly shows the relationship between the availability of information about organic products, and the decision to purchase organic products. Zepeda and Li (2007) discussed the fact that the lack of the availability of organic products in conventional shopping venues constrained the demand for organic products. Roitner-Schobesberger (2006) stated that consumers well informed about organic products in Thailand were more likely to go to natural/health food stores whereas consumers shopping at supermarkets were poorly informed about organic products.

As hypothesised, the self-reported consumers' knowledge on organic foods *(K_OR)* coefficient was positive and significant in Model 1 ($p < 0.01$) and Model 2 ($p < 0.10$). This indicates that respondents who were knowledgeable about organic foods were more likely to be either purchasers or regular purchasers of organic products. Respondents who are educated about the the production process of organic products and perceive the advantages of organic agricultural over conventional practices would be more likely to purchase organic products. The finding is consistent with the results reported by Gifford and Bernard (2006) and Gracia and Magistris (2008).

The *DINEOUT* coefficient, which measured the the frequency of households dining out, was negative and significant in both Model 1 and 2. The finding indicates that the households whose members often dined out or consumed take-away foods were less likely to be either purchasers or regular purchasers of organic products. It appears that the convenience of purchasing prepared meals for the family or eating out, associated with urbanization, discouraged respondents from purchasing organic products for cooking at home.

With regard to the socio-demographic and economic characteristics of respondents, the results show that gender, education level, household income and area of residence had significant impacts on the decision to purchase organic products. The *FEMALE* coefficient was positive and significant in Model 1. This means that housholds with females responsible for their household's food and grocery purchases were more likely to purchase organic products than those households with males as household shoppers. As expected, the *HIGHEDU* coefficient was significant in Model 1. The positive sign suggests that respondents who had graduated with a bachelors degree or higher were more likely to purchase organic products than those who had completed less than a bachelors degree. The results confirm earlier findings that being female and having higher education were important in explaining the purchase of organic products (Onyango et al., 2007; Zepeda & Li, 2007).

The results show respondents' age between 35 and 54 years old *(MIDAGE),* and 55 years old and above *(ELDERLY)* had positive coeffients in Model 1 and Model 2. However, only the *MIDAGE* coefficient was significant in both models. The result suggests that the middle age group of respondents was more likely to be either purchasers or regular purchasers of organic products. This result is similar to that from Wier and Millock's (2008) study that primary household shoppers who were middle-aged had the highest propensity to purchase organic products. However, the result differs from that of Onyango et al.'s (2007) study. Their study showed that young consumers aged between 18 and 32 years old in the United States was positively correlated with the likelihood of purchasing organic products.

Monthly household income was stratified into low, middle and high income categories; middle income was held as the base. The result shows that the high monthly income group (*HIGHINC)* had a significant positive influence in both Model 1 and Model 2, indicating that households having monthly income greater than 60 thousand baht were more likely to be either purchasers or regular purchasers of organic products. Conversely, households with a monthly income less than 30 thousand baht *(LOWINC)* had a negative but insignificant effect on both models. Mixed results about the impact of household income have been reported in the literature. For example, Zepeda and Li (2007) did not find any effect of household income on the choice of organic products. However, Gracia and Magistris (2007) found that consumers who had less income were not willing to purchase organic products. Torjusen et al. (2001) argued that increase in organic product consumption were found in households with high income. Therefore, we can conclude that the level of household income is an important factor affecting the demand for organic products.

Additional information can be obtained from the marginal effects that quantify the impact of each independent variable on the probability respondents are purchasers of organic products and the probability respondents are regular purchasers of organic products. The marginal effect measures the change in percentage in the probability of a unit change in an independent variable[12](Greene, 2008).

Table 5.3 presents the marginal effects for Model 1 (consumers purchase of organic products). Knowledge about organic products *(K_OR)* had the highest impact on Model 1. The result indicates that respondents who were knowledgeable about organic products would increase the probability of purchasing organic products by 5.8 per cent, holding all other variables constant. The *NSTORE* and *HIGHEDU* factors are the second and third highest impact, indicating that respondents who often purchased grocery products at natural/health food stores were 5.2 per cent more likely to purchase organic products and respondents who had obtained higher education (bachelors or higher) were 3.1 per cent more likely to purchase organic products. The fourth most important factor was *DINEOUT*. The probability of purchasing organic products decreased by 2.8 per cent if the households often dined out or consumed take-away food. The marginal effects of *CITY*, *FEMALE*, *MIDAGE* and *HIGHINC* factors suggest that the probability of purchasing organic products would rised by 2.5 per cent if respondents resided in the city, by 2.5 per cent if respondents were female, by 2.3 per cent if respondents were in the middle-aged group (35 – 54 years old) and by 2.2 per cent if the households had a high monthly income. The *HEALTH* and *FSAFETY* factors had the lowest impact on consumers' decisions to purchase organic products.

Similarly, Table 5.3 also shows the marginal effects for Model 2 (consumers regularly purchase organic products). All factors had very low impact on the probability that the consumers regularly purchase orgnic product. The highest marginal effect was the *NSTORE* factors followed by *MIDAGE* and *HIGHINC* factors.

[12] The marginal effect is measured at the mean values of the data for the continuous variables while the dummy variables' effects are calculated as a change in the value when the dummy equals 1 compared with dummy equals 0, holding all other variables at their means (see section 3.2.3.1.3) (Greene, 2008).

Table 5.3 Estimated model for consumers' purchase decisions towards organic products (Model 1 and Model 2)

Variables	*Purchase (Model 1)*				*Regular purchase (Model 2)*			
	Coefficient	*Standard error*	*t-value*	*Marginal effect*	*Coefficient*	*Standard error*	*t-value*	*Marginal effect*
HEALTH	0.45583**	0.21410	0.0333	0.01892	0.53636*	0.28140	0.0566	0.51141D-08
FSAFETY	0.42095*	0.21959	0.0552	0.01748	0.05409	0.28523	0.8496	0.51574D-09
ETHICS	0.00045	0.00148	0.7627	0.00002	-0.00113	0.00140	0.4186	-0.10818D-10
ENVIRON	0.20736	0.16849	0.2184	0.00861	-0.30583	0.19888	0.1241	-0.29160D-08
QBENEFN2	0.00015	0.00132	0.9117	0.00001	0.38864*	0.20938	0.0634	0.37055D-08
AIPRICE	-0.20157	0.13331	0.1305	-0.00837	-0.45130***	0.16276	0.0056	-0.43030D-08
EBENEFIT	0.21047	0.13335	0.1145	0.00874	0.45512***	0.16276	0.0052	0.43394D-08
NSTORE	0.95197***	0.28772	0.0009	0.05184	0.67569**	0.29505	0.0220	0.79700D-08
VEGETARI	0.36783	0.24693	0.1363	0.01653	-0.09737	0.29478	0.7412	-0.90861D-09
DINEOUT	-0.64280***	0.22357	0.0040	-0.02776	-0.57025**	0.27629	0.0390	-0.56571D-08
K_OR	1.05999***	0.26956	0.0001	0.05803	0.50371*	0.29800	0.0910	0.55244D-08
FEMALE	0.72154***	0.27332	0.0083	0.02515	0.29699	0.34064	0.3833	0.26085D-08
HIGHEDU	0.94413***	0.29973	0.0016	0.03106	0.53899	0.37867	0.1546	0.44230D-08
WCOLLAR	0.11388	0.32501	0.7260	0.00457	-0.23362	0.37727	0.5358	-0.24119D-08
MARRIED	0.23809	0.25701	0.3542	0.00982	-0.24271	0.33827	0.4731	-0.23412D-08
CHILDREN	0.11974	0.24592	0.6263	0.00500	0.37814	0.29685	0.2027	0.36959D-08
MIDAGE	0.56999**	0.26655	0.0325	0.02317	0.77505**	0.39202	0.0480	0.72333D-08
ELDERLY	0.03712	0.45496	0.9350	0.00156	0.78823	0.52745	0.1351	0.10573D-07
LOWINC	-0.19752	0.29206	0.4989	-0.00784	-0.41748	0.45138	0.3550	-0.36017D-08
HIGHINC	0.47797**	0.26741	0.0739	0.02194	0.65212**	0.30054	0.0300	0.72817D-08
CITY	0.62135***	0.22241	0.0052	0.02532	0.42142	0.28584	0.1404	0.39572D-08
Constant	-7.12589***	1.19306	0.0000		-6.02602***	1.61754	0.0002	
LL_{model}	-261.443				-184.485			
LL_{nulll}	-347.637				-231.468			
Chi squared	172.387***				93.966***			
DF	21				21			
Pseudo R^2	0.248				0.203			
Hosmer-Lemeshow chi-square	8.819^{NS}				5.341^{NS}			
% correct predictions	64.542				76.892			

Note: *, ** and *** indicate the estimated coefficients are significant at the 10, 5 and 1 per cent level, respectively.
^{NS} indicates non-significant.

5.1.2 Empirical model: purchase and regularly purchase organic vegetables

Table 5.4 presents the goodness-of-fit tests and estimated coefficients for the model of consumers who purchase organic vegetables (Model 1) and the model of consumers who regularly purchase organic vegetables (Model 2). Overall, the goodness-of-fit measures confirmed that these two models fitted the data well and had significant explanatory power. The chi-square statistics using a likelihood ratio test on these two models were 169.71 (d.f.=21, $p \leq 0.01$) and 103.68 (d.f.=21, $p \leq 0.01$), respectively, indicating that the null hypothesis that all coefficients are simultaneously zero is rejected consistently at the 1 per cent level of significance. The Hosmer and Lemeshow tests show there were no significant differences between the observed and predicted values in both models (χ^2 =4.01, d.f.=8, ith $p-value$>0.1 and χ^2 =10.22, d.f.=8, ith $p-value$>0.1, respectively). Moreover, the McFadden pseudo R^2 were 0.246 and 0.208, respectively, which are considered highly satisfactory for social studies. Overall Model 1 and Model 2 correctly predicted 64.94 per cent and 74.90 per cent, respectively. The result shows that *HEALTH, FSAFETY, AIPRICE, EBENEFIT, NSTORE, VEGETARI, DINEOUT, K_OR, FEMALE, HIGHEDU, MIDAGE, HIGHINC* and *CITY* were significant at the 10 per cent level or better in the model of consumers who purchase organic vegetables (Model 1). With respect to the model of consumers who purchase organic products regularly (Model 2), only four variables were significant at the 10 per cent level or better: *NSTORE, K_OR, MIDAGE* and *HIGHINC*. The signs on the parameter estimates of both models support a priori hypotheses.

The coefficients of attitudes towards health consciousness (HEALTH) and Food safety (FSAFETY) were positive and significant at the 10 per cent level in Model 1 but not significant in Model 2. The increase in respondents' health consciousness and concerns for food safety would increase the probability of purchasing organic vegetables. The result is consistent with Durham and Andrade's (2005) study that reported concern for health and food safety influenced consumers' preference for organic fresh vegetables. Furthermore, Williams and Hammitt (2000) and Loureiro et al. (2002) reported that consumers who purchased organic vegetables had a positive attitude towards food safety (see Table 5.4).

The variety, information and price barrier *(AIPRICE)* coefficient had a significant negative effect, but the environmental concern (*EBENEFIT)* coefficient had a significant positive effect in Model 1. However, both factors were not significant in Model 2 (see Table 5.4). The

result suggests that if respondents perceived there was limited variety and information on organic vegetables, and the price was higher than conventional vegetables, they were less likely to purchase organic vegetables. In other words, inadequate availability of information, few stores, the variety of organic products on store shelves, and the price premium of organic products limited demand for organic vegetables. The result is consistent with Durham and Andrade's (2005) results, they concluded that price and product availability were important in explaining consumers' demand for fresh vegetables. Furthermore, the probability of purchasing organic vegetables increased when respondents perceived that organic products had enhanced the environment benefits compared with conventional vegetables. This implies that environmentally conscious consumers, who translate their environmental values through the purchase of products that they perceive to have a positive impact on the environment, were more likely to pay a premium for organic vegetables. Previous studies have identified environmental benefits as an important attribute impacting on respondents' decisions to purchase organic products (Durham & Andrade, 2005; Azucena Gracia & Magistris, 2007; Hamzaoui & Mehdi, 2008).

Interestingly, the perception of quality and health benefits *(QBENEFIT)* was positive but not significant in both Model 1 and Model 2. This implies that the quality and health benefits (i.e. better taste, nutritious, less chemical residue and healthy) of organic products compared with conventional products did not influence the consumers' decision to purchase organic vegetables. The results contradict previous studies where sensory, quality and health benefits attributes influenced the consumers' decisions to purchase organic vegetables (Bourn & Prescott, 2002; Makatouni, 2002). However, the Zhao, Chambers, Matta, Loughin, and Carey (2007) study showed that the perception of organic vegetables and fruits (in terms of more nutritious and health, better taste, environmentally friendly, and fresher) were not statistically significant between organic and conventional products purchasers.

The *NSTORE* and *K_OR* coefficients were positive and significant in both Model 1 and Model 2. The result indicates that respondents who often purchased groceries at natural stores and who were knowledgeable about organic products increased their likelihood to either purchase organic vegetables or regularly purchase organic vegetables. This is possible because consumers who know the benefits of organic products pay more attention to organic vegetables.

The presence of vegetarians in the household *(VEGETARI)* coefficient was significant in Model 1 but insignificant in Model 2. This indicates that the households who had a member who was on a vegetarian diet were more likely to purchase organic products. In fact, consumers who are a vegetarian consume more vegetables and fruits and are more concerned about healthy diets, environmental issues, toxicology and animal rights. Thus, the risk of using synthetic chemical inputs on conventional food crops drives the vegetarian consumers to demand organic vegetables. The result confirms the findings of previous studies that respondents who were on a vegetarian diet appeared to purchase organic fruit and vegetables (Davies et al., 1995; Williams & Hammitt, 2000).

The socio-demographic coefficients *FEMALE*, *HIGHEDU*, *HIGHINC* and *CITY* were positive and significant only in Model 1. This indicates that the probability the respondents purchased organic vegetables increased when they were a female purchasers or they had obtained at least a bachelors degree. The greater the monthly household income, the more likely to purchase organic vegetables. Respondents who lived in the city were more likely to purchase organic vegetables. The *MIDAGE* coefficient was positive and significant in Model 1 and Model 2. This indicates that respondents who aged between 34 and 54 years old were more likely to be either consumers who purchased or regularly purchased organic vegetables.

The marginal effects for Model 1 (consumers purchase organic vegetables) are shown in Table 5.4. The results show *K_OR* factor had the greatest impact on consumers' decision to purchase organic vegetables followed by *NSTORE, HIGHEDU* and *DINEOUT* factors. These indicate that respondents who were knowledgeable about organic products were 2.0 per cent more likely to purchase organic vegetables; respondents who often shopped at natural/health stores were 1.2 per cent more likely to purchase organic vegetables; and respondents who had completed at least a bachelors degree were 1.1 per cent more likely to purchase organic vegetables. In contrast, the households who often dined out or consumed take-away food were 1.0 per cent less likely to purchase organic vegetables. The other remaining factors had low marginal effects.

Similarly, Table 5.4 also presents the marginal effects for Model 2 (consumers regularly purchase organic vegetables). The results show that the *K_OR* factor had the greatest impact, which suggests that they who were knowledegable about organic products were 0.006 per cent more likely to purchase organic vegetables regularly. The second largest impact was *NSTORE,* indicating that respondents who often shopped at natural store were 0.003 per cent

more likely to purchase organic vegetables regularly. The *MIDAGE* coefficient had the lowest impact suggesting that respondents who were in the middle-aged group (34 to 54 years old) were 0.003 per cent more likely to be consumers who regularly purchased organic vegetables.

5.1.3 Empirical model: purchase and regularly purchase organic rice

The results of the goodness-of-fit measures of the estimated model of consumers who purchase organic rice (Model 1) and the model of consumers who regularly purchase organic rice (Model 2) are presented in Table 5.5. The likehood ratio tests were statistically significant (χ^2 =142.16, d.f.=21, $p \leq 0.01$ and χ^2 =93.70, d.f.=21, $p \leq 0.01$, respectively). The Hosmer and Lemeshow tests were non-significant (χ^2 =5.22, d.f.=8, $p \leq 0.01$). The McFadden pseudo R^2 values were 0.223 and 0.267, respectively. The overall results show that the estimated models were able to predict correctly 66.3 per cent and 84.46 percent, respectively. These measures indicate that the estimated models were statistically valid and fitted the data reasonably well.

The results show that *ENVIRON, QBENEFIT, AIPRICE, EBENEFIT, NSTORE, VEGETARI, HIGHEDU, MIDAGE* and *ELDERLY* coefficients were significant at the 10 per cent level or better in Model 1. However, only four factors were significant at the 10 cer cent level or better in Model 2, *NSTORE, K_OR, MIDAGE* and *ELDERLY*.

Concerns about the environment *(ENVIRON)* and the perception of environmental benefits perceived from organic products *(EBENEFIT)* were positive and significant only in Model 1. The result indicates that the increased attitude towards environmental concerns and the perception about the quality and health attributes for organic rice compared with conventional rice increased the probability the respondents purchased organic rice. The possible explanation for these findings may be that consumers who preferred to purchase organic rice might be conscious of the environment and they expressed fear regarding chemical residues causing environment problems. This is further supported by Lockie et al. (2004) and Gracia and Magistris (2007) who stated that green consumers (i.e. more concerned with natural foods, recycling of paper, etc) were more likely to purchase environmentally friendly products such as organic products to protect the environment.

The availability, information and price barrier of organic products (AIPRICE) coefficient was negative and significant in Model 1 but insignificant in Model 2. Interestingly, this variable

influenced the probability of purchasing either organic vegetables or rice (Model 1). The results indicate that when consumers confronted higher prices, and the limited variety of and information about organic products, they were less likely to purchase the specified organic product (vegetables or rice).

The quality and health benefits *(QBENEFIT)* coefficient had a positive effect only in Model 1. If respondents perceived the benefits of organic products in terms of nutrients, taste and less chemical residue compared with conventional products, they were more likely to purchase organic rice.

The often shopping at natural/health store *(NSTORE)* coefficient was positive and significant in both Model 1 and Model 2. The result suggests that respondents who often purchased grocery products at natural stores were more likely to be either purchasers or regular purchasers of organic rice. With regard to the presence of vegetarians in the households, the *VEGETARI* coefficient had a positive sign in both models but was significant only in Model 1. This implies that the households having a member who was on a vegetarian diet were more likely to purchase organic rice. The *K_OR* coefficient was positive and significant only in Model 2. This implies that, in general, respondents who were knowledgeable about organic products were more likely to regularly purchase organic rice.

The socio-demographic variables showed that respondents who had graduated with a bachelors degree or higher *(HIGHEDU)*coefficient was positive and significant in Model 1. The result implies that respondents who had at least 4 years of university were more likely to purchase organic rice. It is interesting that both respondents' age groups, between 35 and 54 years old *(MIDAGE)* and 55 years and above *(ELDERLY)*, were positive and significant in Model 1 and Model 2. Organic rice was more attractive to older respondents (adults and elderly adults) than younger respondents. Since the older consumers are commonly wealthier, they are more willing to purchase the organic rice with its price premium more than young consumers.

Table 5.5 show the marginal effects for Model 1 (consumers purchase organic rice). The *ELDERLY* factor had the greatest impact and the *NSTORE* factor displayed the second largest impact, which implies that if respondents were in the elderly age group (55 years old and above), and they frequently purchased groceries at natural/health stores, then the probability they would purchased organic rice increased by 0.000003 per cent and and 0.000002 per

cent, respectively. The marginal effects of both *MIDAGE* and *VEGETARI* factors were minimal.

The marginal effects on consumers who regularly purchase organic rice (Model 2) are reported in Table 5.5. The *ELDERLY* factor had the greatest impact on Model 2 followed by *K_OR, NSTORE* and *MIDAGE* factors. The findings imply that respondents who were in the elderly age group (55 years old and above) were 0.003 more likely to purchase organic rice regularly. In addition, respondents who were knowledgeable about organic products and who frequently purchased groceries at natural/health stores were 0.00024 per cent and 0.00022 per cent, respectively, more likely to regularly purchase organic rice. The least impact on Model 2 is the *MIDAGE* suggesting that the households having a member who was on a vegetarian diet were 0.0005 per cent more likely to regularly purchase organic rice.

Table 5.4 Estimated model for consumers' purchase decisions towards organic products (Model 1 and Model 2)

Variables	*Purchase (Model 1)*				*Regular purchase (Model 2)*			
	Coefficient	*Standard error*	*t-value*	*Marginal effect*	*Coefficient*	*Standard error*	*t-value*	*Marginal effect*
HEALTH	0.45583**	0.21410	0.0333	0.01892	0.53636*	0.28140	0.0566	0.51141D-08
FSAFETY	0.42095*	0.21959	0.0552	0.01748	0.05409	0.28523	0.8496	0.51574D-09
ETHICS	0.00045	0.00148	0.7627	0.00002	-0.00113	0.00140	0.4186	-0.10818D-10
ENVIRON	0.20736	0.16849	0.2184	0.00861	-0.30583	0.19888	0.1241	-0.29160D-08
QBENEFN2	0.00015	0.00132	0.9117	0.00001	0.38864*	0.20938	0.0634	0.37055D-08
AIPRICE	-0.20157	0.13331	0.1305	-0.00837	-0.45130***	0.16276	0.0056	-0.43030D-08
EBENEFIT	0.21047	0.13335	0.1145	0.00874	0.45512***	0.16276	0.0052	0.43394D-08
NSTORE	0.95197***	0.28772	0.0009	0.05184	0.67569**	0.29505	0.0220	0.79700D-08
VEGETARI	0.36783	0.24693	0.1363	0.01653	-0.09737	0.29478	0.7412	-0.90861D-09
DINEOUT	-0.64280***	0.22357	0.0040	-0.02776	-0.57025**	0.27629	0.0390	-0.56571D-08
K_OR	1.05999***	0.26956	0.0001	0.05803	0.50371*	0.29800	0.0910	0.55244D-08
FEMALE	0.72154***	0.27332	0.0083	0.02515	0.29699	0.34064	0.3833	0.26085D-08
HIGHEDU	0.94413***	0.29973	0.0016	0.03106	0.53899	0.37867	0.1546	0.44230D-08
WCOLLAR	0.11388	0.32501	0.7260	0.00457	-0.23362	0.37727	0.5358	-0.24119D-08
MARRIED	0.23809	0.25701	0.3542	0.00982	-0.24271	0.33827	0.4731	-0.23412D-08
CHILDREN	0.11974	0.24592	0.6263	0.00500	0.37814	0.29685	0.2027	0.36959D-08
MIDAGE	0.56999**	0.26655	0.0325	0.02317	0.77505**	0.39202	0.0480	0.72333D-08
ELDERLY	0.03712	0.45496	0.9350	0.00156	0.78823	0.52745	0.1351	0.10573D-07
LOWINC	-0.19752	0.29206	0.4989	-0.00784	-0.41748	0.45138	0.3550	-0.36017D-08
HIGHINC	0.47797**	0.26741	0.0739	0.02194	0.65212**	0.30054	0.0300	0.72817D-08
CITY	0.62135***	0.22241	0.0052	0.02532	0.42142	0.28584	0.1404	0.39572D-08
Constant	-7.12589***	1.19306	0.0000		-6.02602***	1.61754	0.0002	
LL_{model}	-261.443				-184.485			
LL_{nulll}	-347.637				-231.468			
Chi squared	172.387***				93.966***			
DF	21				21			
Pseudo R^2	0.248				0.203			
Hosmer-Lemeshow chi-square	8.819^{NS}				5.341^{NS}			
% correct predictions	64.542				76.892			

Note: *, ** and *** indicate the estimated coefficients are significant at the 10, 5 and 1 per cent level, respectively.
^{NS} indicates non-significant.

