

Factors Affecting Consumers' Decision to Purchase Vietgap Vegetables in Hanoi, Vietnam

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Abstract

This paper aims to investigate factors affecting Hanoi consumers' decision to purchase VietGAP vegetables as well as to analyze Hanoi consumers' willingness to pay (WTP) for different attributes of VietGAP vegetables. The choice experiment method was employed with four attributes including availability, quality certification label, traceability information, and premium price. Data were gathered from 300 shoppers in five supermarkets and six vegetable stores around center of Hanoi city. Econometric analysis was conducted by using conditional logit model. Overall, the findings reveal that almost consumers perceived that VietGAP vegetables have good health benefits. Notably, consumers prefer VietGAP vegetables that are sold in supermarket system, organic label certified by Non-Government Organizations (NGOs), added more traceability information covering farming, distribution and processing, and circulation and marketing, as well as suitable price. The WTP is highest for organic certification label certified by NGOs attribute and lowest for VietGAP vegetables without label. These findings have market sector as well as policy implication in expanding the supply chains of VietGAP vegetables that it is necessary of horizontal and vertical coordination, and participating of NGOs in standardized certification process as well as it should establish official sanction mechanisms in case of non-compliance.

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Keywords— Consumers' decision, Purchase, VietGAP, Vegetables.

Introduction

In Vietnam, food safety has started to be one of the most concern and priority issues since 1990s (Sarter *et al.*, 2012) because of more and more farmers have been applying excessive amounts of chemical fertilizers and the overuse of dangerous pesticides in their production practices in order to increase yields. This is especially true for vegetable crops (Simmons and Scott, 2007). Despite this, the data of food poisoning cases in Vietnam has not decreased during period from 2000 to 2010, and total number of outbreaks was over 2000, in which 60.6 thousand people were infected and 583 were died (Sarter *et al.*, 2012). The direct and indirect exposure to pesticide also caused chronic pesticide poisonings have an effect on 2 million Vietnamese farmers (Oanh, 2005). Additionally, the annual costs of pesticide-related domestic human health and of lost export opportunities for vegetables and fruits in Vietnam was estimated at US\$700 millions (World Bank, 2006). It is a huge amount of loss for a developing country like Vietnam.

Vegetable is the second most important foodstuff consumed in Vietnam after rice, with almost 6 millions ton per annum (Moustier and Figuié, 2003; Chen, 2007), but amount pesticides use per hectare in the production of vegetables is the highest level among crops (Anh, 2002; Hoi *et al.*, 2009b). A report of Inspections Authority revealed that vegetables are contaminated with a high quantity of pesticides (including banned pesticides), nitrates and heavy metals (Hoang and Nakayasu, 2006). These problems lead to consumers the most reasons for consider the health risk they present. A survey of 200 households in Hanoi in 2002, around 90% of respondents strongly agreed that vegetables are the most implicit hazard food; following items are meat (69,5%), fruits (46%) and aquatic (37%) (Figuié, 2003). Moreover, research by Thuan *et al.* (2010) claimed that the microbiological pollution, toxic chemicals, heavy metals and pesticide residues on vegetables have caused serious impacts on public health in the immediate future and long term.

To cope with these problems, Vietnamese Government has implemented "safe vegetables" program since 1995 (Mergenthaler *et al.*, 2009). Subsequently, the Ministry of Agriculture and Rural Development (MARD) issued the "Temporary Regulation for the Production of Safe Vegetables" (Decision 67/1998/QĐ-BNN-KHCN) in 1998 (These temporary regulations have subsequently been finalized and were released in January 2007 as the "Regulation for the Management and Certification of Safe Vegetable Production"). Lastly, the Decision 379/2008/QĐ-BNN-KHCN was

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promulgated by MARD to establish Vietnamese Good Agricultural Practices (VietGAP) as the main standard and guidelines for safe fruit and vegetable production. VietGAP is a voluntary application process, which is aimed to prevent or minimize the potential hazards of chemical, biology and physics that could occur during production, harvesting and post-harvest handling of fruit and vegetables (MARD, 2008). Within the program, products were sent to market through specialized supply chains in a limited number of VietGAP vegetables shops and supermarkets.