Table 5.5 Estimated model for consumers' purchase decisions towards organic vegetables (Model 1 and Model 2)

Variables	*Purchase (Model 1)*				*Regular purchase (Model 2)*			
	Coefficient	*Standard error*	*t-value*	*Marginal effect*	*Coefficient*	*Standard error*	*t-value*	*Marginal effect*
HEALTH	0.41734*	0.21458	0.0518	0.00584	0.14288	0.26285	0.5867	0.48822D-05
FSAFETY	0.57144**	0.22422	0.0108	0.00800	0.22741	0.26929	0.3984	0.77706D-05
ETHICS	0.00032	0.00151	0.8346	0.00000	0.20765	0.17719	0.2412	0.70953D-05
ENVIRON	0.18471	0.16775	0.2708	0.00259	-0.15975	0.18867	0.3972	-0.54586D-05
QBENEFN2	0.000069	0.00133	0.9586	0.00000	0.20312	0.19844	0.3060	0.69404D-05
AIPRICE	-0.26699**	0.13354	0.0456	-0.00374	-0.07743	0.15294	0.6127	-0.26458D-05
EBENEFIT	0.27678**	0.13368	0.0384	0.00387	0.08185	0.15297	0.5926	0.27968D-05
NSTORE	0.71486**	0.27922	0.0105	0.01244	0.76814***	0.29240	0.0086	0.33527D-04
VEGETARI	0.46519*	0.24473	0.0573	0.00727	0.23522	0.27700	0.3958	0.84940D-05
DINEOUT	-0.69131***	0.22482	0.0021	-0.01016	-0.21841	0.26539	0.4105	-0.75533D-05
K_OR	1.05466***	0.26412	0.0001	0.01998	1.19488***	0.27296	0.0000	0.58862D-04
FEMALE	0.67821**	0.27513	0.0137	0.00798	0.52256	0.33917	0.1234	0.15530D-04
HIGHEDU	0.96763***	0.30459	0.0015	0.01057	0.46084	0.36996	0.2129	0.13830D-04
WCOLLAR	0.19632	0.32723	0.5485	0.00258	-0.11884	0.37468	0.7511	-0.42260D-05
MARRIED	0.33023	0.25952	0.2032	0.00458	0.13113	0.32498	0.6866	0.44618D-05
CHILDREN	0.08754	0.24628	0.7223	0.00123	0.13251	0.28957	0.6472	0.45613D-05
MIDAGE	0.48503*	0.26876	0.0711	0.00666	0.99412***	0.37097	0.0074	0.33344D-04
ELDERLY	-0.13091	0.45471	0.7734	-0.00174	0.51847	0.53733	0.3346	0.22048D-04
LOWINC	-0.18879	0.29624	0.5239	0.00252	-0.18912	0.41209	0.6463	-0.61648D-05
HIGHINC	0.54506**	0.26463	0.0394	0.00864	0.44228	0.29201	0.1299	0.16757D-04
CITY	0.46949**	0.22376	.0359	0.00647	0.20164	0.27572	0.4646	0.68271D-05
Constant	-7.70722***	1.22066	.0000		-6.27052***	1.57887	0.0001	
LL_{model}	-260.4085				-197.407			
LL_{nulll}	-345.2618				-249.249			
Chi squared	169.7066***				103.685***			
DF	21				21			
Pseudo R^2	0.2458				0.208			
Hosmer-Lemeshow chi-square	4.0097^{NS}				10.215^{NS}			
% correct predictions	64.940				74.900			

Note: *, ** and *** indicate the estimated coefficients are significant at the 10, 5 and 1per cent level, respectively.
^{NS} indicates non-significant.

Table 5.6 Estimated model for consumers' purchase decisions towards organic rice (Model 1 and Model 2)

Variables	*Purchase (Model 1)*				*Regular purchase (Model 2)*			
	Coefficient	*Standard error*	*t-value*	*Marginal effect*	*Coefficient*	*Standard error*	*t-value*	*Marginal effect*
HEALTH	0.16946	0.22266	0.4466	0.29551D-08	0.46373	0.33794	0.1700	0.92965D-06
FSAFETY	0.30246	0.23630	0.2006	0.52743D-08	-0.09997	0.36683	0.7852	-0.20040D-06
ETHICS	0.00004	0.00157	0.9797	0.69709D-12	-0.00159	0.00145	0.2730	-0.31817D-08
ENVIRON	0.33789*	0.17244	0.0501	0.58922D-08	0.32106	0.25071	0.2003	0.64363D-06
QBENEFN2	0.49155***	0.17205	0.0043	0.85717D-08	0.12368	0.25629	0.6294	0.24794D-06
AIPRICE	-0.28885**	0.13621	0.0340	-0.50371D-08	0.08643	0.23742	0.7158	0.17326D-06
EBENEFIT	0.29562**	0.13626	0.0300	0.51550D-08	0.20442	0.25434	0.4216	0.40980D-06
NSTORE	0.88380***	0.26638	0.0009	0.20512D-07	0.85346**	0.35230	0.0154	0.22525D-05
VEGETARI	0.62588**	0.24374	0.0102	0.12772D-07	0.29698	0.35737	0.4060	0.63887D-06
DINEOUT	-0.00193	0.23074	0.9933	-0.33578D-10	0.03695	0.35192	0.9164	0.73946D-07
K_OR	0.41321	0.25559	0.1059	0.80699D-08	0.92340***	0.34266	0.0070	0.24312D-05
FEMALE	0.07662	0.27574	0.7811	0.13072D-08	0.49738	0.43953	0.2578	0.87259D-06
HIGHEDU	0.67007**	0.31462	0.0332	0.97316D-08	0.46901	0.46591	0.3141	0.82402D-06
WCOLLAR	0.45940	0.34518	0.1832	0.69427D-08	0.13388	0.47678	0.7789	0.25697D-06
MARRIED	0.44316	0.27045	0.1013	0.76616D-08	0.70671	0.44293	0.1106	0.14082D-05
CHILDREN	-0.23824	0.25237	0.3452	-0.41153D-08	-0.26442	0.36948	0.4742	-0.52468D-06
MIDAGE	1.00131***	0.29664	0.0007	0.17143D-07	2.27086***	0.78037	0.0036	0.48855D-05
ELDERLY	1.06576**	0.46528	0.0220	0.29844D-07	2.93508***	0.86267	0.0007	0.26672D-04
LOWINC	-0.02118	0.31965	0.9472	0.36738D-09	0.33028	0.54665	0.5457	0.72405D-06
HIGHINC	0.03410	0.26528	0.8877	0.59911D-09	-0.13265	0.37987	0.7269	-0.25862D-06
CITY	0.21971	0.23302	0.3457	0.37939D-08	0.48538	0.36979	0.1893	0.95730D-06
Constant	-8.46014***	1.37367	0.0000		-10.7172***	2.25682	0.0000	
LL_{model}	-248.2182				-128.729			
LL_{nulll}	-319.2986				-175.575			
Chi squared	142.161***				93.692***			
DF	21				21			
Pseudo R^2	0.2226				0.267			
Hosmer-Lemeshow chi-square	5.2216^{NS}				6.240^{NS}			
% correct predictions	66.932				84.462			

Note: *, ** and *** indicate the estimated coefficients are significant at the 10, 5 and 1 per cent level, respectively.
^{NS} indicates non-significant

5.2 Empirical models of consumers' willingness to pay for organic products

In order to obtain information about consumers' WTP (WTP) for three organic products, Chinese kale, jasmine rice and pork, the double-bounded approach with two bids was applied in this study. In this section, the results of the mean and median WTP are reported. The estimated factors affecting consumers' WTP for the three specified organic products are presented. The coefficients of the double-bounded WTP model were estimated by the maximum log-likelihood function using the LIFEREG Procedure in SAS version 9.1.3.

5.2.1 Respondents' responses to the double-bounded dichotomous choice

In estimating the consumers' WTP for organic products, we used the data from respondents who answered they would be willing to pay a price premium for organic products after they had read the passage about the production management systems of organic products. From the 502 respondents surveyed, 486 respondents (96.8 per cent) reported that they were willing to pay a price premium for organic products and only 16 respondents (3.2 per cent) said they were not willing to pay a premium for organic products. The 486 respondents were asked to respond to the double-bounded dichotomous choice questions given two bid prices: first (starting) bid and second (follow) bid (see Section *3.2.1.4*); we use the results in the double-bounded dichotomous choice estimation.

As discussed in section 3.2.3.2, the double-bounded data are not the respondents' true maximum WTP as continuous data but it is revealed as interval censored data. The respondents' WTP lies in one of the four different possible outcomes: 'Yes/Yes', 'Yes/No', 'No/Yes' and 'No/No', coded as binary-value variables. Thus, the true maximum WTP is bounded between the low and high amount of the outcome (see Figure 3.3). Table 5.6 presents the distribution of the double-bounded WTP responses for the three specified organic products. The proportion of respondents in terms of the different structure of bid prices were distributed equally: 34 per cent, 34.5 per cent and 31.5 per cent of the total respondents correspondending to the bid structure of versions A, B and C, respectively.

The bid designs captured the WTP ranges quite well. As shown in Table 5.6, the proportion of the respondents who were willing to pay the bid generally decreased with increases in price. This is confirmed by the fact that the higher starting bid price was less likely to generate a

'Yes/Yes' response and more likely to produce a 'No/No' response. In other words, the highest WTP outcome ('Yes/Yes' response) of the highest starting bid price (version C) of Chinese kale, jasmine rice and pork had the lowest responses, 19, 8, and 12 per cent of the total responses of bid structure version C, compared with the highest WTP outcome of the other two versions (19, 13, and 13 per cent of the total responses of the bid structure version B and 32, 26, 23 per cent of the total responses of the bid structure version A). This indicates very few respondents were willing to pay more than the prices of bid designs. As can be seen from Table 5.6, the respondents' maximum WTP lies between the lower and upper bounds of the second bid price because there is a high proportion in the 'Yes/No' and 'No/Yes' responses.

Table 5.7 Distribution of willingness to pay responses for the double-bounded dichotomous choice

Types of products	*Bid version*	*Bid amounts (baht/kg)*			*Distribution of WTP response* [a]				*No. of responses*
		First bid	*Second bid*		*Yes/Yes*	*Yes/No*	*No/Yes*	*No/No*	
			Lower amount	*Upper amount*					
Chinese kale	A	45	37.5	52.5	32	43	56	34	165
					(19.4)	(25.6)	(33.3)	(20.6)	(34.0)
	B	60	50.0	70.0	19	30	78	41	168
					(11.3)	(17.9)	(46.4)	(24.4)	(34.5)
	C	75	62.5	87.5	19	42	36	56	153
					(12.4)	(27.5)	(23.5)	(36.6)	(31.5)
Jasmine rice	A	210	175.0	245.0	26	14	65	60	165
					(15.8)	(8.3)	(38.7)	(36.4)	(34.0)
	B	240	200.0	280.0	13	23	57	75	168
					(7.7)	(13.7)	(33.9)	(44.6)	(34.5)
	C	270	225.0	315.0	8	21	48	76	153
					(5.2)	(13.7)	(31.4)	(49.7)	(31.5)
Pork	A	135	112.5	157.5	23	21	71	50	165
					(13.9)	(12.7)	(43.0)	(30.3)	(34.0)
	B	150	125.0	175.0	13	28	72	55	168
					(7.7)	(16.7)	(42.9)	(32.7)	(34.5)
	C	165	137.5	192.5	12	24	47	70	153
					(7.8)	(15.7)	(30.7)	(45.8)	(31.5)

Note: [1]'Yes/Yes' indicates Yes and Yes response in the first and second bid, respectively.
'Yes/No' indicates Yes and No response in the first and second bid, respectively.
'No/No' indicates No and No response in the first and second bid, respectively.
'No/Yes' indicates No and Yes response in the first and second bid, respectively.
Figures in brackets provide the percentage of the possible outcomes.
[2]Unit price of the organic jasmine rice is baht/5 kg pack.

5.2.2 Specification of the probability distribution functions in the double-bounded contingent valuation method

The specification of the probability distribution of the double-bounded WTP estimates was performed in order to determine how well the distribution fitted the data. To achieve the characteristic of a non-negative amount WTP for organic products, the distribution function emphasises the non-negative probability distributions including log-normal, log-logistic and Weibull were considered (Bateman et al., 2002). In order to select the appropriate probability distribution that best fits the WTP data, the maximum log-likelihood value of the three probability distributions models restricted for independent parameters was used for comparison (Hanemann et al., 1991). Table 5.7 shows that values of the maximum log-likelihood function for log-normal and log-logistic distributions did not differ much from one to another; the fit to the WTP data was very similar for those two distributions. However, we preferred to estimate the consumers' WTP by specifying the log-normal probability distribution because the value of the maximum log-likelihood function was greater for the log-normal probability distribution than for the log-logistic or Weibull probability distributions.

As discussed in Chapter 3, a comparison of the three WTP models was made between the conventional double-bounded dichotomous choice (Model 1: lower, upper) and the double-bounded dichotomous choice followed by the open-ended question including Model 2 (min, max) and Model 3 (min, max2) to provide accurate WTP estimates. In the case of Models 2 and 3, the values of the lower and upper bounds were applied using an open-ended question approach. Unlike the values of lower and upper bounds in Model 1, the conventional approach was used. In this study, the prices of conventional Chinese kale, jasmine rice and pork products[13] were used as the lower bound (min) of the lowest interval range (No/No response) in Models 2 and 3, 30 baht/kg, 140 baht/5 kg pack and 90 baht/kg, respectively. With regard to the respondents' true WTP obtained from the open-ended question, the highest amounts of money that respondents would be willing to pay for organic Chinese kale, organic jasmine rice and organic pork were 90 baht/kg, 400 baht/5 kg and 210 baht/kg, respectively. These values were used as the upper bound (max) for the highest range of WTP (Yes/Yes response) in Model 2. On the other hand, in Model 3 the highest amount of money obtained from the open-ended question that each respondent was willing to pay was used as the upper bound of the four interval ranges (max2).

[13] The price of each conventional products used as the base price in this study was obtained by averaging the prices of each conventional product from various stores collected during the pre-test store survey.

Table 5.7 shows the WTP estimates of the three models (Models 1, 2 and 3). The results show Model 3 was not an appropriate WTP estimate because, compared with the other models, the model produced the lowest value of the log-likelihood (goodness-of-fit measures) for the three specified organic products. Another reason is that the point estimates of the WTP mean and median obtained from Model 3 were inaccurate values since there is an anchoring effect[14], resulting in biased estimates of the WTP mean (see Table 5.8). The anchoring effect emerges when respondents give the maximum amount of money they were willing to pay in the open-ended question is exactly the same as the value of lower bound in the dichotomous choice question. As can be seen in Table 5.9, anchoring in the second bid of the Chinese kale, jasmine rice and pork occurred 55.1 per cent, 21.2 per cent, and 31.5 per cent, respectively, of the total responses in the second bid.

The point estimates of the WTP mean and median and the 95% confidence intervals were calculated using the estimated parameters of the restricted equation (without explanatory variables). These were used to consider the accuracy of the WTP estimates between Model 1 and Model 2. Table 5.8 shows that Model 2 has a higher precision of the WTP estimates than Model 1. The reasons are that the point estimates of the WTP mean and median for the three specified organic products in Model 2 were lower than the WTP mean and median generated by Model 1. In addition, Model 2 produces a 95% confidence interval of the WTP mean that is tighter than Model 1 for the three specified organic products. Therefore, this study employed the double-bounded dichotomous choice followed by an open-ended question in Model 2 to estimate respondents' WTP mean and median and the factors influencing respondents' WTP for three particular organic products.

[14] The anchoring occurs when the answers (the decisions) of the follow-up questions are influenced by the proposed value (or piece of information given), resulting from respondents who are careless or have no pre-established values in answering the questions (Cameron & Quiggin, 1994; Mitchell & Carson, 1989).

Table 5.8 Values of log-likelihood function by Log-normal, Log-logistic and Weibull probability distributions

Distributions	*Values of the maximum log-likelihood function (LL_{null})*								
	Model 1 (lower, upper)			*Model 2 (min, max)*			*Model 3 (min, max2)*		
	Chinese kale	*Jasmine rice*	*Pork*	*Chinese kale*	*Jasmine rice*	*Pork*	*Chinese kale*	*Jasmine rice*	*Pork*
Log-normal	-745.208	-606.155	-622.581	-769.212	-631.249	-637.577	-707.050	-722.141	-742.040
Log-logistic	-747.179	-607.115	-621.526	-783.006	-639.028	-644.154	-795.207	-809.144	-850.092
Weibull	-755.974	-610.431	-632.637	-796.765	-678.819	-682.868	-876.835	-887.716	-930.116

Table 5.9 Coefficients of the double-bounded dichotomous choice model for organic Chinese kale, organic jasmine rice and organic pork

	Model 1 (lower, upper)			*Model 2 (min, max)*			*Model 3 (min, max2)*		
	Chinese kale	*Jasmine rice*	*Pork*	*Chinese kale*	*Jasmine rice*	*Pork*	*Chinese kale*	*Jasmine rice*	*Pork*
Intercept (a)	3.9896	5.3089	4.8817	3.9959	5.3337	4.894	3.9132	5.2558	4.8209
Scale (σ)	0.3151	0.2484	0.2158	0.2791	0.2075	0.1914	0.2853	0.2166	0.1986
Median WTP[1](baht/kg) [4]	54.03	202.13	131.85	54.37	207.20	133.49	50.06	191.67	124.08
Mean WTP[2] (baht/kg) [4]	56.78	208.46	134.96	56.53	211.71	135.95	52.14	196.22	126.55
95% CI of mean WTP[3] ($\pm$ baht/kg)[4]	55.03-58.54 ($\pm$ 1.75)	203.32-213.61 ($\pm$ 5.15)	132.12-137.80 ($\pm$ 2.84)	55.03 -58.04 ($\pm$ 1.51)	207.48-215.94 ($\pm$ 4.23)	133.47-138.44 ($\pm$ 2.48)	50.76-53.52 ($\pm$ 1.38)	192.31-200.12 ($\pm$ 3.91)	124.25-128.85 ($\pm$ 2.29)

Note: [1]Median WTP= e^{a}

[2]Mean WTP= $e^{(a+0.5\sigma^2)}$

[3]95% Confidence interval of the WTP mean is calculated by using estimated parameters (see Appendix E)

[4]Unit price of the organic jasmine rice is baht/5 kg pack.

Table 5.10 Percentages of the anchoring between the maximum WTP and the lower bound in the second bid in the Model 3 (min, max2)

	Chinese kale (%)	*Jasmine rice (%)*	*Pork (%)*
Anchoring (Max2=lower bound)	55.14	21.19	31.48
No anchoring (Max2>lower bound)	44.67	78.81	68.52
Total (N=486)	100.00	100.00	100.00

5.2.3 Willingness to pay premium for the three specified organic products

5.2.3.1 Distribution of the willingness to pay

The overall percentage of the WTP for organic products was generated. In the section IV of the questionnaire for assessing the WTP for organic products, respondents were initially asked to indicate how much more they were willing to pay for organic products, relative to the prices of conventional products. The results in Table 5.10 show that 16 respondents were not willing to pay a price premium for organic products. Of the 486 respondents who were willing to pay a price premium for organic products, most respondents (72.4 per cent) were willing to pay a premium less than 25 per cent for the organic products. A further 18.1 per cent of respondents were willing to pay a price premium between 26 and 50 per cent of the conventional price. This result shows that proportion of respondents who were willing to pay a price premium for organic products decreased with an increase in the price premium level.

The distribution of percentages of the WTP for the three specified organic products is shown in Table 5.11. In general, respondents were willing to pay a high percentage premium for organic vegetables and a low percentage for organic rice and meat. 28.8 per cent of respondents were willing to pay a price premium over 100 per cent for organic Chinese kale compared with the price of conventionally grown Chinese kale; 23.5 per cent were willing to pay between 26 and 50 per cent as a price premium. Conversely, organic jasmine rice and organic pork showed a similar distribution pattern skewed to the low premium range (26 – 50 per cent). The result is consistent with previous research. For example, Millock, Hansen, Wier, and Andersen (2002) found that a substantial proportion (40 per cent) of consumers were willing to pay a price premium of 40 per cent for organic potatoes and a similar proportion (41 per cent) of consumers were willing to pay a 19 per cent price premium for organic minced meat. O' Donovan and McCarthy (2002) found that 70 per cent of consumers were willing to pay less than a 10 per cent price premium for organic meat.

Table 5.11 Percentage of consumes' willingness to pay a price premium for organic products

Percentage of premium (N=486)	*Organic prducts*[1]	*Chinese kale*[2]	*Jasmine rice*[2]	*Pork*[2]
25 per cent and less	72.4	10.9	23.3	21.4
26 – 50 per cent	18.1	23.5	42.2	44.9
51 – 75 per cent	4.1	18.7	15.2	17.5
76 – 100 per cent	5.3	18.1	9.5	9.1
Higher than 100 per cent	0.0	28.8	9.9	7.2

Note: [1]Price premium (in percentage) obtained from question 37 in the questionnaire.
[2] Price premium (in percentage) calculated by the maximum amount respondents are willing to pay obtained from the open-ended WTP question (Section 4 in the questionnaire).

5.2.3.2 Estimated mean willingness to pay

The point estimates of the WTP obtained from the double-bounded dichotomous choice followed by open-ended questions (Model 2) for the three specified organic products are presented in Table 5.11. The WTP median was significantly smaller than the WTP mean for the three specified products. This reflects the asymmetric shape of the log-normal probability distribution. This study considered using the estimated WTP mean for interpreting the WTP price premium for the three specified organic products. The WTP mean for organic Chinese kale was 56.53 baht/kg. Compared with the conventional Chinese kale's price, the premium[15] was 26.53 baht/kg, approximately 88 per cent higher than the conventional Chinese kale price. For organic jasmine rice, the estimated WTP mean was 211.71 baht/5 kg pack. The price premium was 71.71 baht/5 kg pack or roughly 51 per cent over the conventional jasmine rice price. In the case of organic meat, respondents were willing to pay 135.95 baht/kg for organic pork. This price was 45.95 baht/kg (51 per cent) higher than the price of conventional pork. This result confirms that respondents were willing to pay a higher percentage premium for organic Chinese kale than for organic jasmine rice and organic pork. This suggests that the organic attributes of perishable products (vegetables) are demanded more by consumers. The possible explanation is that the extensive use of the chemical fertilizers and pesticides, antibiotics and growth hormones in crop and livestock production has raised consumers' awareness about food safety. Consumers may perceive that the conventional fresh vegetables

[15] The price premium for the three organic products was calculated by comparing the amount of money that the respondents were willing to pay for the three specified organic products with the corresponding conventional alternative.

pose a greater risk of exposure to high chemical residue levels than the alternative product (e.g. rice or meat). Thus, they may be willing to pay more for organic vegetables to avoid the chemical residues. This result differs from the consumers' WTP for organic products in Europe (Gil et al., 2000). The percentage premium that those consumers were willing to pay for those products was not significantly different across products.

In order to generate more precise information, the WTP mean for three specified organic products with respect to the respondents' group (purchasers and non-purchasers of organic products) was estimated. The results confirm that consumers' WTP for the three specified organic products differed between the respondent groups. Table 5.11 shows that purchasers of organic products were willing to pay 60.7 baht/kg for organic Chinese kale, while the non-purchasers of organic products are willing to pay 52.56 baht/kg for organic Chinese kale. The difference between the WTP in purchasers and non-purchasers of organic products for organic Chinese kale was 8 baht/kg. For jasmine rice, the purchasers of organic products were more willing to pay a price premium (222.0 baht/5 kg pack) than non-purchasers of organic products (201.9 baht/kg), roughly 20 baht/5 kg pack. The difference in WTP for an organic pork between purchasers of organic products (142.2 baht/kg) and non-purchasers of organic products (129.95 baht/5 kg pack) was 12 baht/kg. The results also show that organic Chinese kale (27 per cent) had the highest percentage premium difference between the respondent groups (14 per cent for organic jasmine rice and 13 per cent for organic pork). Respondents who purchased organic products were willing to pay substantially more for the three organic products than those who did not purchase organic products. This may be because organic products attract purchasers of organic products who may perceive organic products as having a higher product quality (e.g. nutritious, taste, safe) than conventional products. In addition, the results show that when the non-purchasers of organic products have access to information about the organic production and processing system, they were willing to purchase and pay a premium for organic products.

To compare the estimated WTP means with the actual retail prices for organic products, the retail prices for organic Chinese kale, jasmine rice and pork were collected at the retail stores during the data collection period (see Table 5.12). The results show that the actual retail price for organic products from the surveyed stores was considerably higher than the estimated WTP mean. As may be seen from Tables 5.11 and 5.12, the retail price for organic Chinese

kale was between 70 and 135 baht/kg, organic jasmine rice[16] was between 240 and 375 baht/kg and organic pork was between 150 and 205 baht/5 kg pack compared with the estimated WTP means of 56.5 baht/kg, 211.7 baht/5 kg pack and 136.0 baht/kg, respectively.

Table 5.12 Estimates for consumers' willingness to pay for organic Chinese kale, jasmine rice and pork

	Model 2 (min, max)		
	Chinese kale	*Jasmine rice*	*Pork*
Median WTP (baht/kg) [1]	54.37	207.20	133.49
Mean WTP(baht/kg) [1]	56.53	211.71	135.95
Mean WTP-Purchase	60.70	222.03	142.23
Mean WTP-Non purchase	52.56	201.91	129.95
Conventional price [2] (baht/kg)[1]	30.00	140.00	90.00
Estimated premium[3] (baht/kg)[1]	26.53	71.71	45.95
Purchase	30.70	82.03	52.23
Non-purchase	22.56	61.91	39.95
WTP's difference (Purchase-Non purchase)	8.14	20.12	12.28
Percentage of premium[4]	88.43	51.22	51.06
Purchase	102.33	58.59	58.03
Non purchase	75.20	44.22	44.39
%WTP's difference (Purchase-Non purchase	27.13	14.37	13.64
Percentage distribution of premium[5] (N=486)			
25 per cent and less	10.91	23.25	21.40
26 – 50 per cent	23.46	42.18	44.86
51 – 75 per cent	18.72	15.23	17.49
76 – 100 per cent	18.11	9.47	9.05
Higher than 100 per cent	28.81	9.88	7.20

Note: [1]Unit price of the organic jasmine rice is baht/5 kg pack.
[2]Average price of conventional products at the period of surveyed data.
[3]Estimated price premium = Mean WTP – Conventional price.
[4]Percentage of price premium = (Estimated premium*100)/Conventional price.

Table 5.13 Retail prices for organic Chinese kale, jasmine rice and pork[1]

Products	*Aden*	*The mall*	*Villa market*	*Tops supermarket*	*Carfour*
Chinese Kale (baht/kg.)	70	130-135	145	130	110
Jasmine rice (baht/5 kg.)	240	250	375	240	-

[16] Retail price of meat produced free of chemicals, antibiotics and animal welfare concerns; the product process is closely following the organic standards (period of conversion from conventional to organic practice).

Pork [2] (baht/kg.)	-	150	-	205	-

Note: [1]Retail prices for organic products are surveyed during 10-30 January, 2009.
[2]Retail price for products from farms during conversion from conventional to organic practice.

5.2.4 Consumers' WTP for organic products

A regression equation was used to estimate the factors explaining consumers' WTP for the three specified organic products Chinese kale, jasmine rice, and pork. The exploratory variables hypothesized to affect consumers' WTP for the three specified organic products are shown in Table 5.2.

5.2.4.1 Consumers' WTP for organic Chinese kale

The estimated results of the consumers' WTP for organic Chinese kale are summarised in Table 5.13. The results show that the *PURCHASE, HEALTH, ENVIRON, QBENEFIT, CHILDREN* and *HIGHINC* coefficients were significant the 10 per cent level or better. As hypothesized, the *PURCHASE* coefficient was positively and significantly correlated with the WTP for organic Chinese kale. This implies that respondents who had experience in purchasing organic products were WTP more for organic Chinese kale than other respondents. One possible reason is that purchasers of organic products have experienced and may appreciate the quality of organic products. Thus they are less concerned about price than other respondents. The result is consistent with the studies by Govindasamy and Italia (1999) and Vanit-Anunchai (2006) that reported that consumers who regularly purchased organic fresh produce were willing to pay a price premium for organic fresh produce.

The *HEALTH* coefficient was positive and significant at the 5 per cent level, which indicates that respondents who were more health conscious and more interested in the quality of food consumed, were more willing to pay a premium for organic Chinese kale. Batte et al. (2007) also found that health-concern was an important determinant of the WTP for 95 per cent organic content product. Thus, we can conclude that if respondents engaged in health-conscious behaviours (i.e. consider well-being and the quality of life) it positively impacted on their WTP a premium for organic vegetables.

The results show a negative significant relationship between attitudes to environmental concerns *(ENVIRON)* and consumers' WTP for organic Chinese kale. Respondents who were more concerned with the environment were less willing to pay a premium for organic Chinese kale. The results contrast with prior studies regarding consumers' WTP for organic products in developed countries (e.g. USA and European countries). For example, Loureiro et

al.'s (2002) study concluded that consumers' WTP for organic products had a strong relationship with awareness of environment issues. Jill, Kim, and Morteza (2006) found that consumers who were environmentalists were more willing to pay for minimal-pesticide strawberries. However, Beckmann, Christensen and Christensen (2001) argued that environmentally friendly behaviour cannot be led by environmental awareness. Rice, Wongtada and Leelakulthanit (1996) provided a good explanation of differences in purchasing power towards environmentally friendly products between countries. The authors found that, in Western countries, green consumers, who were concerned for the environment, changed their consumption behaviour, such as purchasing environmental friendly products, to preserve the environment. On the other hand, consumers in Thailand reported that purchasing green products did not solve environmental problems. The authors also argued this may result from the limitation of availability of environmentally friendly products in the Thailand market and the proportion of consumers concerned for the environment is not big compared with Western countries.

Perception of the quality benefits of organic products *(QBENEFIT)* was positive and significant at the 1 per cent level. The result implies that the more respondents perceived quality and health benefits from organic products than conventional products (i.e.tastier, better appearance, more nutrients, less chemicals and more health benefits), the more likely they were willing to pay a price premium for organic Chinese kale. Loureiro and Hine (2002) claimed that consumers who pay attention to the nutrition and freshness of the products were willing to pay a higher price for organic potatoes.

The *CHILDREN* and *HIGHINC* coefficients were the only two socio-demographic variables that were statistically significant in affecting the consumers' WTP for organic Chinese kale. However, the *CHILDREN* coefficient was negative, which contradicts prior research findings (Loureiro & Hine, 2002). The result indicates that households with children under 18 years old were less likely to pay more for organic Chinese kale than households without children. This result is consistent with Huang et al.'s (1999) findings that consumers with young children were less likely to pay a price premium for safer food (hydroponically grown vegetables). The possible explanation is that families with children in the house tend to have less disposable income to use to pay a price premium, thus they are less willing to pay a price premium for organic products.

With regard to income categories, low income level (*LOWINC*) showed a negative relationship with the consumers' WTP for organic Chinese kale and high income level *(HIGHINC)* showed a positve relationship. This suggests that households with a low monthly income level (less than 30,000 baht) may not have excess disposible income to pay for organic Chinese kale. Conversely, households with a high monthly income (greater than 60,000 baht) were likely to pay more for organic Chinese kale. This implies that households with greater financial resources were willing to pay a price premium for vegetables that they believed were of higher quality, such as organic vegetables. This results are similar to other studies in Thailand. For example, Posria, Shankarb and Chadbunchachaic (2006) stated that the probability of the WTP for safe vegetables increased if the households' income increased. Additionally, Boccaletti and Nardella (2000), Govindasamy and Italia (1999), and Misra, Huang and Ott (1991) reported that higher income households were more likely to pay a price premium for certified organic produce.

5.2.4.2 Consumers' WTP for organic jasmine rice

Table 5.14 shows the estimated results of consumers' WTP for organic jasmine rice. The results show that *PURCHASE, ETHICS, QBENEFIT, CHILDREN, ELDERLY* and *CITY* coefficients are significant in influencing the probability of consumers' WTP for organic jasmine rice.

The *PURCHASE* coefficient was positive and significant at the 1 per cent level. This means consumers who had experience in purchasing organic products were willing to pay more for organic jasmine rice than consumer who had never experience in purchasing organic products. Respondents' WTP for organic jasmine rice was positively related to ethical concerns *(ETHICS).*The result suggests that the higher the respondents' concern about ethics, the more likely they were willing to pay a price premium for organic jasmine rice. Consumers' attitudes towards GM food in Thailand were negative. Consumers obtained the GMOs information through Greenpeace Southeast Asia and the government, which launched campaigns to provide information on the risks of GMOs and reported several products contained ingredients from soy proteins derived from GMOs (Valyasevi, Tanticharoen, & Bhumiratana, 2003). The government in Thailand has decided to ban GM rice (Gruère & Sengupta, 2009), but the experiment with GM papaya raised consumers' safety perceptions of such products that may cause their WTP a price premium for organic rice to ensure that they were buying GMOs-free rice.

In addition, the *QBENEFIT* coeffient was positive and significant with respect to respondents' WTP for organic jasmine rice. This suggests that the greater the respondents perceived the benefits of the quality and health attributes of organic products compared with conventional products, the more respondents were willing to pay for organic jasmine rice.

In terms of socio-demographic variables, the results show a negative relationship between households with children *(CHILDREN)* and respondents' WTP for organic rice. This indicates that households with children were less likely to pay a price premium for organic jasmine rice. With respect to respondents' age groups, both the *MIDAGE* (35 to 54 years old) and *ELDERLY* (55 years old and over) coefficients were positive but only *ELDERLY* was significant at the 10 per cent level. This implies that the older the respondents, the more likely they will pay a price premium for organic jasmine rice. These results are similar to the finding of Misra et al. (1991) and Batte et al.'s (2007) studies.

As hypothesised, the *CITY* coefficient is positive and significant at the 10 per cent level. This indicates that respondents who lived in the city (urban area) were more likely to pay a price premium for organic rice than those who lived outside the city (suburban and rural area). Most stores that sell natural or organic products were more available in the city than in rural areas. Thus urban consumers have more possibility to visit and purchase organic rice than rural consumers.

Table 5.14 Estimated model for consumers' willingness to pay for organic Chinese kale

Variables	*Coefficient*	*Standard error*	*p-value*
PURCHASE	0.0920***	0.0291	0.0016
HEALTH	0.0642**	0.0249	0.0100
FSAFETY	-0.0091	0.0246	0.7120
ETHICS	0.0225	0.0178	0.2053
ENVIRON	-0.0507**	0.0197	0.0101
QBENEFIT	0.0545***	0.0203	0.0073
AIPRICE	0.0033	0.0181	0.8562
EBENEFIT	-0.0276	0.0192	0.1494
NSTORE	0.0160	0.0335	0.6325
VEGETARI	-0.0337	0.0292	0.2482
DINEOUT	-0.0114	0.0263	0.6647
K_OR	0.0360	0.0306	0.2389
FEMALE	-0.0168	0.0315	0.5943
HIGHEDU	-0.0227	0.0352	0.5195
WCOLLAR	-0.0348	0.0374	0.3509
MARRIED	0.0057	0.0305	0.8509
CHILDREN	-0.0477*	0.0289	0.0985
MIDAGE	0.0133	0.0321	0.6786
ELDERLY	0.0390	0.0524	0.4564
LOWINC	-0.0511	0.0346	0.1405
HIGHINC	0.0574*	0.0313	0.0666
CITY	0.0390	0.0265	0.1408
Scale (bid price)	0.2508	0.0092	
Intercept	3.7888	0.1472	
LL_{model}	-697.3745		
No. of observations	468		

Note: *, ** and *** indicate the estimated coefficients are significant at the 10, 5 and 1 per cent level, respectively.

Pseudo $R^2 = 1 - (\frac{LL_{model}}{LL_{null}})$

Table 5.15 Estimated model for consumers' willingness to pay for organic jasmine rice

Variables	*Coefficient*	*Standard error*	*p-value*
PURCHASE	0.0425*	0.0221	0.0544
HEALTH	0.0119	0.0190	0.5310
FSAFETY	0.0063	0.0186	0.7367
ETHICS	0.0310**	0.0135	0.0211
ENVIRON	-0.0235	0.0150	0.1162
QBENEFIT	0.0374**	0.0155	0.0158
AIPRICE	-0.0128	0.0137	0.3532
EBENEFIT	-0.0119	0.0146	0.4161
NSTORE	0.0273	0.0252	0.2788
VEGETARI	0.0108	0.0220	0.6254
DINEOUT	-0.0218	0.0199	0.2722
K_OR	0.0211	0.0232	0.3643
FEMALE	-0.0176	0.0240	0.4634
HIGHEDU	-0.0263	0.0267	0.3255
WCOLLAR	-0.0484	0.0281	0.1043
MARRIED	0.0057	0.0231	0.8055
CHILDREN	-0.0445**	0.0219	0.0421
MIDAGE	0.0320	0.0243	0.1881
ELDERLY	0.0679*	0.0394	0.0853
LOWINC	-0.0266	0.0260	0.3075
HIGHINC	0.0347	0.0237	0.1434
CITY	0.0371*	0.0201	0.0650
Scale (bid price)	0.1867	0.0075	
Intercept	5.2190	0.1112	
LL_{model}	-566.958		
No. of observations	468		

5.2.4.3 Consumers' WTP for organic pork

Table 5.15 presents the empirical results of the consumers' WTP for organic meat. The results show that the coefficients for *PURCHASE, ETHICS, ENVIRON, QBENEFIT, K_OR* and *CITY* factors significantly affected the likelihood that a consumer would pay a price premium for organic pork.

The *PURCHASE* coefficient was significant at the 10 per cent level suggesting that respondents who had experience in purchasing organic products were willing to pay more for organic pork. In addition, the *ETHICS* coefficent is positive and significant at the 10 per cent level. This indicates that respondents' WTP for meat produced by ethical treatment or cruelty-free methods increased with an increase in concern about ethical issues. This result supports the findings of McCluskey, Durham and Horn (2009), who reported that concern about animal welfare was significant in the increase in the WTP for milk from pasture-fed cows.

The *ENVIRON* coefficient was negative and contradicts the hypothesised relation. This contradiction suggests that the higher the respondents' concern about environment, the less likely they were willing to pay a price premium for organic pork. The result of Wandel and Bugge (1997) study is supported by our findings. They reported that most (87 per cent) consumers who were interested in environmentally sound production did not want to pay more than 5 per cent premium for environmentally friendly products and only half of those consumers were willing to pay 10 per cent more. Only 10 per cent of respondents were willing to pay for environmentally friendly products if the price was 25 per cent more.

As hypothesised, the *QBENEFIT* coefficient was positively correlated with respondents' WTP for organic pork. This means the higher the respondents' perception of the benefits of the quality and health attributes for organic pork compared with conventional pork, the more likely they were willing to pay a price premium for organic pork. This result is similar to the organic jasmine rice WTP model. Thus, it is evidence that the perception of the quality and health attributes of organic products was an important indicator of consumers' WTP for organic products.

The results also show that the *K_OR* coefficient was not significant in respondents' WTP for organic Chinese kale and organic jasmine rice. However, it was significant at the 5 per cent level in respondents' WTP for organic pork. This means respondents who were more knowledgeable about organic products were willing to pay more for organic pork than those who were not. This is because organic meat is not available or promoted in Thailand markets.

Therefore, we can conclude that only respondents who had a good understanding of organic products were willing to pay a higher price for organic pork.

The socio-demographic variables were not significant in explaining the consumers' WTP for organic pork. The results show that only residing in the city *(CITY)* significantly increased the respondents' WTP for organic pork. This indicates that respondents who resided in the city were willing to pay more for organic pork. Therefore, we can conclude that the WTP for organic pork was highly influenced by the place of residence of respondents.

Table 5.16 Estimated model for consumers' willingness to pay for organic pork

Variables	*Coefficient*	*Standard error*	*p-value*
PURCHASE	0.0360*	0.0205	0.0787
HEALTH	0.0146	0.0177	0.4087
FSAFETY	0.0113	0.0173	0.5156
ETHICS	0.0229*	0.0126	0.0690
ENVIRON	-0.0255*	0.0139	0.0668
QBENEFIT	0.0398***	0.0145	0.0060
AIPRICE	-0.0017	0.0128	0.8930
EBENEFIT	-0.0201	0.0136	0.1384
NSTORE	0.0126	0.0235	0.5928
VEGETARI	-0.0012	0.0206	0.9524
DINEOUT	-0.0224	0.0185	0.2265
K_OR	0.0437**	0.0216	0.0434
FEMALE	0.0109	0.0223	0.6259
HIGHEDU	-0.0109	0.0248	0.6606
WCOLLAR	0.0047	0.0264	0.8574
MARRIED	0.0147	0.0216	0.4951
CHILDREN	-0.0136	0.0204	0.5036
MIDAGE	0.0091	0.0226	0.6876
ELDERLY	0.0343	0.0368	0.3507
LOWINC	-0.0207	0.0242	0.3934
HIGHINC	0.0130	0.0221	0.5570
CITY	0.0577***	0.0187	0.0020
Scale (bid price)	0.1756	0.0070	
Intercept	4.6776	0.1034	
LL_{model}	-579.741		
No. of observations	468		

5.3 Summary

This chapter presents the results and discussion of consumers' purchase decisions and consumers' WTP for organic products. The logistic regression was used to estimate the significant factors influencing consumers who purchased organic products and the important factors in explaining consumers who regularly purchased organic products (vegetables and rice). The results show that both psychological factors and socio-demographic characteristics were important in explaining both models.

The consumers' WTP for organic products' models were evaluated by the double-bounded contingency valuation method to obtain a better understanding of the price premium the consumers were willing to pay and the factors influencing their WTP for three specified organic products (Chinese kale, jasmine rice and pork). Overall, most respondents were willing to pay a price premium to obtain organic products and they were willing to pay a price premium less than 25 per cent for organic products. In addition, purchasers of organic products were willing to pay a higher price for the three specified products than non-purchasers of organic products. The consumers' WTP for the three organic products would increase if they had previously purchased organic products and perceived quality and health benefits from organic products. Interestingly, respondents who were more concerned about the environment were less likely to pay a higher price for the three specified organic products.

Chapter 6
Conclusions and Implications

This chapter summarises the study with a brief description of the objectives of the study, followed by the methods and data analysis. A summary of the analysis results presented in Chapter Five is provided. In addition, the implications of the study for producers, marketers and consumers of organic products are presented. This chapter concludes with the limitations and recommendations for future study.

6.1 Summary and empirical findings

6.1.1 Summary and major findings

Over the past decade, interest in organically grown products has grown substantially across the globe and is enhanced by growing awareness of environmental problems, concern about health and food safety from the potential hazards of modern agricultural practices with the heavy application of synthetic fertilizers and pesticides and concern about biotechnology production systems (e.g. genetically modified organisms). In Thailand, the market for organic products is in the beginning stage of development, but its growth has increased significantly and is attributable to the expansion of both supply and demand for organic products. Retail sales of organic products have increased substantially (150 per cent) from 2002 to 2005 (Lorlowhakarn et al., 2008). On the supply side, the organically managed farmland in Thailand is increasing to meet the growing demand for organic products. From 2002 to 2007, the certified organic farmland has increased more than 700 per cent to 19,123 hectares (Willer & Kilcher, 2009). This increase was mainly driven by the National Organic Agenda under the government's policies and the private sector's initiatives. However, the demand for organic products is relatively small compared with total food consumption and many consumers still do not have access to the organic products market. Information to understand Thai consumers' behaviour towards organic products is limited since it has not been widely researched. To sustain the growth of organic products in the domestic market, a better understanding of consumers' purchasing behaviour towards organic products had to be investigated.

The purpose of this study was to assess the market potential for organically grown products in Thailand. The study analysed critical factors influencing consumers' decisions to purchase organic products. This study also assessed the price premium that consumers were willing to pay for organic products and the factors affecting consumers' WTP for organic products. The results from this study will provide important information to producers and marketers as well as policymakers to promote organic products among Thai consumers.