Moreover, in cooperation with local authorities, the “VietGAP vegetable” label is promoted through annual fairs for farmers and through advertising programs for retailers and consumers (Mergenthaler et al., 2009). However, after initial external controls and issuance of certificates, quality controls are mostly organized in an internal participation within cooperatives without external authentication. For instance, giving the “VietGAP vegetable” label is not verified by a standardized certification process, and no official sanction mechanisms is provided in case of non-compliance (Moustier et al., 2005). Furthermore, the lack of standard enforcement mechanisms leads to the asymmetric information and distrust between producers and consumers. As a result, after more than 10 years of major efforts and investments by state authorities and market actors, VietGAP vegetable distribution system has not been able to take a significant share of the vegetable market and gain widespread consumer trust yet (Hoi et al., 2009a). Potential growth of “VietGAP vegetables” from the described supply chains are severely hampered under the consumers’ high demand for safe foods (Hoang and Nakayasu, 2006).

Hanoi was chosen as a pilot for “Safe Vegetables” program for its majority market of vegetable consumption in Vietnam. According to the data is provided by MARD (2015), the demand for green vegetables in Hanoi is 950.000 ton/year. However, the proportion of safe vegetables were sold less than 5% of household consumption and less than 2% of production (Moustier and Figuié, 2003). This raises to some questions are why the proportion of VietGAP vegetable consumption is still low in Hanoi? What factors affect consumers purchase or non-purchase? What are the main obstacles that consumers faced with purchasing VietGAP vegetables? And how to promote consumers to purchase VietGAP vegetables? To answer these questions, it is necessary to carry out one research in order to explore what are the factors controlling consumers to purchase or restraining non-purchase VietGAP vegetables for their consumption. Up to now, there are few well studies or documents on these aspects in Vietnam, especially rare in Hanoi city. Hence, the purpose of this research is to investigate the factors affecting Hanoi consumers’ decision to purchase as well as to analyze their WTP for different attributes of VietGAP vegetables. These determinants are essential, not only for meeting the increasing demands of consumers, orienting for VietGAP vegetable producers in providing their products in the markets, but also useful for policy makers promote the future development of the demand for VietGAP vegetables in Vietnam.

Literature Review

There are some theories attempt to explain the consumer decision-making process. Concerns the theoretical framework which used to study safe food consumption, many studies used attitude-behaviour models like the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). The central factor in these theories is the individual’s intention to perform a given behaviour and these theories have therefore been utilized in many consumer studies, especially in the area of food choice (Tarkiainen and Sundqvist, 2005; Chen, 2007). Besides, one of many consumer decision process models that have been developed to emphasis on how consumers make a purchase decisions for goods and services was mentioned in Alvesleben (1997). This book provided a general model of food consumer behaviour which claimed that product information, product perception and attitudes are the forces driving consumer behaviour. Moreover, Bigné (1997) also built a conceptual model where independent variables such as consumers’ socio-demographic characteristics and lifestyles and dependent variables including the level of knowledge and environmental attitudes induced consumers’ behaviour. Additionally, the Engel-Blackwell-Minimal model (EBM) in (Blackwell *et al.*, 2006) showed the process of consumer decision which encompassed seven stages: 1)

Consumers’ needs or problems; 2) searching for information; 3) pre-purchase evaluation of alternatives; 4) Purchase; 5) Consumption; 6) Post-consumption evaluation; and 7) Divestment. Likewise, Hawkins and Mothersbaugh (2010) also believed that the consumer decision process indicates a map of consumers’ minds, which is composed of a sequence of activities: problem recognition, information search, brand appreciation and selection, store choice, purchase, and post purchase processes. It means that the term consumer decision conveys a picture of an individual carefully assessing the characteristics of goods, trademarks, or services and rationally choosing the one that meet the identified need for the least cost. By understanding the consumer decision-making road map, marketers enable to explore why people are or are not buying products and what can be done to get them to buy more. Thus, almost theories show that consumers’ purchasing decision towards safe products is a process which driven by the perceived desirable attributes of the products basing on the consumers’ knowledge, attitude of the safe term.