A self-administered questionnaire was employed to elicit information from consumers about their organic purchasing behaviour, attitudes toward health, food safety, ethics and environment, perceptions of organic products, organic products' knowledge, WTP for organic products, and socio-demographic information. A convenience sampling method was used to interview respondents, who were 18 years of age and over and were responsible for household grocery purchases. The survey questionnaire was administered to three types of store including natural/health food stores, fresh markets and supermarkets in the Bangkok metropolitan area, during January 10-30, 2009. Seven hundred questionnaires were distributed and 502 questionnaires were completed and returned, a return rate of 72 per cent.

Descriptive statistics were used to describe the sample respondents' characteristics. The chi-square test and the independent-samples *t*-test, were used to test the differences and similarities between purchasers and non-purchasers of organic products. Exploratory factor analysis was employed to identify the underlying dimensions in explaining the inter-relationships among the attitudes and perception items and reducing the items into a smaller set of factors used as explanatory variables in the empirical analysis. Logistic regression was used to estimate how the explanatory variables influenced consumers' purchase decisions towards organic products. The double-bounded contingency valuation method was used to obtain a deeper insight into the price premium that consumers were willing to pay for organic products and the factors affecting their WTP for organic products.

The descriptive statistics show that the majority of respondents were female, between 34 and 54 years old, married or in a de facto relationship, had completed at least an undergraduate degree and were white collar workers. Almost half of the respondents had children in the household and resided in the suburbs. The results of consumers' purchase behaviour towards food products showed that organic products were not widely consumed as evidenced by the low intensity of shopping where only 48 per cent and 17 percent of the total respondents were consumers who purchase organic products and who purchase organic products regularly,

respectively. When purchasing food products, purchasers of organic products ranked quality of food products as the most important attribute followed by absence of pesticide residues, and price of product. Thus, it is not surprising that purchasers of organic products gave as the main reasons for their decision to purchase organic products that they were free of chemical additives (e.g. pesticides or growth hormones) and were good for their health. On the other hand, non-purchasers of organic products were more price-conscious consumers because they ranked the price of the food products as a more important attribute than pesticide residue-free when they purchased food products. Moreover, the higher price of organic products was identified most frequently by non-purchasers of organic products as the major deterrent factor in not purchasing organic products. Both purchasers and non-purchasers of organic products revealed that the availability of products was the fourth most important attribute when purchasing food products. The low availability of organic products in the domestic market was a major reason why non-purchasers of organic products did not purchase organic products and purchasers of organic products who did not purchase organic products on a regular basis. The majority of purchasers of organic products reported that organic products can be found mostly at natural/health food stores and supermarkets.

The results also showed that respondents were not sufficiently knowledgeable about organic products. Some respondents (27 per cent) misunderstood organic products as alternative products (i.e. hygienic or GM-free products). However, purchasers of organic products had a significantly higher degree of knowledge about organic products than non-purchasers of organic products. Efficiency of certified organic labels was reported to be low by respondents. Many purchasers of organic products (30 per cent) were not aware of certified organic labels when they purchased organic products. In addition, among the various organic certification labels in the market, only Organic Thailand and Organic Agriculture Certification Thailand (ACT) are accredited by IFOAM and are widely known by the purchasers of organic products.

With regard to the unprocessed organic food category, purchasers of organic products frequently purchased and spent more money on organic vegetables and rice but the majority of them stated that they had never purchased organic eggs, meat, herbs and dairy products. Similarly, in terms of organic vegetables, organic salads (e.g. lettuces) and organic Chinese kales were the two most popular purchases. Doi Kham/Doi Luang and Lemon Farm brands were frequently purchased by purchasers of organic products because the brands were well known. Jasmine brown rice and jasmine white rice comprised the majority of organic rice

that the purchasers of organic products frequently purchased. The purchasers of organic products often purchased supermarket brands and cooperative farmer groups brands followed by Aden, Lemon Farm, Green Net and Thai Thai. The three main venues where purchasers of organic products often purchased organic products were conventional supermarkets, natural or health food stores and fresh markets.

Table 6.1 summarises the results of the consumers' purchase decisions towards organic products and two specified organic products (organic vegetables and organic rice) in both the purchase model (Model 1) and the regularly purchase model (Model 2) [17]. The empirical results of the consumers' WTP a price premium for three specified organic products (organic Chinese kale, jasmine rice, and pork) are also presented in Table 6.1. The results are summarised as follows:

- Both socio-demographic characteristics and psychological factors impacted consumers' purchase decisions towards organic products in both Model 1and Model 2 and the consumers' WTP a price premium for organic products. According to the psychology factors, the health conscious coefficient *(HEALTH)* was a great contributor to all models, except for the consumers' decision to purchase organic rice. This indicates that consumers who were health concious were willing to pay a higher price for organic products.

- Food safety concern *(FSAFETY)* had a positive and significant impact on Model 1 for only organic products and organic vegetables. The results imply that consumers who were concerned about food safety issues related to artificial additives, pesticides, and growth hormones used in food, were more likely to purchase organic products, especially organic vegetables.

- There is a positive and significant relationship between the ethical concern coefficient *(ETHICS)* and consumers' WTP for organic jasmine rice and pork. The results indicated that consumers who paid more attention to ethical concerns associated with animal welfare and GMOs-free issues would be willing to pay a price premium of organic rice and meat.

- The concern for environment coefficient *(ENVIRON)* had a significant impact on Model 1 only for organic rice. However, the coefficient had a negative impact on the

[17] The purchase model refers to consumers who purchase organic products while the regularly purchase model refers to consumers who purchase organic products regularly.

consumers' WTP for the three specified organic products. This can be explained by the fact that consumers who were environmentally conscious tended to purchase organic products, especially organic rice but they were not willing to pay a high price for organic products. This is because consumers in Thailand generally have a low level of awareness of environmental problems. Furthermore, environmentally-conscious consumers form a small group. Their attitude towards protection of the environment and stopping global warming and climate change tended to focus on direct impacts such as reducing garbage and growing more trees, rather than indirect impacts such as the purchase of environmentally friendly grown products.

- The perception towards the quality benefits of organic products coefficient *(QBENEFIT)* had a positive impact on Model 1 for organic rice and Model 2 for organic products, and the WTP model for the three specified organic products. The results imply that consumers who perceived organic products were better taste, nutritious, less chemical residue and healthy over conventional products would regularly purchase organic products and were willing to pay a price premium for them.

- Organic product consumption is sensitive to price, availability of products and information. The perception of variety, information and price barrier *(AIPRICE)* coefficient had a negative impact on Model 1 for organic vegetables and rice and on Model 2 for organic products. The limited availability of organic products and information and the higher price negatively impacted Thai consumers' decisions to purchase organic products.

- The environmental benefits perceived from organic products coefficient *(EBENEFIT)* had a positive impact on Model 1 for only organic vegetables and rice and on Model 2 for organic products. On the other hand, the *EBENEFIT* coefficient had a negative relationship but no significant impact on consumers' WTP for the three specified organic products. It has been noted that consumers associate organic production methods with environmental problems but they were not willing to pay more for environmentally friendly products.

- The knowledge about organic products *(K_OR)* coefficient was the key determinant of the consumers' decision to purchase all organic product categories (both Model 1 and Model 2) and the consumers' WTP a price premium for organic pork. Consumers who understood how organic products were produced and processed were more likely to

distinguish the benefits of organic products. Thus, they had a greater probability of purchasing organic products and were willing to pay more for organic products. We can conclude that consumers' knowledge about organic products is a prerequisite for the development of the organic market in Thailand.

- The purchasing groceries at natural/health food stores *(NSTORE)* coefficient had a strong impact on the consumers' decisions to purchase all organic product categories (both Model 1 and Model 2). In contrast, *NSTORE* had no impact on the consumers' WTP a price premium for the three specified organic products. Customers who often visited and purchased food at natural/health food stores were generally concerned with their health and/or the environment. Thus, they were more likely to purchase organic products and more likely to purchase them on regular basis.

- The presence of vegetarians in the household *(VEGETARI)* coefficient had a positive influence on Model 1 for only organic vegetables and organic rice. However, it was insignificant in the model of WTP a price premium for organic products. The results imply that the respondents' decisions to purchase organic vegetables and rice were inpart driven by household members who had an interest in a vegetarian lifestyle.

- If consumers frequently dined out or consumed take-away food *(DINEOUT)*, they were less likely to purchase organic products and organic vegetables, and they were also less likely to be regular consumers of organic products. The results imply that the convenience of purchasing non-home-prepared food from street stalls and restaurants in Thailand influenced consumers' food purchasing behaviour.

- There was a positive relationship between the coefficient *PURCHASE* and consumers' WTP a price premium for the three specified organic products. This is because consumers with prior experience in purchasing organic products may better perceive the benefits of organic product attributes and thus had a higher probability of paying a price premium for organic products.

- With regard to the socio-demographic variables, those estimated coefficients were significant across the organic products in each model. Female respondents who were responsible for grocery shopping tended to purchase organic products. However, the female respondents did not necessarily purchase organic products regularly and were not willing to pay a price premium for organic products.

- The high educational level *(HIGHEDU)* coefficient had a positive impact on Model 1 for all organic products, but was insignificant in Model 2 and the WTP a price premium model. Consumers who were well-educated were well informed about organic products and willing to purchase organic products but at reasonable prices.

- The white-collar occupation *(WCOLLAR)* and married or divorced *(MARRIED)* coefficients were insignificant predictors for all three models. The results imply that occupation and marital status did not influence consumers' purchase of organic products in Thailand.

- Households with children *(CHILDREN)* coefficient had no impact on consumers' decisions to purchase organic products but had a negative impact on consumers' WTP a price premium for organic Chinese kale and jasmine rice. This implies that respondents who had children in the household *(CHILDREN)* were less likely to pay a price premium for organic Chinese kale and jasmine rice. Households with children may have lower disposable income to spend on premium food products. Thus, children in the household became a significant factor when consumers were considering whether to pay a price premium for organic products.

- The middle-aged group *(MIDAGE)* coefficient had a positive impact on the consumers' decisions to purchase all organic products (both Model 1 and Model 2). The coefficient of elderly people *(ELDERLY)* had a positive impact only on the consumers' decisions to purchase organic rice (both Model 1 and Model 2) and on the consumers' WTP a price premium for organic jasmine rice. The results suggest that the middle-aged consumers were more likely to purchase all organic product categories than other age groups. It is interesting to note that the older consumers preferred to purchase and pay more for organic rice.

- With regard to monthly household income, the low household income *(LOWINC)* coefficient had no significant effect on the three models. On the other hand, the high household income *(HIGHINC)* coefficient had a positive impact on Model 1, except for organic rice, and the consumers' WTP a price premium model for organic Chinese kale. Therefore, we can conclude that household income does influence the demand for organic products.

- Consumers who resided in the city *(CITY)* were more likely to purchase organic products, and organic vegetables and they were willing to pay a price premium for organic jasmine rice and pork. This is because, for city dwellers, there are numerous stores selling organic products compared with consumers who live outside the city.

This study used double-bounded dichotomous choices with an open-ended question to investigate the mean WTP for three specified organic products. According to the information obtained from the open-ended questions, the truncated method for binding the values in the highest interval range of the double-bounded responses can be used to improve the statistical efficiency of WTP estimates. Three different upper bound values in the highest interval range included: (1) infinity, which is the classical method; (2) the highest maximum WTP; and (3) the individual's maximum WTP. Of the three methods, the truncated method using the highest maximum WTP value for the overall responses produced the best precision of the WTP mean for organic products. The results are summarized as follows:

- Once consumers were informed about how organic food is produced, they were willing to pay more for organic products. The estimated WTP mean differs among the three specified organic products in this study. The WTP mean for organic Chinese kale was 56.6 baht/kg, organic jasmine rice was 211.7 baht/ 5 kg pack, and organic pork was 135.9 baht/kg.

- Comparing the WTP means of the specified organic products with the prices of conventional products, the results showed that the WTP a price premium for organic Chinese kale over conventional Chinese kale was 26.53 baht/kg (88 per cent), organic jasmine rice over conventional jasmine rice was 71.71 baht/5 kg pack (51 per cent), and organic pork over conventional pork was 45.95 baht/kg (51 per cent). This indicates that consumers were willing to pay a greater premium for organic vegetables than rice or pork.

- In terms of the WTP means between purchasers and non-purchasers of organic products, the WTP mean for both groups was much higher than the conventional product prices. In addition, consumers who had experience in purchasing organic products revealed a higher WTP mean than consumers who had never experience in purchasing organic products for all the three specified organic products. The difference in the WTP mean between purchasers and non-purchasers of organic products was greatest for organic Chinese kale followed by organic jasmine rice and organic pork.

For example, purchasers of organic products were willing to pay a price premium over the non-purchasers of organic products for organic Chinese kale of 8.1 baht/kg (27.1 per cent), for organic jasmine rice 20.1 baht/5 kg pack (14.4 per cent) and for organic pork 12.3 baht/kg (13.6 per cent).

- Comparing the estimated WTP means and market prices for the three specified organic products, the results showed that organic consumers' WTP for organic Chinese kale, organic jasmine rice and organic pork (61 baht/kg, 222 baht/5 kg pack and 142 baht/kg, respectively) were very close to the market prices (70-135 baht/kg, 240-375 baht/5 kg pack, 150-205 baht/kg, respectively). In addition, the WTP amounts for consumers who did not purchase organic products were lower than current market price. However, they were more likely to switch to organic products if organic Chinese kale, organic jasmine rice, and organic pork were sold at reasonable prices (52.6 baht/kg, 201.9 baht/ 5 kg pack, and 130 baht/kg, respectively).

Table 6.1 Summary of the significant factors affecting consumers' purchase decisions and consumers' willingness to pay for organic products

Variables	*Consumers' purchase decision*		*Consumers' WTP*
	Purchase (Model 1)	*Regularly purchase (Model 2)*	
PURCHASE	N/A	N/A	(+, S)
HEALTH	(+) (NS) only the rice model	(+) (S) only the aggregate model	(+) (S) only the Chinese kale model
FSAFETY	(+) (NS) only the rice model	(±, NS)	(±, NS)
ETHICS	(+, NS)	(+, NS)	(+) (NS) only the Chinese kale model
ENVIRON	(+) (S) only the rice model	(±, NS)	(-) (NS) only the jasmine rice model
QBENEFIT	(+) (S) only the rice model	(+) (S) only the aggregate model	(+, S)
AIPRICE	(-) (NS) only the aggregate model	(±) (-, S) only the aggregate model	(±, NS)
EBENEFIT	(+) (NS) only the aggregate model	(+) (S) only the aggregate model	(-, NS)
NSTORE	(+, S)	(+, S)	(+, NS)
VEGETARI	(+) (NS) only the aggregate model	(±, NS)	(±, NS)
DINEOUT	(-) (NS) only the rice model	(-) (S) only the aggregate model	(-, NS)
K_OR	(+) (NS) only the rice model	(+, S)	(+) (S) only the pork model
FEMALE	(+) (NS) only the rice model	(+, NS)	(±, NS)
HIGHEDU	(+, S)	(+, NS)	(-, NS)
WCOLLAR	(+, NS)	(±, NS)	(±, NS)
MARRIED	(+, NS)	(±, NS)	(+, NS)
CHILDREN	(±, NS)	(±, NS)	(-) (NS) only the pork model
MIDAGE	(+, S)	(+, S)	(+, NS)
ELDERLY	(+) (S) only the rice model	(+) (S) only the rice model	(+) (S) only the jasmine rice model
LOWINC	(-, NS)	(±, NS)	(-, NS)
HIGHINC	(+) (NS) only the rice model	(±) (+, S) only the aggregate model	(+) (S) only the Chinese kale model
CITY	(+) (NS) only the rice model	(+, NS)	(+) (NS) only the Chinese kale model

Note: (+), (-), (S), (NS) represent positive, negative, significant, and non-significant affecting the dependent variable.

6.2 Implications of the study findings

6.2.1 Academic Implications

This study is the first research in Thailand and one of few conducted in middle income countries to determine the significant factors influencing consumers' purchasing behaviour. Furthermore, this study revealed factors affecting the price premium that consumers are willing to pay for organic products.

This study enhances our understanding of the consumers' purchase decisions and their WTP for organic products by considering several possible socio-demographic characteristics compared to previous research *(*including, *gender, education, occupation, marital status, age, household income, children in household, location of residence)* and psychological factors, including attitude *(health concern, food safety concern, food ethical concern, environmental concern)* and perception of the products *(quality and health benefits, availability, information and price barrier, environmental benefits)* (see Durham & Andrade, 2005; Gifford & Bernard, 2006; Azucena Gracia & Magistris, 2008; Loureiro et al., 2002; Magnusson & Cranfield, 2005; Verhoef, 2005; Zepeda & Li, 2007). Further, this study includes factors associated with consumers' lifestyle such as *dining out* or *consuming take-away food* (need) which has not been studied previously. The empirical results of this study confirm that consumers' lifestyle related to *dining out* has a significant impact on the consumers' purchase decisions towards organic products.

Previous research has conclude that both private factors (i.e. health-related factors and quality attributes of organic product factors) and public factors (environment-related and ethics-related factors) are significant in explaining the consumers' purchasing behaviour towards organic products (Durham & Andrade, 2005; Azucena Gracia & Magistris, 2008; Makatouni, 2002; Schifferstein & Oude Ophuis, 1998). The empirical results in this study show that health-related factors (including health and food safety concerns, quality and health benefits of organic products) appear to have a strong impact on the consumers' purchase decisions (see Model 1 and Model 2) for organic products. On the other hand, the public factors (including the concern of environment and ethics, and the environmental benefits of organic products) have less impact on their decision to purchase organic products. Therefore, the decision to purchase environmentally friendly products (e.g. organic products) is not necessarily driven by public concerns. However, this may be unique to Thailand because

Thais in general are less aware of environmental problems compared with Western people (Rice et al., 1996). Supportive finding by Chokriensukchai & Tamang (2010) also show that Thai youths seem to ignore the issues of environment such as global warming. They have very low exposure to programs about the environment and lifestyle activities that contribute to global warming. Thai people in general still do not separate wastes (i.e. plastics, hazardous, organic and non-organic wastes) simply because they are no awareness, knowledge, facilities and incentives to do so (Mongkolnchaiarunya, 2005).

The results in this study also confirm that socio-demographic factors are significant in explaining the consumers' purchase decision and consumers' WTP for organic products. Past research has concluded that socio-demographic factors are less significant than psychological factors (see Durham & Andrade, 2005; Azucena Gracia & Magistris, 2007; Verhoef, 2005). However, gender, education, age, household income, and location of residence in the study (but not for occupation, marital status, and children in household) have a significant impact in explaining the purchase of organic products and the WTP a price premium for organic products. Be concerned about separating wastes for environmental reasons

The results provide evidence that the double-bounded dichotomous choice model with the open-ended question obtains more efficient WTP estimates than the conventional double-bounded dichotomous choice model. In order to improve the statistical quality of the double-bound measurement, this study applied an open-ended question in the double-bounded dichotomous choice method (see Bateman et al., 2002). The upper bound value in the highest interval range of the double-bounded method is truncated with the amount of maximum WTP obtained from the open-ended question. The empirical results showed that the WTP estimates using the double-bounded dichotomous choice with open-ended question provide more precise information than the conventional double-bounded dichotomous choice model. First, the estimated WTP means are lower than the conventional double-bounded method. Second, the 95 % confidence intervals from the double-bounded followed by the open-ended question are much smaller than the conventional double-bounded method so that the degree of precision of the WTP estimates is higher.

6.2.2 Practical implications

The results of this study provide some information to marketers to improve their marketing strategies to enhance their sales of organic products and to assist farmers or producers to develop effective production strategies in producing organic products. In addition, policy

makers can use some of the findings to frame their policies in developing the domestic organic product market.

The socio-demographic characteristics that influence consumers' decisions to purchase and the WTP a price premium for organic products are a diverse rather than homogenous group. Thus, it is challenging for marketers and producers to develop appropriate targeting, positioning and communication strategies to increase the demand for organic products in the domestic market. The marketing strategies for introducing organic products to the domestic market will be succesful if the marketers target female consumers who are highly-educated, middle-aged (between 35-54 years old), have a high household income, reside in the city, and have a family member who is on a vegetarian diet. In addition, organic rice will sell better among consumers who are aged 35 years old and over with a high household income. Similarly, high household income is the most important variable influencing consumers who purchase organic products on a regular basis. The empirical results also show that consumers without children, in the elderly group with high household income and live in the city are willing to pay more for organic products.

Policy makers, marketers and producers will be able to persuade more consumers to purchase organic products by providing more information and educational promotional campaigns on organic products. However, the product information needs to be appropriately designed and use various forms of communication. The empirical results showed that greater knowledge about organic products will not only induce new purchasers of organic products but will raise the level of consumption among the existing purchasers of organic products. Policy makers and marketers should attempt to increase consumers' understanding of the term 'organic' by providing information about how organic products are produced and processed.

The certified organic' label is another way to disseminate organic product information to consumers. However, the effectiveness of the certified organic label depends on how consumers perceive organic product certification. The results of this study show that purchasers of organic products frequently misinterpret the organic certification meaning and concept. Therefore, policy makers should improve the organic certification content to enhance consumers' understanding of organic products. At the same time, the issue of transparency of information campaigns for organic certification is desirable. Thai government agencies have initiated some certification to guarantee the product quality such as the 'Hygienic Fresh Fruit and Vegetable' by the Department of Agriculture (DOA) and the

Ministry of Agriculture and Cooperatives (MOAC), 'Pesticide-safe vegetables' by the Department of Medical Science and the Ministry of Public Health (MOPH), 'Food Safety' by the National Bureau of Agricultural Commodity and Food Standards (ACFS) and MOAC, 'Organic Thailand' by DOA and other certified organic labels from private agencies. However, the majority of Thai consumers are confused about government certifications. Thus, the Thai government has to design effective certification strategies to distinguish the differences between organic products and other products. It would be helpful if MOAC and MOPH considered reducing the number of health product labels to improve organic product certification at large (see Kramol et al., 2006; Posria et al., 2006; Roitner-Schobesberger et al., 2008). In terms of communication channels (such as promotional tools), information should be broadly accessible to both purchasers and non-purchasers of organic products. According to the results, purchasers who have purchased organic products obtain organic product information mostly from the mass media such as advertising via magazines/newspapers and radio/television. Thus, the government should invest more in advertising the organic products through these channels, which can broadly provide essential information on organic products to the consumers. In-store advertising is another source of information to reach consumers about organic products at the point of purchase. Marketers should separate shelves/sections between organic products and other health products so that consumers can easily distinguish these products. Furthermore, providing information at the point of purchase such as organic product sale items and brochures to distinguish organic products from other health products can increase consumers' purchases of organic products.

The availability and variety of organic products are important factors to consider when expanding the organic product market. The empirical results suggest that the availability of organic products in grocery stores and a wide variety of organic product categories on the store shelves (e.g. fruits, vegetables, rice, and meat) strongly influence the consumers' purchase decisions for organic products. Thus, marketers and producers should improve the distribution channels of organic products. This includes a broader range of organic product categories available in appropriate market outlets. For example, marketers and producers should be more concerned about the availability of and a wider range of choices of organic vegetables, rice, eggs and meat products in the market. This can persuade non-purchasers of organic products to purchase organic products.

Furthermore, the priority outlet that the marketers should target is natural or health food stores. The results show that consumers who often purchased grocery food products at natural

or health food stores were more likely to purchase organic products. At present, there is a limited number of natural and health food stores selling organic products such as Lemon farm, Aden, Green net and these stores carry a limited assortment of organic products. Thus, greater availability and a wider variety of organic products at natural or health food stores can reach the potential consumers interested in organic products. Other potential outlets are supermarkets/hypermarkets (e.g. Villa market, The mall, Carrefour and Big C) where consumers in the high-income and middle-income groups often shop for their groceries. Expanding the availability and ranges of organic products in hypermarkets will make it possible to reach the majority of consumers who might be interested in organic products. However, continuity of supply, quality and certain quantities of organic products should be more concerned. Thus, greater production efficiency and supply chain organisation are required from marketers and producers. Currently, organic products in Thailand are considered a niche market where the products are more available in health food stores and premium supermarkets, which target consumers with high purchasing power.

Farmers' markets and fresh markets are additional outlets for the distribution of organic products. These channels can distribute organic products to the majority of people in Thailand and they formed a direct link between consumers and producers/growers. However, producers/growers should provide the necessary information about organic products to local consumers to distinguish between organic products and conventional products.

Health and food safety consciousness is significantly associated with the purchase of organic products. Therefore, the promotional activities on organic products by government agencies and marketers should focus on the health and food safety attributes of organic products. For example, the promotional campaign should emphasize that organic products are safe and produced without synthetic chemical inputs, artificial additives and growth stimulants. This is important to most consumers who are concerned about health and food scandals.

In addition, improving the perception of the quality and health benefits of organic products (i.e. better taste, nutritious, less chemical residue and healthy) significantly increased consumers' WTP for organic products. Moreover, the empirical results showed that consumers' preferences with regard to food product attributes confirmed that food quality attributes (e.g. freshness, appearance, and nutrition) and the chemical pesticides-free attribute were the most important factors influencing their purchase of food products. The marketing strategies should try to increase consumer familiarity with organic products and to have a

positive experience in organic products on sensory (i.e. taste), nutrition and food safety attributes compared with conventional products. This includes providing product samples, promoting trials of the products and advertising consumers' experiences of the quality of the products. In addition, producers have to improve the quality and safety of organic products to meet consumers' expectations of the quality standards.

The promotion campaign to attract new purchasers of organic products should emphasize the environmental benefits of organic products by informing consumers that organic agricultural production conserves national resources and prevents hazardous chemicals entering the environment compared with conventional agriculture production. Previous research related to consumers' attitudes towards environmental issues argued that if sufficient information about environmental problems had been provided to consumers, their awareness may result in an increase in their environmentally friendly behaviour (see Hammitt, 1990). Hence, policy makers should emphasize the negative impact of modern agriculture on the environment in order to raise the environmental awareness among the people.

Furthermore, the results identify that the consumers' decisions to purchase organic products are restricted by their frequency of eating away from home or consuming take-away food. Thai people, especially those living in the city, rely more on non-home-prepared food since it takes less time to prepare and is more convenient. Purchasing or consuming ready-to-eat food from street stalls and restaurants is common in Thailand (Yamane, 1973). Therefore, organic restaurants/stalls might be a new potential market channel to service organic products to consumers. For example, restaurants that serve organic food on their menus can introduce consumers to alternative food choices.

The empirical results show that the price premium for organic products hindered consumers' purchases of organic products. Consumers perceive the gap between the price of organic and conventional products is still high. However, the results of the WTP estimates for the three specified organic products (Chinese kale, jasmine rice, and pork) showed, consumers' WTP mean for those products was higher than the corresponding conventional products. Policy makers, marketers and producers should focus on how to reduce the price of organic products to encourage more people to purchase organic products. Thailand's National Agenda on Organic Agriculture was launched in 2005 with several projects focusing on organic farming, the development of organic quality products and promoting organic products (Schröeder & McEachern, 2004). There must be continuous support from government agencies and

coordination between government agencies, especially the Ministry of Commerce (MOC), MOPH and MOAC, and between government agencies and non-government organization (NGOs) to increase the numbers of producers/farmers and sellers in organic products. At the same time, MOAC should provide more support such as monetary (i.e. subsidising costs of organic inspection and certification and organic inputs) and technological support to organic producers as well as non-organic producers to convert to organic farming. Marketers and producers should improve the efficiency of processing and distribution of organic products, for example, reduce the distribution cost of organic products by directly distributing organic products from producers to consumers or reducing the middlemen, and availability of the products to share unit costs. This will lower the marketing margin and consumers will be able to purchase organic products at lower prices.

The WTP mean for the three specified organic products for both purchasers and non-purchasers of organic products were lower than, but closer to, the actual prices of organic products in the market. In light of these results, organic products might gain an appreciable market share if marketers used a pricing strategy with other marketing strategies to encourage consumers to purchase organic products at affordable prices. For example, marketers can promote a sale price offered on a particular organic product (e.g. vegetables, rice or meat) through supermarkets to induce non-purchasers of organic products (both in upper and lower-income groups) to switch to organic products.

The empirical results show that ethical concerns with regard to animal welfare and GMOs in food production increased consumers' WTP for organic products, especially rice and meat. At present, Thai consumers are unaware of GMOs and have little concern about animal welfare issues (see Table 4.5). Moreover, government and marketing agencies have aggressively promoted the negative impact of traditional agriculture related to health and safety issues but neglected animal welfare and GMOs. For example, the government campaign on 'Food safety' focuses only on public health. Therefore, policy makers should raise consumers' awareness and understanding of animal welfare and potentially hazardous GMOs transfers. This understanding can raise the perception of organic products' attributes.

6.3 Limitations of the study

There are a number of limitations related to the survey data and the methodology used in the study. These include:

- The scope of survey area in this study is restricted to the Bangkok Metropolitan Area in Thailand. Therefore, the results of this study may not be generalizable to the whole country. The results cannot represent the economic/social influences of the overall organic product market, which consists of different types of purchasers and non-purchasers of organic products throughout Thailand.

- Respondents' inability to complete the survey questionnaire. A number of questions were skipped or answered incorrectly by respondents, especially the attitude and perception questions and the open-ended questions in the WTP assessment. This led to a reduction in the useable sample for factor analysis and the WTP estimates which impacts the goodness-of-fit of these methods. This contributes to any bias in the estimates of the consumers' purchase decisions and WTP a price premium for organic products.

- Another limitation is bias from the sampling method. This study employed convenience sampling with a store-intercept survey to collect the data. Consumers who shop at targeted stores and fresh markets were invited to voluntarily participate in the self-administered questionnaire. The study results showed that this method results in the samples being slightly biased towards highly-educated respondents (see Table 4.2). This may be because respondents, who have a high education, are interested in organic products and are more likely to participate in the survey but less-educated consumers, who may have different purchase intentions towards the organic products, were less likely to participate in this study. This leads to an upward bias in the estimates of the decision to purchase and the WTP for organic products.

- The model for assessing factors influencing purchase decisions with regard to organic meat was dropped because only a few respondents purchased organic meat. The sample was not large enough to obtain meaningful results (see Table 4.9 and 4.15). This is because organic livestock production in Thailand (e.g. meat, poultry, eggs, shrimp and dairy products) is still in the development stage. Farming animals under an organic system needs time to develop because the process involves quality production standards and methods, including animal health and welfare standards (see Zanoli & Naspetti, 2002). Thus, there are not many organic meat sellers available in the market and most of the products are uncertified organic products.

- Another concern is the reliability of the internal consistency (Cronbach's Alpha coefficient) where the ethics factor exhibited a low reliability. It is possible that the construct has a few items generating a low reliability (Pallant, 2004). However, the mean inter-item correlation of the ethics factor was considered reliable where Briggs and Cheek (1986) argued that this measurement is appropriate for small items to test the reliability among the items in the construct. However, future research should take this concern into account.

- According to the infancy of the market for organic products in Thailand, the data based on actual purchase behaviour such as the supermarket scanner for organic products from specific organic product alliances provides a better assessment of consumers' WTP for organic products. However, such a scanner is unavailable in Thailand's supermarkets. This study used a stated preference approach (double-bounded dichotomous choice) to estimate the consumers' WTP, which can lead to a potential hypothetical response bias, since consumers may not act as predicted in a real market situation.

6.4 Recommendations for future study

There are several areas in which this study could be extended and suggestions for future studies are:

- Future study should identify and evaluate with a broader sample and locations across different regions in Thailand. With regard to the diverse geographical locations, it could fully capture the factors influencing the consumers' purchase decisions and their WTP for organic products. This information would be more helpful to marketers to expand the market for organic products in Thailand.

- This study focuses on certain hypothetical organic food products such as vegetables, rice and meat with certain characteristics. The results may be limited and different from other organic food products, especially processed food products, with different food attributes and benefits. It would be interesting to apply the same theoretical model developed in this study to assess consumers' purchase decisions and WTP for other organic products or environmentally friendly products.

- Face-to-face interviews should be considered in future studies. There were low response rates and incomplete questions in the self-administered questionnaire in this study, especially on the attitudinal questions and hypothetical scenario choices for the WTP questions. This deficiency revealed that Thai people are not familiar with social economic research and were reluctant to participate in the study. The advantage of the face-to-face interview is that the interviewers can reduce these problems, which results in higher response rates.

- Future studies should consider developing items with regard to the quality and health benefits of organic products. The factor analysis results in this study deleted the item 'organic products have better appearance than conventional products' from the quality and health benefits construct since it had a factor loading less than 0.5 and did not load on other factors. However, several researchers working on consumers' behaviour towards organic products found that the 'appearance' of organic products is important for choosing organic products (Chryssochoidis, 2000; Jolly, 1991). Future study should include this appearance construct.

- Household disposable income and the number of occupants in the household were excluded in this study. These variables reflect the real purchasing power of the household better than the household's total income used in this study (see Krystallis & Chryssohoidis, 2005; Thompson & Kidwell, 1998). To improve the performance of the models, future study should include these variables.

- The double-bounded dichotomous choice model with open-ended questions captures the maximum WTP (Bateman et al., 2002). However, this method can produce an anchoring effect in the form of 'yea-saying' bias. Future research should address this anchoring bias effect.

- The results in this study can be used as information for addressing more specific issues in future studies with other potential analysis techniques. For example, this study revealed the quality and health benefits of organic products significantly impacted the amount of consumers' WTP for the three specified organic products. However, it did not generate in-depth information to quantify consumer preferences for organic product attributes. It would be beneficial to know the monetary value the consumer places on the preferences for each of the product attributes. The choice experiment method can be applied to address this question.

- Logit model was used to estimate the consumers' decision to purchase organic products and the consumers' decision to purchaser organic products regularly as the simplest and best possible probabilistic choice among the discrete choice models. However, the nested logit model, is an alternative specification, where future researchers can consider using to estimate similar studies in the future. The nested logit model possesses a branching structure and it can overcome the restriction of independence of irrelevant alternative (IIA) assumption.

Reference

Antle, J. (1999). The new economics of agriculture. *American Journal of Agricultural Economics, 81*(5), 993-1010.

Ara, S. (2003). *Consumer willingness to pay for multiple attributes of orgnaic rice: a case study in the philippines.* Paper presented at the The 25th International Conference of Agricultural Economists (IAAE), Durban, South Africa.

Baker, S., Thompson, K. E., Engelken, J., & Huntley, K. (2004). Mapping the values driving organic food choice: Germany vs the UK. *European Journal of Marketing, 38*(8), 995.

Bateman, I. J., Carson, R. T., Day, B., Hanemann, W. M., Hanley, N., Hett, T., et al. (2002). *Economic valuation with stated preference techniques: a manual*. Northamptonm, MA Edward Elgar.

Batte, M. T., Hooker, N. H., Haab, T. C., & Beaverson, J. (2007). Putting their money where their mouths are: Consumer willingness to pay for multi-ingredient, processed organic food products. *Food Policy, 32*(2), 145-159.

Becker, G. S. (1976). *The economic approach to human behavior*. Chicago: Chicago University Press.

Beckmann, S. C., Christensen, A. S., & Christensen, A. G. (2001). Environment-related consumer behaviour in a macro-cultural perspective - an anthropological approach for revealing consumers' contemporary worldviews as antecedents of behaviour. *Paper at the 29th EMAC Conference, Rotterdam, 2001.*

Blackwell, R., D'Souza, C., Taghian, M., Miniard, P., & Engel, J. F. (2006). *Consumer behaviour : an Asia Pacific approach*. South Melbourne, Vic.: Thomson.

Boccaletti, S., & Nardella, M. (2000). Consumer willingness to pay for pesticide-free fresh fruit and vegetables in Italy. *The International Food and Agribusiness Management Review, 3*, 297-310.

Bonti-Ankomah, S., & Yiridoe, E. K. (2006). *Organic and conventional food: A literature review of the economics of consumer perceptions and preferences* (Final Report).

Bord Bia, A. (2000). *Prospects for organic food in Ireland*. Bublin.

Botonaki, A., Polymeros, K., Tsakiridou, E., & Mattas, K. (2006). The role of food quality certification on consumers' food choices. *British Food Journal, 108*(2/3), 77.

Bourn, D., & Prescott, J. (2002). A comparison of the nutritional value, sensory qualities, and food safety of organically and conventionally produced foods. *Critical Reviews in Food Science and Nutrition, 42*(1), 1–34.

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality, 54*, 106-148.

Briz, T., & Ward, R. W. (2009). Consumer awareness of organic products in Spain: An application of multinominal logit models. *Food Policy, 34*(3), 295-304.

Buzby, J. C., & Skees, J. R. (1994). Consumers want reduced exposure to pesticides on food. *Food Review, 17*(2), 19-22.

Buzby, J. C., Skees, J. R., & Ready, R. C. (1995). Using contingent valuation to value food safety: A case study of grapefruit and pesticide residues. In J. A. Caswell (Ed.), *Valuing Food Safety and Nutrition*.

Byrne, P. J., Bacon, J. R., & Toensmeyer, U. C. (1994). Pesticide residue concerns and shopping location likelihood. *Agribusiness, 10*(6), 491.

Cameron, T. A., & Huppert, D. D. (1991). Referendum contingent valuation estimates: sensitivity to the assignment of offered values. *Journal of the American Statistical Association, 86*(416), 910–918.

Cameron, T. A., & Quiggin, J. (1994). Estimation using contingent valuation data from a "dichotomous choice with follow-up" questionnaire. *Journal of Environmental Economics Management, 27*, 218-234.

Canavari, M., Bazzani, G. M., Spadoni, R., & Regazzi, D. (2002). Food safety and organic fruit demand in Italy: A survey. *British Food Journal, 104*(3-5), 220.

Carson, R. T. (1985). *Three Essays on Contingent Valuation (Welfare Economics, Non-Market Goods, Water Quality).* University of Califomia, Berkeley.

Carson, R. T., & Hanemann, W. M. (2005). Contingent valuation. In K.-G. Maler & J. R. Vincent (Eds.), *Handbook of Environmental Economics vol. 2* (pp. 642). North-Holland, New York: Elsevier.

Chang, H.-S., & Zepeda, L. (2005). Consumer perceptions and demand for organic food in Australia: focus group discussions. *Renewable Agriculture and food Systems, 20*(3), 155-167.

Chokriensukchai, K., & Tamang, R. (2010). Thai Youths and Global Warming: Media Information, Awareness, and Lifestyle Activities. *Applied Environmental Education & Communication, 9*(3), 198-208.

Christos, F., & Athanasios, K. (2002). Purchasing motives and profile of the Greek organic consumer: A countrywide survey. *British Food Journal, 104*(8/9), 730.

Cicia, G., Giudice, T. D., & Scarpa, R. (2002). Consumers' perception of quality in organic food: A random utility model under preference heterogeneity and choice correlation from rank-orderings. *British Food Journal, 104*(3-5), 200.

Clemes, M., Gan, C., & Kao, T.-H. (2008). University Student Satisfaction: An Empirical Analysis. *Journal of Marketing for Higher Education, 17*(2), 292-325.

Clemes, M., Gan, C., & Zhang, D. (2010). Customer switching behaviour in the Chinese retail banking industry. *The International Journal of Bank Marketing, 28*(7), 519-546.

Cooper, D. R., & Schindler, P. S. (2008). *Business research methods* (10 ed.). Boston: McGraw-Hill Irwin.

Cooper, J. C., & Hanemann , W. M. (1995). *Referendum Contingent Valuation: How Many Bounds Are Enough?* (working paper, May): USDA Economic Research Service, Food and Consumer Economics Division.

Corsi, A., & Novelli, S. (2003). *Measuring quality-constrained and maximum prices consumers are willing to pay for quality improvements: the case of organic beef meat*. Paper presented at the The 25th International Conference of Agricultural Economists.

Courville, S. (2006). Organic standards and certificants. In Paul Kristiansen, Acram Taji & J. Reganold (Eds.), *Organic Agriculture : A Global Perspective*: CSIRO publishing.

Cuccia, T. (2003). Contingent valuation. In R. Towse (Ed.), *A handbook of cultural economics* (pp. 494). Northampton, MA: Edward Llgar.

Davies, A., Titterington, A. J., & Cochrane, C. (1995). Who buys organic food? A profile of the purchasers of organic food in Northern Ireland. *British Food Journal, 97*(10), 17.

Demeritt, L. (2002). *All things organic 2002: A look at the organic consumer*. Bellevue, WA: The Hartman Group.

Dunlap, R. E., & Van Liere, K. D. (1978). The new environmental paradigm. *Journal of Environmental Education, 9*, 10-19.

Durham, C. A., & Andrade, D. (2005). Health vs. environmental motivation in organic preferences and purchases. *Selected paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Providence, July 24–27, Rhode Island*.

Eischen, E., Prasertsri, P., & Sirikeratikul, S. (2006). *Thailand's organic outlook 2006*: USDA foreigh Agricultural Service.

FAO. (2002). *Organic agriculture, environment and food security*. Rome.

FAO. (2004). *Production and export of organic fruit and vegetables in Asia*. Rome.

Fillion, L., & Arazi, S. (2002). Does organic food taste better? A claim substantiation approach. *Nutrition & Food Science, 32*(4), 153-157.

Fotopoulos, C., & Krystallis, A. (2002). Organic product avoidance: Reasons for rejection and potential buyers' identification in a countrywide survey. *British Food Journal, 104*(3-5), 233.

Freeman, A. M. (2003). *The Measurement of Environmental and Resource Values: Theory and Methods* (2 ed.). Washington, DC: Resources for the Future.

Giannakas, K. (2002). Information asymmetries and consumption decisions in organic food product markets. *Canadian Journal of Agricultural Economics, 50*(1), 35.

Gifford, K., & Bernard, J. C. (2006). Influencing consumer purchase likelihood of organic food (Vol. 30, pp. 155-163)

Gil, J. M., Gracia, A., & Sánchez, M. (2000). Market segmentation and willingness to pay for organic products in Spain. *International Food and Agribusiness Management Review, 3*, 207-226.

Goktolga, Z. G., Bal, S. G., & Karkacier, O. (2006). Factors effecting primary choice of consumers in food purchasing: The Turkey case. *Food Control, 17*(11), 884-889.

Goldman , B., & Clancy, K. (1991). A survey of organic produce purchases and related attitudes of food cooperative shoppers. *American Journal of Alternative Agriculture, 6*, 89-96.

Goldman, B. J., & Clancy, K. L. (1991). A survey of organic produce purchases and related attitudes of food cooperative shoppers. *American Journal of Alternative Agriculture, 6*(02), 89-96.

Govindasamy, R., DeCongelio, M., & Bhuyan, S. (2005). An evaluation of consumer willingness to pay for organic produce in the northeastern U.S. *Journal of Food Products Marketing, 11*(4).

Govindasamy, R., & Italia, J. (1999). Predicting willingness-to-pay a premium for organically grown fresh produce. *Journal of Food Distribution Research, 30*(2), 44-53.

Gracia, A., & de Magistris, T. (2007). Organic food product purchase behaviour: a pilot study for urban consumers in the South of Italy. *Spanish Journal of Agricultural Research, 5*(4), 439-451.

Gracia, A., & Magistris, T. d. (2007). Organic food product purchase behaviour: a pilot study for urban consumers in the South of Italy. *Spanish Journal of Agricultural Research, 5*(4), 439-451.

Gracia, A., & Magistris, T. d. (2008). The demand for organic foods in the South of Italy: A discrete choice model. *Food Policy, 33*(5), 386-396

Green Net/Earth Net Foundation. (2005). *Organic agriculture situation in Thailand 2005 (Thai language)*. Earth Net Foundation, Bangkok.

Greene, W. (2008). *Econometric analysis* (6th ed.). New Jersey: Prentice-Hall.

Grimsrud, K. M., McCluskey, J. J., Loureiro, M. L., & Wahl, T. I. (2004). Consumer attitudes to genetically modified food in Norway. *Journal of Agricultural Economics, 55*(1), 75-90.

Groff, A., & Kreider, C. (1993). Analysis of the delaware market for organically grown produce. *Journal of Food Distribution Research, 24*(1), 118-126.

Gruère, G., & Sengupta, D. (2009). GM-free private standards and their effects on biosafety decision-making in developing countries. *Food Policy, 34*, 399-406.

Grunert, S. C., & Juhl, H. J. (1995). Values, environmental attitudes, and buying of organic foods. *Journal of Economic Psychology, 16*(1), 39.

Haab, T. C., & McConnell, K. E. (2002). *Valuing environmental and natural resources: the econometrics of non-market valuation* Northampton, Cheltenham UK: Edward Elger Publishing Limited.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis (6th ed.)*. New Jersey: Prentice-Hall, Inc.

Hammitt, J. K. (1990). Risk perceptions and food choice: An exploratory analysis of organic- versus conventional-produce buyers. *Risk Analysis*(10), 367-374.

Hamzaoui, E. L., & Mehdi, Z. (2008). Decision making process of community organic food consumers: an exploratory study. *The Journal of Consumer Marketing, 25*(2), 95.

Hanemann, W. M. (1985). Some issues in continuous- and discrete-response contingent valuation studies. *Northeastern Journal of Agricultural Economics, 14*(April), 5-10.

Hanemann, W. M., & Kanninen, B. (1998). *The statistical analysis of discrete response CV data*. CA: Department of Agricultural and Resource Economics, University of California at Berkeley.

Hanemann, W. M., Loomis, J., & Kanninen, B. J. (1991). Statistical efficiency of double-bounded dichotomous choice contingent valuation. *American Journal of Agricultural Economics, 73*, 1255-1263.

Hansen, B., Alrøe, H. F., & Kristensen, E. S. (2001). Approaches to assess the environmental impact of organic farming with particular regard to Denmark. *Agriculture, Ecosystems and Environment 83*(1-2), 11-26.

Harper, G. C., & Makatouni, A. (2002). Consumer perception of organic food production and farm animal welfare. *British Food Journal, 104*(3-5), 287.

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression (second Editon)*. New York: John Wiley&Sons.

Huang, C. L. (1996). Consumer preferences and attitudes toward organically grown produce. *European Review of Agricultural Economics, 23*(3), 331-342.

Huang, C. L., Kan, K., & Fu, T. T. (1999). Consumer willingness-to-pay for food safety in Taiwan: A binary-ordinal probit model of analysis. *The Journal of Consumer Affairs, 33*(1), 76.

Hughner, R. S., McDonagh, P., Prothero, A., Shultz, C. J., & Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour, 6*(2-3), 94-110.

Hutchins, R. K., & Greenhalgh, L. A. (1997). Organic confusion: sustaining competitive advantage. *British Food Journal, 99*(9), 336.

IFOAM. (2008). *Definition of Organic Agriculture*. Retrieved 10 April, 2009,

Isvilanonda, S., Patrwart, J., Piemsomboon, C., Janekarnkij, P., Sirisupluxna, P., Praneetvatakul, S., et al. (2006). *A study on marketing system of the royal project product*.

Jill, E. H., Kim, S., & Morteza, H. (2006). Evaluating Willingness-to-Pay for Bison Attributes: An Experimental Auction Approach. *Canadian Journal of Agricultural Economics, 54*(2), 269.

Jitsanguan, T. (2001). Sustainable agricultural systems for small-scale farmers in Thailand: Implications for the environment. *Extension Bulletin. the Food & Fertilizer Technology Center*.

Jolly, D. A. (1991). Determinats of organic horticultural products consumption based on a sample of California consumers *Horticultural Economics and Marketing.*(ISHS), 295: 141-148.

Jolly, D. A., & Dhesi, J. (1989). *Psychographic, demographic, and economic factors associated with organic poultry consumption* Paper presented at the The Western Region Home Management Family Economics Educators Annual Conference.

Kasikorn Research Center. (2004). Organic Farm Produce: Thailand's Opportunities in the World Market

Kinnear, T. C., & Taylor, J. R. (1991). *Marketing research: An applied approach* (Fourth ed.). New York: McGraw-Hill.

Kramol, P., Thong-ngam, K., Gypmantasiri, P., & Davies, W. P. (2006). Challenges in developing pesticide-free and organic vegetable markets and farming systems for smallholder farmers in north Thailand.

Krissoff, B. (1998). "Emergence of U.S. organic agriculture - can we compete? . *American Journal of Agricultural Economics, 80*(5), 1130-1133.

Krystallis, A., & Chryssohoidis, G. (2005). Consumers' willingness to pay for organic food: Factors that affect it and variation per organic product type. *British Food Journal, 107*(4/5), 320.

Lancaster, K. (1966). A new approach to consumer theory. *Journal of Political Economy, LXXIV*(2), 132-157.

Lea, E. (2001). *Moving from meat: vegetarianism, beliefs and information systems.* The University of Adelaide, Adelaide.

Lea, E., & Worsley, T. (2005). Australians' organic food beliefs, demographics and values. *British Food Journal, 107*(10/11), 855.

Lee, K., & Hatcher, C. (2001). Willingness to pay for information: An analysis's guide. *Journal of Consumer Affairs, 15*(1).

Leila Hamzaoui, E., & Mehdi, Z. (Writer) (2008). Decision making process of community organic food consumers: an exploratory study.

Lindeman, M., & Väänänen, M. (2000). Measurement of ethical food choice motives. *Appetite, 34*(1), 55-59.

Lockie, S., Lyons, K., Lawrence, G., & Grice, J. (2004). Choosing organics: a path analysis of factors underlying the selection of organic food among Australian consumers. *Appetite, 43*(2), 135-146.

Lockie, S., Lyons, K., Lawrence, G., & Mummery, K. (2002). Eating 'Green': motivations behind organic food consumption in Australia. *Sociologia Ruralis, 42*(1), 23-40.

Lorlowhakarn, S., Boonyanopakun, K., Ellis, W., Panyakul, V., Vildozo, D., & Kasterine, A. (2008). *Strengthening the export capacity of Thailand's organic agriculture*. Bangkok, Thailand: National Innovation Agency (NIA).

Loureiro, M. L., & Hine, S. (2002). Discovering niche markets: A comparison of consumer willingness to pay for local (Colorado grown), organic and GMO-free products. *Journal of Agricultural and Applied Economics, 34*(3), 477-487.

Loureiro, M. L., McCluskey, J. J., & Mittelhammer, R. C. (2001). Assessing consumer preferences for organic, eco-labeled, and regular apples. *Journal of Agricultural and Resource Economics, 26*(2), 404-416.

Loureiro, M. L., McCluskey, J. J., & Mittelhammer, R. C. (2002). Will consumers pay a premium for eco-labeled apples? *The Journal of Consumer Affairs, 36*(2), 203.

Lusk, J. L. (2003). Effects of cheap talk on consumer willingness-to-pay for golden rice (Vol. 85, pp. 840-856) http://www.blackwell-synergy.com/doi/abs/10.1111/1467-8276.00492

Lusk, J. L., & Hudson, D. (2004). Willingness-to-pay estimates and their relevance to agribusiness decision making. *Review of Agricultural Economics, 26*(2), 152-169.

Lusk, J. L., & Schroeder, T. C. (2004). Are choice experiments incentive compatible? A test with quality differentiated beef steaks (Vol. 86, pp. 467-482) http://www.blackwell-synergy.com/doi/abs/10.1111/j.0092-5853.2004.00592.x

Lyons, K., & Lawrence, G. (2001). Institutionalisation and resistance: Organic agriculture in Australia and New Zealand. In *Food, Nature and Society: Rural Life in Late Modernity*.

Maddala, G. S. (1983). *Limited-dependent and Qualitative Variables in Econometrics*. New York: Cambridge University Press.

Magistris, T. d., & Gracia, A. (2008). The decision to buy organic food products in Southern Italy. *British Food Journal, 110*(9), 929-947.

Magnusson, M. K., Arvola, A., Hursti, U.-K. K., Åberg, L., & Sjödén, P.-O. (2001). Attitudes towards organic foods among Swedish consumers. *British Food Journal, 103*(3), 209.

Magnusson, M. K., Arvola, A., Hursti, U.-K. K., Åberg, L., & Sjödén, P.-O. (2003). Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behaviour. *Appetite, 40*(2), 109-117.

Magnusson, M. K., & Cranfield, J. A. L. (2005). Consumer demand for pesticide free food products in Canada: A probit analysis. *Canadian Journal of Agricultural Economics, 53*(1), 67-81.

Makatouni, A. (2002). What motivates consumers to buy organic food in the UK? Results from a qualitative study. *British Food Journal, 104*(3-5), 345.

McCluskey, J. J., Durham, C. A., & Horn, B. P. (2009). Consumer preferences for socially responsible production attributes across food products. *Agricultural and Resource Economics Review, 38*(3), 345-356.

McEachern, M. G., & McClean, P. (2002). Organic purchasing motivations and attitudes: are they ethical? *International Journal of Consumer Studies, 26*(2), 85-92.

Meier-Ploeger, A., & Woodward, L. (1999). Trends between countries. *Ecology and Farming, 20*(January-April), 15.

Millock, K., Hansen, L. G., Wier, M., & Andersen, L. M. (2002). Willingness to pay for organic foods: A comparison between survey data and panel data from denmark.

Millock, K., Wier, M., & Andersen, L. M. (2004). *Consumer's demand for organic foods-attitudes, value and purchasing behaviour*. Paper presented at the the XIII Annual Conference of European Association of Environmental and Resource Economics.

Misra, S. K., Huang, C. L., & Ott, S. L. (1991). Consumer Willingness to Pay for Pesticide-Free Fresh Produce. *Western Journal of Agricultural Economics, 16*(2), 218-227.

Mitchell, R. C., & Carson, R. T. (1989). *Using surveys to value public goods: The contingent valuation method*. Washington, D.C.: Resources for the Future.

Mongkolnchaiarunya, J. (2005). Promoting a community-based solids waste management initiative in local government: Yala municipality, Thailand. *Habitat International, 29*(27-40).

National Bureau of Agricultural Commodity and Food Standards (ACFS). (2003). *Organic agriculture. Part1: the production, processing, labelling and marketing of organic agriculture*. Bangkok: National Bureau of Agricultural Commodity and Food Standards (ACFS), Ministry of Agricutural and Cooperatives.

Newsom, J. T., McFarland, B. H., Kaplan, M. S., Huguet, N., & Zani, B. (2005). The health consciousness myth: implications of the near independence of major health behaviours in the North American population. *Social Science and Medicine, 60*, 433-437.

Norwood, F. B., & Lusk, J. C. (2008). *Agricultural marketing and price analysis*: Prentice Hall.

Notermans, S., Gallhoff, G., Zwietering, M. H., & Mead, G. C. (1995). The HACCP concept: specification of criteria using quantitative risk assessment. *Food Microbiology, 12*, 81-90.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory (3rd Edition)*. New York: McGraw-Hill.

O' Donovan, P., & McCarthy, M. (2002). Irish consumer preference for organic meat. *British Food Journal, 104*(3-5), 353.

Onozaka, Y., Bunch, D., & Larson, D. (2006). What exactly are they paying for? Explaining the price premium for organic fresh produce. [Working paper, Department of Agricultural and Resource Economics, University of California]. *9*(6), 1-4.

Onyango, B. M., Hallman, W. K., & Bellows, A. C. (2007). Purchasing organic food in US food systems. *British Food Journal, 109*(5), 399.

Organic Agriculture Certification Thailand (ACT). (2005). *ACT organic agriculture standards 2005*. Bangkok: Organic Agriculture Certification Thailand (ACT).

Pallant, J. (2004). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS*. Buckingham: Open University Press.

Panyakul, V. (2003). Organic Agriculture in Thailand, *Seminar on Production and Export of Organic Fruit and Vegetables in Asia. November 3-5, 2003*. Bangkok, Thailand

Panyakul, V. (2001). Organic Agriculture in Thailand, *A national report prepared for ESCAP "Exploring the potential of organic farming for rural employment and income generation in Asia"*

Parrott, N., Olesen, J. E., & Høgh-Jensen, H. (2006). Certified and non-certified organic farming in the developing world. In N. Halberg, H. F. Alrøe, M. T. Knudsen & E. S. Kristensen (Eds.), *Global Development of Organic Agriculture: Challenges and Promises. CAB International*. Wallingford.

Pearce, D. W., & Turner, R. K. (1990). Economics of natural resources and the environment. *Johns Hopkins University Press,* 51-53.

Posria, W., Shankarb, B., & Chadbunchachaic, S. (2006). Consumer Attitudes Towards and Willingness to Pay for Pesticide Residue Limit Compliant "Safe" Vegetables in Northeast Thailand. *Journal of International Food & Agribusiness Marketing, 19*(1), 81-101.

Radman, M. (2005). Consumer consumption and perception of organic products in Croatia. *British Food Journal, 107*(4/5), 263.

Ready, R. C., Buzby, J. C., & Hu, D. (1996). Differences between continuous and discrete contingent value estimates. *Land Economics, 72*(3), 397.

Rice, G., Wongtada, N., & Leelakulthanit, O. (1996). An investigation of self-efficacy and environmentally concerned behavior of Thai consumers. *Journal of International Consumer Marketing, 9*(2), 1.

Roddy, G., Cowan, C. A., & Hutchinson, G. (1996). Consumer attitudes and behavior to organic foods in Ireland. *Journal of International Consumer Marketing, 9*(2), 41.

Rodríguez, E., Lacaze, V., & Lupín, B. (2007). *Willingness to pay for organic food in Argentina: Evidence from a consumer survey*. Paper presented at the the

105th EAAE Seminar 'International Marketing and International Trade of Quality Food Products'.

Roitner-Schobesberger, B. (2006). *Consumers' Perception of Organic Foods in Bangkok, Thailand.* University of Natural Resources and Applied Life Sciences, Vienna, Austria.

Roitner-Schobesberger, B., Darnhofer, I., Somsook, S., & Vogl, C. R. (2008). Consumer perceptions of organic foods in Bangkok, Thailand. *Food Policy, 33*(2), 112-121.

Rundgren, G. (2006). *Best practices for organic policy: what developing country governments can do to promote the organic sector*: UNEP/UNCTAD.

Sakagami, M., Sato, M., & Ueta, K. (2006). Measuring consumer preferences regarding organic labelling and the JAS label in particular. *New Zealand Journal of Agricultural Research, 49*, 247-254.

Sanjuán, A. I., Sánchez, M., Gil, J. M., Gracia, A., & Soler, F. (2003). Brakes to organic market enlargement in Spain: consumers' and retailers' attitudes and willingness to pay. *International Journal of Consumer Studies, 27*(2), 134-144.

Schaffner, D. J., Bokal, B., Fink, S., Rawls, K., & Schweiger, J. (2005). Food Retail-Price Comparison In Thailand. *Journal of Food Distribution Research, 36*(1), 167-171.

Schifferstein, H. N. J., & Oude Ophuis, P. A. M. (1998). Health-related determinants of organic food consumption in The Netherlands. *Food Quality and Preference, 9*(3), 119-133.

Schröeder, M. J. A., & McEachern, M. G. (2004). Consumer Value Conflicts Surrounding Ethical Food Purchase Decisions: A Focus on Animal Welfare. *International Journal of Consumer Studies, 28*(2), 168–177.

Soler, F., Gil, J. M., & Sanchez, M. (2002). Consumers' acceptability of organic food in Spain. *British Food Journal, 104*(8/9), 670.

Stobbelaar, D. J., Casimir, G., Borghuis, J., Marks, I., & Meijer, L. (2007). Adolescents Attitudes Towards Organic Food: A Survey of 15- to 16-Year Old School Children. *International Journal of Consumer Studies, 31*(4), 349-356.

Stracke-Laßmann, M. (2007). *Strategies of Organic Producers in Thailand.* University of Natural Resources and Applied Life Sciences, Vienna, Austria.

Sylvander, B. (1995). Conventions on Quality in the Fruit and Vegetables Sector: Results on the Organic Sector. *Acta Horticulture*, 241-246.

Thompson, G. D. (1998). Consumer Demand for Organic Foods: What We Know and What We Need to Know *American Journal of Agricultural Economics, 80(5)*(Dec., 1998), 1113-1118.

Thompson, G. D., & Kidwell, J. (1998). Explaining the Choice of Organic Produce: Cosmetic Defects, Prices, and Consumer Preferences. *American Journal of Agricultural Economics, 80*(2), 277-287.

Torjusen, H., Lieblein, G., Wandel, M., & Francis, C. A. (2001). Food system orientation and quality perception among consumers and producers of organic food in Hedmark County, Norway. *Food Quality and Preference, 12*(3), 207-216.

Train, K. E. (2003). *Discreate Choice Methods with Simulation*. NY: Cambridge University Press.

Tregear, A., Dent, J. B., & McGregor, M. J. (1994). The demand for organically-grown produce. *British Food Journal, 96*(4), 21.

Tse, A. C. B. (2001). How much more are consumers willing to pay for a higher level of service? A preliminary survey. *Journal of Services Marketing, 15*(1), 10-15.

UNCTAD. (2004). *Trade and environment review*. New York: United Nations.

Ureña, F., Bernabéu, R., & Olmeda, M. (2008). Women, men and organic food: differences in their attitudes and willingness to pay. A Spanish case study. *International Journal of Consumer Studies, 32*(1), 18-26.

Valyasevi, R., Tanticharoen, M., & Bhumiratana, S. (2003). *Current Status of Biosafety of Genetic Modified*

Foods in Thailand. : National Science and Technology Development Agency.

Van Ravenswaay, E., & Wohl, J. (1995). *Using contingent valuation methods to value the health risks from pesticide residues when risks are ambiguous*.

Vanit-Anunchai, C. (2006). *Possibilities and Constraints of Marketing Environmentally Friendly Produced Vegetables in Thailand.* Hannover University, Hannover,Germany.

Varian, H. R. (1992). *Microeconomic Analysis* (third ed.). London: W.W. Norton and Co.

Verhoef, P. C. (2005). Explaining purchases of organic meat by Dutch consumers. *European Review of Agricultural Economics, 32*(2), 245.

Vindigni, G., Janssen, M. A., & Jager, W. (2002). Organic food consumption. *British Food Journal, 104*(8/9), 624.

Vladicka, B., & Cunningham, R. (2002). *A Profile of the Organic Industry and its Issues*: Agricultural, Food and Rural Development.

Wandel, M., & Bugge, A. (1997). Environmental concern in consumer evaluation of food quality. *Food Quality and Preference, 8*(1), 19-26.

Wiboonpongse, A., & Sriboonchitta, S. (2004). Recovering Markets: Securing Small Producer Participation in Restructured National and Regional Agri-Food System in Thailand.

Wier, M., & Calverley, C. (2002). Market potential for organic foods in Europe. *British Food Journal, 104*(1), 45.

Wier, M., O'Doherty Jensen, K., Andersen, L. M., & Millock, K. (2008). The character of demand in mature organic food markets: Great Britain and Denmark compared. *Food Policy, 33*(5), 406-421.

Willer, H., & Kilcher, L. (2009). *The World of Organic Agriculture - Statistics and Emerging Trends 2009*. FIBL-IFOAM report. IFOAM, Bonn; FiBL, Frick; ITC, Geneva.

Willer, H., & Yussefi, M. (Eds.). (2003). *The World of Organic Agriculture - Statistics and Emerging Trends 2003*. International Federation of Organic Agriculture Movements (IFOAM), DE-Bonn and Research Institute of Organic Agriculture, FiBL, CH-Frick.

Willer, H., & Yussefi, M. (Eds.). (2006). *The World of Organic Agriculture - Statistics and Emerging Trends 2006*. International Federation of Organic Agriculture Movements (IFOAM), DE-Bonn and Research Institute of Organic Agriculture, FiBL, CH-Frick.

Willer, H., & Yussefi, M. (Eds.). (2007). *The World of Organic Agriculture - Statistics and Emerging Trends 2007*. International Federation of Organic Agriculture Movements (IFOAM), DE-Bonn and Research Institute of Organic Agriculture, FiBL, CH-Frick.

Williams, P. R., & Hammitt, J. K. (2000). A comparison of organic and conventional fresh produce buyers in the Boston area. *Risk Analysis, 20*(5), 735-746.

Williams, P. R., & Hammitt, J. K. (2001). Perceived risks of conventional and organic produce: pesticides, pathogens, and natural toxins. . *Risk Analysis, 21*(2), 319-330.

Worner, F., & Meier-Ploeger, A. (1999). What the consumer says. *Ecology and Farming, 20*((Jan-April)), 14-15.

Yamane, T. (1973). *Statistics, an Introductory Analysis. 3rd ed*. New York: Harper and Row.

Yasmeen, G. (1997). *Bangkok's foodscape: Public eating, gender relations and urban change.* The University of British Columbia.

Zanoli, R., Bahr, M., Borschen, M., Laberenz, H., Naspetti, S., & Thelen, E. (2004). *The European Consumer and Organic Food*. Aberystwyth: School of Management &Business. The University of Wales.

Zanoli, R., & Naspetti, S. (2002). Consumer motivations in the purchase of organic food: a means-end approach. *British Food Journal, 104*, 643-653.

Zepeda, L., & Li, J. (2007). Characteristics of Organic Food Shoppers. *Journal of Agricultural and Applied Economics, 39*(1), 17-28.

Zhao, X., Chambers, E., Matta, Z., Loughin, T. M., & Carey, E. E. (2007). Consumer Sensory Analysis of Organically and Conventionally Grown Vegetables. *Journal of Food Science, 72*(2), S87-S91.

Appendix A

The Survey Questionnaire

Lincoln University
Te Whare Wānaka o Aoraki

Commerce Division
PO Box 84, Lincoln University,
Canterbury 7647, New Zealand
Telephone 64 3 325-2811
Facsimile 64 3 325-3847
www.lincoln.ac.nz

Reference No. _____

December 16, 2008

Dear Respondent,

You are invited to participate in a research that is a part of my Doctoral research project at Lincoln University, New Zealand. This research aims to understand the factors affecting consumers' purchasing decision and consumers' willingness to pay for organic products. The finding will assist policy makers and marketers to plan market strategies for developing the domestic organic market.

I would like to request you cooperation in filling out the following questionnaire. For the most part, you will be able to complete it by circling numbers, ticking boxes and putting numbers in boxes. It should take approximately 15-20 minutes to complete. Once you have completed the questionnaire, please return it to me. Alternatively, you can return it to me before mid-February 2008 by using the self-addressed and postage paid envelope provided. I deeply appreciate your valuable participation. There are no right or wrong answers because this survey seeks your personal viewpoint. The answers will provide results to better understand consumer decision making and factors affecting consumer choice.

The research has been approved by the Human Ethics Committee of Lincoln University. The participation is voluntary and participants' anonymity will be maintained. You will not be identified as a respondent in any way. You are free to terminate your participation at any time and without prejudice, including withdrawal of any information you have provided. However, if you complete the questionnaire and give it back to me, it will be understood that you are 18 years of age or older and have consented to participate in this research and consent to publication of the results of this research with the understanding the anonymity will be preserved.

If you have any questions or concerns, please feel free to contact me at telephone numbers (02) 9314879 in Thailand or (64)-3-325-3838 ext 8405 or by sending an email to sriwary2@lincoln.ac.nz. Alternatively, you may contact my research supervisors Dr. Christopher Gan and/or Dr. Minsoo Lee at telephone numbers (64)-3-325-03838 ext 8155 or by sending an email to Dr. Gan at ganc1@lincoln.ac.nz or Dr. Lee at minsoolee@szpku.edu.cn.

Thank you very much for your cooperation and assistance.

Best regards,

Yaowarat Sriwaranun
PhD Candidate
Commerce Division
Lincoln University

Survey of Consumers Purchasing Behaviour towards Organic Products in Thailand

Questionnaire No. _____

Introduction: You, who are the primary grocery shopper for the household, are invited to participate in a survey that is a part of my Doctoral research project at Lincoln University, New Zealand. This research aims to identify the factors affecting consumers' purchase decisions and preferences towards organic products in Thailand.

For each question with brackets provided, please check your answer(s); otherwise, please follow the instructions given to answer the questions.

Section I : ***Principal grocery shopper and shopping behaviour for the household***

1. Are you the ***primary grocery shopper*** for your household?
   ☐ Yes
   ☐ No (Thank you, please stop doing the survey)

2. Where do you often purchase your groceries? (check all that apply)
   ☐ Supermarket (e.g. the mall, Carrefour, Big C)
   ☐ Natural/health food store (e.g. Lemon Farm, Aden)
   ☐ Grocery/convenience store (e.g. Seven eleven, Lotus express)
   ☐ Wet market/Farmers' market
   ☐ Other(s) please specify _____

3. How often does your family dine out or consume take-away food (food prepared away from home)?
   ☐ Always
   ☐ Often
   ☐ Sometimes
   ☐ Rarely
   ☐ Never

4. Please indicate on how often your family prepare food at home on a scale of 1 to 4, where 1 means "rarely" and 4 means "always".

	Never	***Rarely***	***Sometimes***	***Often***	***Always***
Breakfast	0	1	2	3	4
Lunch	0	1	2	3	4
Dinner	0	1	2	3	4

5. Are any of you family members a vegetarian?
   ☐ No
   ☐ Yes

6. Are any of you family members having nutritional related health problems?
   ☐ No
   ☐ Yes

7. Below is series of food product attributes. Please rank them on how important they are to your decision to purchase food products, where 1 means "most important" and 7 means "least important".

	Rank ⮟
Quality (e.g. freshness, colour, nutrition)	☐
Price	☐
Availability	☐
Absence of pesticide residue	☐
Produced in an environmentally friendly way	☐
Produced without using genetically modified organisms(GMOs)	☐
Country of origin	☐

8. Please circle the number which most accurately reflects how strongly you agree or disagree with the following statements on a scale of 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree".

	Strongly agree ⮟	⮟	***Neither agree nor disagree*** ⮟	⮟	***Strongly disagree*** ⮟	***Don't know*** ⮟
8a. Lifestyle						
1. I exercise regularly.	5	4	3	2	1	0
2. I well balance work and family/life.	5	4	3	2	1	0
3. I often eat healthy food.	5	4	3	2	1	0
4. I often read/check quality label before buying a new food product.	5	4	3	2	1	0
8b. Health concern						
5. I avoid buying food with artificial additives and preservatives.	5	4	3	2	1	0
6. I believe that pesticide residues/ in food cause cancer and other diseases.	5	4	3	2	1	0
7. I believe that the use of growth/red meat stimulants in livestock production is harmful to humans.	5	4	3	2	1	0
8c.Ethical concern						
8. I certainly buy 'animal welfare friendly' food products if they are available.	5	4	3	2	1	0
9. I certainly believe that genetically modified foods are probably safe for human consumption.	5	4	3	2	1	0
8d.Environment concern						
10. I like to buy products prepared in an environmentally friendly way.	5	4	3	2	1	0
11. I believe that pesticide and herbicide residues on farms would cause negative effect on the environment.	5	4	3	2	1	0
12. I separate the rubbish that can be re-used and put in recycle bin.	5	4	3	2	1	0
13. I use reusable bag when I shop.	5	4	3	2	1	0

Section II: ***Consumer purchasing behaviour and attitude towards organic product***

9. Please tell me how knowledgeable you are about ***the following food***s on a scale of 1 to 5, where 1 means "Not at all knowledgeable" and 5 means "Very knowledgeable".

	Very knowledgeable	***Knowledgeable***	***Somewhat knowledgeable***	***Little knowledgeable***	***Not at all knowledgeable***	***Not answer***
Organic food	5	4	3	2	1	0
Genetically modified (GM) food	5	4	3	2	1	0
Hygienic food	5	4	3	2	1	0

10. What does '**organic product'** means? (check only one)
    - ☐ Products produced where synthetic fertilizers, pesticides residue do not exceed the maximum residue limits
    - ☐ Products produced without synthetic fertilizers, pesticides and GMOs
    - ☐ Products that are genetically modified free (GM free)
    - ☐ Other(s) please specify _____

11. Where did you mostly get information about organic products? (check only one)
    - ☐ Relatives, friends or colleagues
    - ☐ Experts (e.g. doctors, nutritionists)
    - ☐ Retailer advertisement or in store handouts
    - ☐ Agricultural fairs or exhibitions
    - ☐ Magazine, newspaper
    - ☐ Radio, television
    - ☐ Other(s) please specify _____

12. Below is a series of statements pertaining to your attitude toward organic products. Please circle the number which most accurately reflects how strongly you agree or disagree with each statement on a scale of 1 to 5, where 1 means "Strongly disagree" and 5 means "Strongly agree".

I think/found that ……..	***Strongly agree*** ▼	▼	***Neither agree nor disagree*** ▼	▼	***Strongly disagree*** ▼	***Don't know*** ▼
12a.Sensory						
1. organic products are tastier than conventional products.	5	4	3	2	1	0
2. organic products have better appearance than conventional products (e.g. freshness, colour, texture).	5	4	3	2	1	0
12b.Health Benefit						
3. organic products have more nutrients than conventional products (e.g. vitamins and minerals).	5	4	3	2	1	0
4. organic products have less chemical residue than conventional products.	5	4	3	2	1	0
5. eating organic products are more beneficial to my health than conventional products.	5	4	3	2	1	0
12c.Convenience						
6. organic products are not easily found in grocery stores compared with conventional products.	5	4	3	2	1	0
7. organic products do not have a wide range of choices compared with conventional products.	5	4	3	2	1	0
8. there is lack of availability of organic product information compared with conventional products.						
12d.Price						
9. organic products are much more expensive than conventional products.	5	4	3	2	1	0
10. price of organic products is a barrier to decision to buy.	5	4	3	2	1	0
12e.Environmental Benefit						
11. products grown organically are more ecologically sound than grown conventionally.	5	4	3	2	1	0
12. products grown organically are obtained from sustainable resources and less polluted discharges into air, water and soil than grown conventionally.	5	4	3	2	1	0

13. Have you bought any organic products ***during last year***?
☐ No (please go to Q22)
☐ Yes

14. How often do you purchase organic products?
☐ More than once a week (Always)
☐ Once a week (Often)
☐ 2 – 3 times a month (Sometimes)
☐ Once a month (Rarely)
☐ Other(s) please specify _____

15.Why do you purchase organic products? (check all that apply)

☐ Healthier (Good for health) and contain more nutrients/vitamins
☐ Free from pesticides/growth hormones
☐ Taste better
☐ No trust in conventional products
☐ GMOs free
☐ Environmentally friendly and sustainable production method (support environmental friendly way)
☐ Support of smaller/local producers
☐ Other(s) please specify _____

16. Where do you often purchase organic products? (Check all that apply)

☐ Supermarket (e.g. The Mall, Carrefour, Big C)
☐ Natural/health food store (e.g. Lemon Farm, Aden)
☐ Grocery/convenience store (e.g. Seven Eleven, Lotus Express)
☐ Wet market/Farmers' market
☐ Cooperative shop
☐ Home delivery or internet
☐ Other(s) please specify _____

17. Why do you purchase organic products from a preferred retail channel? (Check all that apply)

☐ Wide range of organic products
☐ Convenient location
☐ Supporting local farmers/products
☐ Buying most groceries there
☐ Convenient opening hours
☐ Cheaper prices
☐ Other(s) please specify _____

18.What would persuade you to purchase more organic products? (Check all that apply)

☐ Price cheaper
☐ More readily available (all supermarkets, farmers' market)
☐ Better appearance
☐ Packaging (size)
☐ Environmentally friendly packaging, no plastic
☐ Wide range of organic products
☐ Trust in certification bodies
☐ Evidence of quality or organic standards
☐ Other(s) please specify _____

19. What 'certified organic' labels do you purchase ***often***? (Check all that apply)

☐ Organic Thailand
☐ ACT (Organic Agriculture Certification Thailand)
☐ IFOAM (International Federation of Organic Agriculture Movements)
☐ Organic standard-soil association
☐ Bioagricert
☐ Don't know
☐ Never purchase organic products that have 'certified organic' labels (please go to **Q21**)
☐ Other(s) please specify _____

20. Why do you purchase organic products from the above certified label? (check all that apply)
- ☐ Cheaper prices
- ☐ Safer
- ☐ Well-known
- ☐ Easy to find
- ☐ Higher quality
- ☐ Introduced/Recommended by others
- ☐ Other(s) please specify _____

21.Which kind of organic products do you purchase and what is the amount do you consume compared to the total amount of each products? (Check all that apply)

	Never purchase	***1-25%***	***26-50%***	***51-75%***	***75-100%***	
Organic rice	☐	☐	☐	☐	☐	of all rice
Organic vegetables	☐	☐	☐	☐	☐	of all vegetables
Organic eggs	☐	☐	☐	☐	☐	of all eggs
Organic meat (e.g. pork, chicken, beef)	☐	☐	☐	☐	☐	of all meat
Organic milk and dairy products	☐	☐	☐	☐	☐	of all milk and dairy products
Organic seafood products (e.g. prawn)	☐	☐	☐	☐	☐	of all seafood products
Organic spices and herbs	☐	☐	☐	☐	☐	of all spices and herbs

(Skip to Q24, when finished Q21)

22.Why do you not purchase organic products? (Check all that apply)
- ☐ High price
- ☐ Do not like the appearance
- ☐ Lack of variety
- ☐ Not available where I normally shop
- ☐ Do not believe organic products are high quality
- ☐ Do not like the taste
- ☐ Do not trust that the products truly produced organically
- ☐ Confused (about terminology, certification bodies, etc)
- ☐ Satisfied with the quality of non-organically produced products
- ☐ Insufficient information about organic products
- ☐ Other(s) please specify _____

23. What would persuade you to purchase organic products? (Check all that apply)
- ☐ Price cheaper
- ☐ More readily available (all supermarkets, farmers' market)
- ☐ Better appearance
- ☐ Packaging (size)
- ☐ Environmentally friendly packaging, no plastic
- ☐ Wide range of organic products
- ☐ Trust in certification bodies
- ☐ Evidence of quality or organic standards
- ☐ Other(s) please specify _____

Section III. ***Behaviour of Purchasing Organic Vegetables, Rice and Meat***

Vegetables

24. How important are the following attributes when you purchase ***fresh vegetables***? Please circle the number which most accurately reflects how important or unimportant each attributes on a scale of 1 to 5, where 1 means "Very unimportant" and 5 means "Very important".

	Very important		***Neutral***		***Very unimportant***	***Don't know***
Quality (e.g. Freshness)	5	4	3	2	1	0
Price	5	4	3	2	1	0
Absence of pesticide residue	5	4	3	2	1	0
Produced in an environmentally friendly way	5	4	3	2	1	0
Produced without using genetically modified organisms(GMOs)	5	4	3	2	1	0
Availability	5	4	3	2	1	0

25. How often do you choose vegetables that are ***organically grown*** when you go grocery shopping?
- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Rarely
- ☐ Never (please go to **Q29**)

26. Which kind of organic vegetables do you purchase ***often***? (Check all that apply)
- ☐ Cabbages
- ☐ Chinese kales
- ☐ Chinese mustard cabbages
- ☐ Chinese water spinach
- ☐ Cucumbers
- ☐ Tomato
- ☐ Vegetable's salads, lettuces
- ☐ Herbs
- ☐ Other(s) please specify _____

27. What brand of organic vegetables do you purchase ***often***? (Check all that apply)
- ☐ Rai Pluk Ruk
- ☐ Green net
- ☐ Lemon Farm
- ☐ Aden
- ☐ Doi Kham/Doi Luang
- ☐ Supermarket brands (e.g. TOPs, Macro, Big C, and Carrefour)
- ☐ Cooperative farmer groups
- ☐ No brand name
- ☐ Other(s) please specify _____

28. Why do you purchase organic vegetables from a preferred brand? (check all that apply)
☐ Cheaper prices
☐ Higher quality
☐ Well known
☐ Easy to find
☐ Better appearance
☐ Packaging (size)
☐ Environmental friendly packaging, no plastic
☐ Wide range of organic products
☐ Evidence of quality or organic standards from a source can be trust
☐ Introduced/Recommended by others
☐ Others (please specify) _____

Rice

29. How important are the following attributes when you purchase ***rice***? Please circle the number which most accurately reflects how important or unimportant with each attribute on a scale of 1 to 5, where 1 means "Very unimportant" and 5 means "Very important".

	Very important		***Neutral***		***Very unimportant***	***Don't know***
	⮟	⮟	⮟	⮟	⮟	⮟
Quality (e.g. colour, texture)	5	4	3	2	1	0
Price	5	4	3	2	1	0
Absence of pesticide residue	5	4	3	2	1	0
Produced in an environmentally friendly way	5	4	3	2	1	0
Produced without using genetically modified organisms(GMOs)	5	4	3	2	1	0
Availability	5	4	3	2	1	0

30. How often do you choose rice that is ***organically grown*** when you go grocery shopping?
☐ Always
☐ Often
☐ Sometimes
☐ Rarely
☐ Never (please go to **Q34**)

31. Which kind of organic rice do you purchase ***often***? (Check all that apply)
☐ Jasmine white rice
☐ Jasmine brown rice
☐ Mixed grain rice
☐ Other(s) please specify _____

32. What brand of organic rice do you purchase ***often***? (Check all that apply)
☐ Great Harvest
☐ Thai Thai
☐ Green net
☐ Lemon Farm
☐ Aden
☐ Supermarket brands (e.g. TOPs, Macro, Big C, and Carrefour)
☐ Cooperative farmer groups
☐ No brand name
☐ Other(s) please specify _____

33. Why do you purchase organic rice from a preferred brand? (Check all that apply)
☐ Cheaper prices
☐ Higher quality
☐ Well known
☐ Easy to find
☐ Better appearance
☐ Packaging (size)
☐ Environmental friendly packaging, no plastic
☐ Wide range of organic products
☐ Evidence of quality or organic standards from a source can be trust
☐ Introduced/Recommended by others
☐ Others (please specify) _____

Meat

34. How important are the following attributes when you purchase ***meat***? Please circle the number which most accurately reflects how important or unimportant with each attribute on a scale of 1 to 5, where 1 means "Very unimportant" and 5 means "Very important".

	Very important ➘	➘	***Neutral*** ➘	➘	***Very unimportant*** ➘	***Don't know*** ➘
Quality (e.g. colour, Freshness)	5	4	3	2	1	0
Price	5	4	3	2	1	0
Absence of pesticide residue	5	4	3	2	1	0
Produced in an environmentally friendly way	5	4	3	2	1	0
Produced without using genetically modified organisms(GMOs)	5	4	3	2	1	0
Availability	5	4	3	2	1	0

35. How often do you choose meat that is ***organically grown*** when you go grocery shopping?
☐ Always
☐ Often
☐ Sometimes
☐ Rarely
☐ Never (please go to **Section 4**)

36. Which kind of organic meat do you purchase ***often***? (Check all that apply)
☐ Pork
☐ Chicken
☐ Beef
☐ Other(s) please specify _____

Section IV. ***Willingness to Pay for Organic Products***

In this part of the questionnaire, I would like to measure the value that you put on organic products. In order to do this, I will give you information about organic products and put you in 2 hypothetical situations. Please read and consider these situations seriously and think of what you would really do in these situations as the following.

Organic products are from a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. All synthetic chemical inputs are prohibited, including artificial fertilizers, pesticides, and synthetic growth stimulants. Moreover, using genetically engineered organisms and products thereof is prohibited in organic production and processing. Therefore, organic products are free from all chemical inputs and non-GMOs in the production process.

37. Regarding the meaning of organic products as above, how many of percentage would you be willing to pay ***more*** for organic products comparing with conventional product price (Please state the number of the percentage you are willing to pay more in the blank)

    I am willing to pay more _____ % of conventional product price

38. Suppose ***conventional Chinese kale*** is your regular fresh vegetables that you usually purchase costs *30* baht per kilogram. Would you be willing to pay (45*, 60, 75)* baht per kilogram for ***organic Chinese kale***?
    ☐ No (please go to Q39)
    ☐ Yes (please go to Q40)

39. Would you be willing to pay **(37.5*, 50, 62.5)*** baht per kilogram for ***organic Chinese kale***?
    ☐ No
    ☐ Yes

39.1 What is the maximum amount you are willing to pay for 1 kilogram of organic Chinese kale?
    Please state the amount _____ (baht/kg) (please go to Q41)

40. Would you be willing to pay **(52.5*, 70, 87.5)*** baht per kilogram for ***organic Chinese kale***?
    ☐ No
    ☐ Yes

40.1 What is the maximum amount you are willing to pay for 1 kilogram of organic Chinese kale?
    Please state the amount _____ (baht/kg) (please go to Q41)

41. Suppose ***conventional jasmine rice*** is your regular rice that you usually purchase costs *140* baht per 5 kilogram pack. Would you be willing to pay (*210, 240, 270)* baht per 5 kilogram pack for ***organic jasmine rice***?
    ☐ No (please go to Q42)
    ☐ Yes (please go to Q43)

42. Would you be willing to pay ***(175, 200, 225)*** baht per 5 kilogram pack for ***organic jasmine rice***?
    ☐ No
    ☐ Yes

39.1 What is the maximum amount you are willing to pay for 5 kilogram pack of organic jasmine rice?

Please state the amount _____ (baht/5 kg pack) (please go to Q44)

43. Would you be willing to pay ***(245, 280, 315)*** baht per kilogram for ***organic jasmine rice***?

☐ No

☐ Yes

40.1 What is the maximum amount you are willing to pay for 5 kilogram pack of organic jasmine rice?

Please state the amount _____ (baht/5 kg pack) (please go to Q44)

44. Suppose ***conventional pork*** is your regular pork that you usually purchase costs *90* baht per kilogram. Would you be willing to pay (*135, 150, 165)* baht per kilogram for ***organic pork***?

☐ No (please go to Q45)

☐ Yes (please go to Q46)

45. Would you be willing to pay ***(112.5, 125, 137.5)*** baht per kilogram for ***organic pork***?

☐ No

☐ Yes

39.1 What is the maximum amount you are willing to pay for 1 kilogram of organic pork?

Please state the amount _____ (baht/kg) (please go to Q47)

46. Would you be willing to pay ***(157.5, 175, 192.5)*** baht per kilogram for ***organic pork***?

☐ No

☐ Yes

40.1 What is the maximum amount you are willing to pay for 1 kilogram of organic pork?

Please state the amount _____ (baht/kg) (please go to Q47)

Section V. ***Socio-Demographic Information***

47. What is you gender?
☐ Male
☐ Female

48. Which age group are you in?
☐ 18-24 years old
☐ 25-34 years old
☐ 35-44 years old
☐ 45-54 years old
☐ 55-64 years old
☐ 65 years old and older

49. What is your education level?
☐ Primary school
☐ Secondary school
☐ Technical and vocational school (2 years)
☐ Bachelor degree
☐ Masters degree or higher
☐ Other(s) please specify _____

50. What is your occupation?
☐ Government officer
☐ Private company officer
☐ Self employed
☐ Farmer
☐ House wife/husband
☐ Labourer
☐ Retired
☐ Unemployed
☐ Other(s) please specify _____

51. What is your marital status?
☐ Single
☐ Married/De facto relationships
☐ Divorced/Separated/Widowed
☐ Other(s) please specify _____

52. How many members of your household are in the following age groups? (check all that apply)

	Number of family members						
	Don't have	***1***	***2***	***3***	***4***	***5 or More than 5***	***Not answer***
Children (0 - <7 years old)	0	1	2	3	4	5	☐
Youth (7 – <18 years old)	0	1	2	3	4	5	☐
Adults (> 18 years old)	0	1	2	3	4	5	☐

53. What is your monthly household income?

☐ Less than 10,000 baht
☐ 10,001-20,000 baht
☐ 20,001-30,000 baht
☐ 30,001-40,000 baht
☐ 40,001-50,000 baht
☐ 50,001-60,000 baht
☐ 60,001-70,000 baht
☐ 70,001-80,000 baht
☐ 80,001-90,000 baht
☐ 90,001-100,000 baht
☐ 100,001-150,000 baht
☐ More than 150,000 baht

54. Which of the following best describes the area in which your home is located?

☐ City
☐ Suburb

Your participation in this survey is greatly appreciated. Thank you for your time and if you have further comments about Organic products, please feel free to comment in the space provided below. Once again, we assure you that your identity will remain ***STRICTLY CONFIDENTIAL.***

_____

_____

_____

_____

_____

_____

Appendix B

Descriptive Analysis

B.1 General attitudes related to health, food safety, ethics and environment

Statements	*Purchasers of organic products (n=242)*						*Non-purchasers of organic products (n=260)*						*Total (n=502)*					
	SA	*A*	*NAND*	*DA*	*SDA*	*Don't know*	*SA*	*A*	*NAND*	*DA*	*SDA*	*Don't know*	*SA*	*A*	*NAND*	*DA*	*SDA*	*Don't know*
I exercise regularly	36.0	28.0	26.0	7.0	1.0	0.0	28.6	23.6	28.6	9.2	10.0	0.0	32.0	25.0	27.0	8.0	6.0	0.0
I well balance work and family/life	22.0	45.0	28.0	2.0	0.0	0.0	18.5	46.5	31.2	3.0	0.0	0.0	20.3	46.2	29.9	3.0	0.6	0.0
I often eat healthy food	37.0	38.0	21.0	2.0	1.0	0.0	20.0	33.0	40.8	3.5	2.0	0.0	28.3	35.4	31.3	3.0	2.0	0.0
I often read/check quality label before buying a new food products	47.5	33.9	17.4	1.2	0.0	0.0	32.3	39.6	22.3	5.4	0.4	0.0	39.6	36.9	19.9	3.4	0.2	0.0
I avoid buying food with artificial additives and preservatives	61.2	26.8	11.2	0.8	0.0	0.0	38.5	30.4	25.8	3.5	1.8	0.0	49.4	28.7	18.7	2.2	1.0	0.0
I believe that pesticide residues/ in food cause cancer and other diseases	70.7	26.4	2.9	0.0	0.0	0.0	52.3	34.6	11.9	0.4	0.8	0.0	61.2	30.6	7.6	0.2	0.4	0.0
I believe that the use of growth/red meat stimulants in livestock production is harmful to human	75.2	21.1	3.7	0.0	0.0	0.0	58.0	30.8	10.4	0.4	0.4	0.0	66.3	26.1	7.2	0.2	0.2	0.0
I certainly buy 'animal welfare friendly' food products if they are available	17.4	36.8	38.8	6.6	0.0	0.4	13.8	35.0	40.0	8.8	0.8	1.5	15.5	35.9	39.4	7.8	0.4	1.0
I certainly believe that genetically modified foods are reasonably safe for human consumption	3.7	14.9	42.1	14.9	24.0	0.4	3.5	17.7	46.9	15.0	15.4	1.5	3.6	16.3	44.6	14.9	19.5	1.0
I like to buy product prepared in an environmentally friendly way	27.6	41.0	24.8	5.0	1.6	0.0	14.6	41.1	35.1	6.5	2.7	0.0	20.9	41.0	30.1	5.8	2.2	0.0
I believe that pesticide and herbicide residue on farms would cause negative effect on environment	52.5	33.9	12.4	0.8	0.0	0.4	40.4	37.2	18.5	2.7	0.8	0.4	46.2	35.7	15.5	1.8	0.4	0.4
I separate the rubbish that can re-use and put in recycle bin	25.6	34.4	24.4	10.7	4.5	0.4	13.5	26.5	43.5	11.9	4.6	0.0	19.3	30.3	34.3	11.3	4.6	0.2
I use reusable bag when I shop	19.0	30.6	29.3	13.2	7.9	0.0	13.4	20.0	41.2	16.2	8.8	0.4	16.1	25.1	35.5	14.7	8.4	0.2

Note: SA= Strongly agree, A= Agree, NAND= Neither agree nor disagree, DA=Disagree, and SD= Strongly disagree

B.2 Perception towards organic products

Statements	*Purchasers of organic products (n=242)*						*Non-purchasers of organic products (n=260)*						*Total (n=502)*					
	SA	*A*	*NAND*	*DA*	*SDA*	*DK*	*SA*	*A*	*NAND*	*DA*	*SDA*	*DK*	*SA*	*A*	*NAND*	*DA*	*SDA*	*DK*
Organic products are tastier than conventional products.	16.0	28.0	44.0	4.0	2.0	5.0	6.9	19.7	44.6	10.0	3.8	15.0	11.0	23.0	44.0	7.0	3.0	10.2
Organic products have better appearance than conventional products (e.g. freshness, colour, texture)	31.0	35.0	28.0	4.0	1.0	0.4	2.3	13.1	39.2	27.7	10.0	7.3	16.1	23.7	33.9	16.3	6.0	4.0
Organic products have more nutrients than conventional products (e.g. vitamins and minerals).	26.0	43.0	19.0	3.0	4.0	2.5	15.0	32.7	31.2	6.9	4.0	10.0	20.7	37.8	25.5	5.4	4.2	6.4
Organic products are less chemical residue than conventional products.	49.6	34.3	11.6	2.1	1.7	0.8	33.8	33.5	21.2	5.0	1.5	5.0	41.4	33.9	16.5	3.6	1.6	3.0
Eating organic products are more beneficial to my health than conventional products.	43.8	39.3	13.6	1.7	0.8	0.8	27.3	34.6	25.4	4.6	1.9	6.2	35.3	36.9	19.7	3.2	1.4	3.6
Organic products are not easily found in grocery store compared with conventional products.	33.9	27.3	26.0	8.7	3.3	0.8	30.4	33.1	23.5	4.6	1.9	6.5	32.1	30.3	24.7	6.6	2.6	3.8
Organic products do not have a wide range of choices compared with conventional products.	26.9	41.7	20.7	7.0	2.9	0.8	29.2	34.2	21.9	5.0	2.7	6.9	28.1	37.8	21.3	6.0	2.8	4.0
It is lack of availability of organic product information compared with conventional products	36.2	38.1	17.4	8.3	2.5	0.0	33.5	38.4	18.1	2.3	1.5	3.8	34.9	38.2	17.7	5.2	2.0	2.0
Organic products are much more expensive than conventional products.	37.6	39.3	17.8	2.5	2.1	0.8	31.2	32.3	23.5	2.7	0.8	9.6	34.3	35.7	20.7	2.6	1.4	5.4
Price of organic products is a barrier to decision to buy compared with conventional products	16.9	34.7	29.3	10.7	7.0	1.2	32.3	31.2	23.8	4.6	1.9	6.2	24.9	32.9	26.5	7.6	4.4	3.8
Products grown organically are more ecologically sound than grown conventionally.	36.0	40.0	17.8	3.7	0.0	2.5	28.1	34.6	25.0	2.7	0.0	9.6	31.9	37.3	21.5	3.2	0.0	6.2
Products grown organically are obtained from sustainable resources and less polluted discharges into air, water and soil than grown conventionally.	47.1	31.8	17.4	2.1	0.8	0.8	30.8	36.5	23.8	2.0	0.4	6.5	38.6	34.3	20.7	2.0	0.6	3.8

Note: SA= Strongly agree, A= Agree, NAND= Neither agree nor disagree, DA=Disagree, SD= Strongly disagree and DK=Don’t know

B.3 Knowledge of organic and other credence products

Statements	*Purchasers of organic products (n=242)*					*Non-purchasers of organic products (n=260)*					*Total (n=502)*				
	VK	*K*	*SK*	*LK*	*NK*	*VK*	*K*	*SK*	*LK*	*NK*	*VK*	*K*	*SK*	*LK*	*NK*
Orgnaic food	13.6	21.9	52.9	7.4	4.2	3.1	10.8	48.1	20.0	18.0	8.2	16.1	50.4	13.9	11.4
Genetically modified food	2.5	14.9	44.6	23.1	14.9	1.2	6.5	36.2	26.1	30.0	1.8	10.6	40.2	24.7	22.7
Hygienic food	10.3	33.5	44.6	8.7	2.9	6.5	15.0	48.8	16.2	13.5	8.4	23.9	46.8	12.5	8.4

Note: VK= Very knowledgeable, K= Knowledgeable, SK= Somewhat knowledgeable, LK=A little knowledgeable, and NK= Not at all knowledgeable.

B.4 The important of product attributes when purchasing vegetables, rice and meat

Statements	*Purchasers of organic products (n=242)*						*Non-purchasers of organic products (n=260)*						*Total (n=502)*					
	SA	*A*	*NAND*	*DA*	*SDA*	*DK*	*SA*	*A*	*NAND*	*DA*	*SDA*	*DK*	*SA*	*A*	*NAND*	*DA*	*SDA*	*DK*
Vegetable																		
Freshness	75.0	21.0	3.0	0.0	0.0	0.0	72.2	22.0	5.0	0.4	0.4	0.0	73.0	21.0	4.0	0.0	0.0	0.0
Price	24.0	29.0	38.0	4.0	3.0	0.0	32.0	37.0	26.0	3.0	0.0	0.0	28.5	33.8	31.9	4.2	1.6	0.0
Absence of pesticide residues	72.0	20.0	5.0	0.0	0.0	0.0	58.5	28.5	13.0	0.0	0.0	0.0	64.9	25.1	9.8	0.2	0.0	0.0
Produced in an environmentally friendly way	35.6	34.2	26.2	3.6	0.4	0.0	23.8	34.3	34.7	4.3	2.5	0.4	29.1	34.2	30.9	4.0	1.6	0.2
Produced without using genetically modified organisms(GMOs)	29.3	27.6	31.6	6.2	4.9	0.4	19.5	24.9	34.7	9.7	6.1	5.1	23.8	26.0	33.2	8.1	5.6	3.3
Availability	46.7	33.8	16.4	1.3	1.8	0.0	58.6	27.4	10.8	1.8	1.4	0.0	53.2	30.3	13.3	1.6	1.6	0.0
Rice																		
Quality	38.3	37.7	20.4	2.4	1.2	0.0	37.6	37.9	21.5	1.5	0.9	0.6	37.8	37.8	21.2	1.8	1.0	0.4
Price	27.5	36.5	28.7	4.1	3.1	0.0	36.4	34.6	25.4	2.7	0.6	0.3	33.5	35.3	26.5	3.1	1.4	0.2
Absence of pesticide residues	55.1	31.7	12.6	0.6	0.0	0.0	46.0	31.3	18.8	1.5	1.5	0.9	49.0	31.5	16.7	1.2	1.0	0.6
Produced in an environmentally friendly way	33.5	35.3	25.1	4.8	1.3	0.0	22.4	35.2	34.6	4.2	3.0	0.6	26.0	35.3	31.5	4.4	2.4	0.4
Produced without using genetically modified organisms(GMOs)	32.9	27.6	29.9	4.8	4.2	0.6	18.5	25.4	32.8	10.1	8.4	4.8	23.3	26.0	31.9	8.4	7.0	3.4
Availability	43.1	35.9	16.8	3.0	1.2	0.0	50.8	33.1	14.3	0.9	0.6	0.3	48.2	34.1	15.1	1.6	0.8	0.2
Meat																		
Freshness	73.1	23.9	3.0	0.0	0.0	0.0	70.4	22.5	4.8	0.7	0.5	1.1	70.7	22.7	4.6	0.6	0.4	1.0
Price	31.3	34.3	28.4	4.5	1.5	0.0	35.8	38.2	21.6	2.8	0.5	1.1	35.3	37.6	22.5	3.0	0.6	1.0
Absence of pesticide residues	59.7	35.8	3.0	1.5	0.0	0.0	58.3	28.0	11.0	1.1	0.2	1.4	58.3	29.1	10.0	1.2	0.2	1.2
Produced in an environmentally friendly way	38.8	38.8	19.4	1.5	1.5	0.0	27.4	34.5	31.5	3.4	1.8	1.4	28.9	35.0	29.9	3.2	1.8	1.2
Produced without using genetically modified organisms(GMOs)	40.2	34.2	20.9	1.5	3.2	0.0	21.6	21.8	31.7	13.1	6.7	5.1	24.1	23.5	30.2	11.6	6.2	4.4
Availability	43.3	40.3	14.9	1.5	0.0	0.0	50.6	34.5	10.3	2.8	0.7	1.1	49.5	35.3	11.0	2.6	0.6	1.0

Note: SA= Strongly agree, A= Agree, NAND= Neither agree nor disagree, DA=Disagree, SD= Strongly disagree and DK=Don’t know

Appendix C

Factor Analysis

C.1 Correlation Matrix of consumers' general attitudes

	I exercise regularly	*I well balance work and family/life.*	*I often eat healthy food.*	*I often read/check quality label before buying a new food products.*	*I avoid buying food with artificial additives and preservatives.*	*I believe that pesticide residues/ in food cause cancer and other diseases.*	*I believe that the use of growth/red meat stimulants in livestock production is harmful to human.*
I exercise regularly	1.000	.353	.336	.198	.294	.184	.138
I well balance work and family/life.		1.000	.345	.245	.205	.249	.170
I often eat healthy food.			1.000	.422	.432	.217	.156
I often read/check quality label before buying a new food products.				1.000	.370	.253	.171
I avoid buying food with artificial additives and preservatives.					1.000	.423	.311
I believe that pesticide residues/ in food cause cancer and other diseases.						1.000	.633
I believe that the use of growth/red meat stimulants in livestock production is harmful to human.							1.000
I certainly buy 'animal welfare friendly' food products if they are available.							
I certainly believe that genetically modified foods are reasonably not safe for human consumption.							
I like to buy product prepared in an environmentally friendly way.							
I believe that pesticide and herbicide residues on farms would cause negative effect on the environment.							
I separate the rabbis that can re-use and put in recycle bin.							
I use reusable bag when I shop.							

C.1 Correlation Matrix of consumers' general attitudes (continued)

	I certainly buy 'animal welfare friendly' food products if they are available.	*I certainly believe that genetically modified foods are reasonably not safe for human consumption.*	*I like to buy product prepared in an environmentall y friendly way.*	*I believe that pesticide and herbicide residues on farms would cause negative effect on the environment.*	*I separate the rabbis that can re-use and put in recycle bin.*	*I use reusable bag when I shop.*
I exercise regularly	.205	.050	.250	.168	.233	.252
I well balance work and family/life.	.201	.047	.179	.116	.252	.211
I often eat healthy food.	.146	.040	.272	.139	.259	.291
I often read/check quality label before buying a new food products.	.198	.107	.215	.187	.239	.206
I avoid buying food with artificial additives and preservatives.	.214	.077	.339	.282	.291	.249
I believe that pesticide residues/ in food cause cancer and other diseases.	.265	-.004	.294	.367	.301	.173
I believe that the use of growth/red meat stimulants in livestock production is harmful to human.	.279	.070	.292	.388	.186	.159
I certainly buy 'animal welfare friendly' food products if they are available.	1.000	.222	.252	.135	.222	.152
I certainly believe that genetically modified foods are reasonably not safe for human consumption.		1.000	.044	.064	.054	-.018
I like to buy product prepared in an environmentally friendly way.			1.000	.452	.480	.458
I believe that pesticide and herbicide residues on farms would cause negative effect on the environment.				1.000	.472	.370
I separate the rabbis that can re-use and put in recycle bin.					1.000	.566
I use reusable bag when I shop.						1.000

C.2 Correlation Matrix of consumers' perception

	organic products are tastier than conventional products	*organic products have more nutrients than conventional products*	*organic products are less chemical residue than conventional products*	*eating organic products are more beneficial to my health than conventional products*	*organic products are not easily found in grocery stores*	*organic products do not have a wide range of choices*	*it is lack of availability of organic product information*
organic products are tastier than conventional products	1.000	.479	.254	.328	.103	.042	.059
Organic products have more nutrients than conventional products (e.g. vitamins/minerals)		1.000	.332	.413	.148	.132	.058
Organic products are less chemical residue than conventional products			1.000	.452	.119	.108	.021
Eating organic products are more beneficial to my health than conventional products				1.000	.258	.234	.082
Organic products are not easily found in grocery stores					1.000	.634	.371
Organic products do not have a wide range of choices						1.000	.473
It is lack of availability of organic product information							1.000
Organic products are much more expensive than conventional products							
Products grown organically are more ecologically sound than grown conventionally.							
Products grown organically are obtained from sustainable resources and less polluted discharges into air, water and soil than grown conventionally.							

C.2 Correlation Matrix of consumers' perception (continued)

	it is lack of availability of organic product information	*organic products are much more expensive than conventional products*	*products grown organically are ecologically sound*	*organic products are obtained from sustainable resources and reducing polluted discharges into air, water and soil*
organic products are tastier than conventional products	.059	-.007	.094	.143
Organic products have more nutrients than conventional products (e.g. vitamins/minerals)	.058	.003	.120	.177
Organic products are less chemical residue than conventional products	.021	.054	.202	.228
Eating organic products are more beneficial to my health than conventional products	.082	.101	.254	.314
Organic products are not easily found in grocery stores	.371	.252	.321	.271
Organic products do not have a wide range of choices	.473	.377	.308	.199
It is lack of availability of organic product information	1.000	.270	.088	.078
Organic products are much more expensive than conventional products		1.000	.225	.157
Products grown organically are more ecologically sound than grown conventionally.			1.000	.605
Products grown organically are obtained from sustainable resources and less polluted discharges into air, water and soil than grown conventionally.				1.000

Appendix D

Logistic Regression

D.1 Correlation matrix and collinearity diagnostics

		Health	*Fsafety*	*Environ*	*Ethics*	*QbenefN2*	*AIPrice*	*Ebenefit*	*NStore*	*Vegetarian*	*DineOut*	*K_OR*
HEALTH	Pearson Correlation	1	.366(**)	.444(**)	.229(**)	.308(**)	.053	.221(**)	.189(**)	.159(**)	-.093(*)	.125(**)
	Sig. (2-tailed)		.000	.000	.000	.000	.240	.000	.000	.000	.036	.005
FSAFETY	Pearson Correlation		1	.370(**)	.196(**)	.166(**)	.024	.348(**)	.077	.089(*)	.001	.056
	Sig. (2-tailed)			.000	.000	.000	.588	.000	.083	.046	.990	.206
ENVIRON	Pearson Correlation			1	.169(**)	.227(**)	.050	.318(**)	.087	.064	.027	.043
	Sig. (2-tailed)				.000	.000	.269	.000	.052	.153	.543	.339
ETHICS	Pearson Correlation				1	.156(**)	-.012	.169(**)	.239(**)	.098(*)	.015	.091(*)
	Sig. (2-tailed)					.001	.796	.000	.000	.029	.735	.043
QBENEFN2	Pearson Correlation					1	.184(**)	.292(**)	.180(**)	.102(*)	-.100(*)	.142(**)
	Sig. (2-tailed)						.000	.000	.000	.024	.027	.002
AIPRICE	Pearson Correlation						1	.286(**)	-.051	-.077	.060	.040
	Sig. (2-tailed)							.000	.261	.088	.185	.371
EBENEFIT	Pearson Correlation							1	-.013	.077	.093(*)	.067
	Sig. (2-tailed)								.769	.089	.040	.140
NSTORE	Pearson Correlation								1	.104(*)	-.082	.170(**)
	Sig. (2-tailed)									.019	.066	.000
VEGETARI	Pearson Correlation									1	-.021	.119(**)
	Sig. (2-tailed)										.642	.007
DINEOUT	Pearson Correlation										1	-.024
	Sig. (2-tailed)											.589
K_OR	Pearson Correlation											1
	Sig. (2-tailed)											

** Correlation is significant at the 1per cent level (2-tailed).

* Correlation is significant at the 5 per cent level (2-tailed).

D.1 Correlation matrix and collinearity diagnostics (continued)

		female	*highedu*	*Wcollar*	*Married*	*Children*	*Midage*	*Elderly*	*Inc30_60*	*Inc60over*	*City*
HEALTH	Pearson Correlation	-.040	-.018	.005	.225(**)	.097(*)	.187(**)	.113(*)	-.058	.138(**)	.026
	Sig. (2-tailed)	.374	.695	.911	.000	.030	.000	.011	.196	.002	.565
FSAFETY	Pearson Correlation	.015	.113(*)	.105(*)	.045	.093(*)	.082	-.023	-.024	.134(**)	.063
	Sig. (2-tailed)	.732	.011	.019	.313	.036	.067	.613	.599	.003	.161
ENVIRON	Pearson Correlation	.048	.065	.139(**)	.080	.089(*)	.032	-.014	-.020	.014	-.015
	Sig. (2-tailed)	.283	.144	.002	.074	.047	.469	.748	.647	.746	.743
ETHICS	Pearson Correlation	-.025	.083	.044	.094(*)	.053	.055	-.035	-.024	.049	-.023
	Sig. (2-tailed)	.574	.064	.323	.035	.238	.220	.430	.595	.277	.606
QBENEFN2	Pearson Correlation	.032	-.022	-.011	.102(*)	.036	.051	.029	.033	.075	.102(*)
	Sig. (2-tailed)	.485	.628	.809	.024	.422	.258	.521	.463	.096	.023
AIPRICE	Pearson Correlation	-.077	-.041	.072	.007	.022	-.003	-.024	.105(*)	-.029	.002
	Sig. (2-tailed)	.087	.364	.111	.877	.628	.947	.596	.020	.517	.964
EBENEFIT	Pearson Correlation	-.078	-.023	.056	.096(*)	.127(**)	.000	.006	-.001	.070	.007
	Sig. (2-tailed)	.084	.613	.219	.034	.005	.998	.887	.984	.120	.869
NSTORE	Pearson Correlation	.055	.040	-.063	.131(**)	-.041	.050	.184(**)	-.054	.167(**)	.134(**)
	Sig. (2-tailed)	.221	.367	.157	.003	.362	.263	.000	.229	.000	.003
VEGETARI	Pearson Correlation	-.020	.073	-.019	.007	-.010	.097(*)	.004	-.046	.135(**)	.059
	Sig. (2-tailed)	.649	.105	.664	.877	.821	.030	.932	.303	.002	.187
DINEOUT	Pearson Correlation	-.060	.066	.143(**)	-.083	-.067	-.027	-.137(**)	-.051	.035	-.054
	Sig. (2-tailed)	.178	.140	.001	.062	.133	.543	.002	.254	.434	.225
K_OR	Pearson Correlation	.009	.108(*)	-.017	.162(**)	-.027	-.003	.122(**)	-.089(*)	.157(**)	.107(*)
	Sig. (2-tailed)	.847	.015	.710	.000	.542	.952	.006	.046	.000	.017

** Correlation is significant at the 1 per cent level (2-tailed).

* Correlation is significant at the 5 per cent level (2-tailed).

D.1 Correlation matrix and collinearity diagnostics (continued)

		female	*highedu*	*Wcollar*	*Married*	*Children*	*Midage*	*Elderly*	*Inc30_60*	*Inc60over*	*City*
FEMALE	Pearson Correlation	1	-.001	-.103(*)	-.088(*)	-.032	-.007	-.024	.010	-.084	-.062
	Sig. (2-tailed)		.975	.020	.049	.472	.884	.599	.820	.059	.166
HIGHEDU	Pearson Correlation		1	.200(**)	.018	-.100(*)	-.071	-.084	.042	.160(**)	.094(*)
	Sig. (2-tailed)			.000	.690	.025	.114	.060	.347	.000	.035
WCOLLAR	Pearson Correlation			1	-.110(*)	.056	.081	-.311(**)	-.041	.085	.001
	Sig. (2-tailed)				.014	.208	.069	.000	.357	.057	.986
MARRIED	Pearson Correlation				1	.341(**)	.321(**)	.135(**)	.100(*)	.187(**)	.052
	Sig. (2-tailed)					.000	.000	.002	.025	.000	.244
CHILDREN	Pearson Correlation					1	.327(**)	-.100(*)	.163(**)	.023	-.138(**)
	Sig. (2-tailed)						.000	.024	.000	.603	.002
MIDAGE	Pearson Correlation						1	-.375(**)	.051	.124(**)	-.013
	Sig. (2-tailed)							.000	.255	.005	.771
ELDERLY	Pearson Correlation							1	-.075	.144(**)	.138(**)
	Sig. (2-tailed)								.095	.001	.002
LOWINC	Pearson Correlation								1	-.597(**)	-.074
	Sig. (2-tailed)									.000	.097
HIGHINC	Pearson Correlation									1	.140(**)
	Sig. (2-tailed)										.002
CITY	Pearson Correlation										1
	Sig. (2-tailed)										

** Correlation is significant at the 1 per cent level (2-tailed).

* Correlation is significant at the 5 per cent level (2-tailed).

D.2 Collinearity Diagnostics for independent variables in the estimated models

Variables	*Collinearity Statistics*	
	Tolerance	*VIF*
(Constant)		
HEALTH	0.624	1.602
FSAFETY	0.721	1.387
ETHICS	0.685	1.459
ENVIRON	0.856	1.168
QBENEFN2	0.783	1.277
AIPRICE	0.859	1.163
EBENEFIT	0.697	1.435
NSTORE	0.823	1.216
VEGETARI	0.917	1.090
DINEOUT	0.919	1.088
K_OR	0.897	1.115
FEMALE	0.938	1.067
HIGHEDU	0.823	1.215
WCOLLAR	0.806	1.241
MARRIED	0.674	1.484
CHILDREN	0.755	1.325
MIDAGE	0.617	1.621
ELDERLY	0.629	1.590
LOWINC	0.534	1.874
HIGHINC	0.482	2.075
CITY	0.907	1.103

a Dependent Variable: Have you bought any organic products during last year