There have been some researches that have provided empirical evidences on the most important motivation in purchasing safe products (Huang, 1996; Ara, 2003; Hoang and Nakayasu, 2006; Onozaka *et al.*, 2006; Gracia and Magistris, 2007; Dickieson *et al.*, 2009; Yue and Tong, 2009; Sriwaranun, 2011; Chikkamath *et al.*, 2012; Huong, 2012; Sporleder *et al.*, 2014). However, different models and determinants are used because food choice is a complex phenomenon that represents one of the most important parts of human behaviour (Magistris and Gracia, 2008). Especially, the study of safe food purchasing behaviour is difficult because of the purchase decision depends on many

factors that are not only vary sharply across individuals but also depend on consumers' attitudes toward the unobservable safe foods characteristics.

Based on previous studies, the factors affecting consumers' decision to purchase safe foods can be divided into three groups. Firstly, product-related attributes concerned with the physical aspects of the foods as well as nutrient content and functional aspects of the product. The second group contains consumer-related, physiological effects and psychological factors while the third group contains external social and economic factors. This study is an emphasis on the first group due to it is appropriate to the situation of VietGAP vegetables in Hanoi.

Furthermore, numerous studies have measured consumers' preferences and willingness to pay for safe foods with attribute-based method. Overall, price, appearances, label, brand, packaging, availability, quality, traceability, and environmental friendly are some of the crucial criteria consumers use to specify which product is more attractive. Cicia *et al.* (2002), Hearne and Volcan (2002) Ara (2003), Yue and Tong (2009), Huong (2012), Sporleder *et al.*

(2014), and Wu *et al.* (2015) for instances, used different approaches to examine consumers' choice relevant price attribute. In most of these studies, price is considered to be the main driving force for consumers' decision to purchase safe products. It is, inversely, Abdullahi Farah *et al.* (2011) confirmed that there is no significant influence of price on

Malaysian consumers' decision to purchase Basmati rice. Some other literature has been devoted to consumers' preference of appearances, brand, packaging, and the role of traceability information on consumers' decision to purchase (Loureiro and Umberger, 2007; Bonilla, 2010; Wu *et al.*, 2015). Moreover, certification label is important attribute of products that is "a means to provide information to the consumer by assuring producer compliance with established standards" (Hearne and Volcan, 2002). Wu *et al.* (2015) also recognized that labels concerning credence characteristics of food, such as quality and safety information; and quality certification, help "bridge the information gap" between marketers and consumers due to asymmetric information. In addition, traceability is also a significant attribute influence consumers' decision to purchase products because consumers doubt whether traceable foods are really safe or not (Wu *et al.*, 2015). On the other hand, there are some socio-economic factors that also significantly affected the consumers' decision to use safe foods like income, education, occupation, age, family size and the number of presence children in a family (Hoang and Nakayasu, 2006). Besides, Posri *et al.* (2006) revealed that inadequate availability, rather than lack of demand is the constraining factor to consumer's WTP for vegetables in the Northeast Thailand. There is an increase in WTP of consumers when they have more income, age, and supermarket sourcing of vegetables.

Methodology

Measuring Consumers' Preferences Using Choice Modeling

A choice modeling framework is employed in our study in order to explore Hanoi consumers' preferences for various attributes of VietGAP vegetables. This experiment is based on Lancasterian model, (Lancaster, 1966), which initiated the consumer choice theory by introducing the idea that each commodity in the choice set involves a group of attributes or characteristics, and Random Utility Theory. Following Lancaster, consumer typically makes a decision amongst products, having compared the characteristics of other products, and opts for products that possess the combination of attributes that maximizes their utility. Thus, consumers' preferences for goods are not direct from goods themselves, they are derived from the attributes of the goods. The consumer's utility of choice can be represented as function:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

Where U_{ij} is consumer i 's utility of choosing a choice j , V_{ij} is the deterministic element or the observable element of utility, and ε_{ij} is the unobserved component of utility which are assumed to be Independently and Identically Distributed (IID).

It can be seen that (i) choice experiment has been widely employed to explore consumers' preferences for multi-attribute products, especially non-monetary attributes; and (ii) the conditional logit, multinomial logit, and nested logit models are the most popular tools employed to analyze discrete variables (Bonilla, 2010). The conditional logit model and the multinomial logit model are quite similar. However, the multinomial logit model uses individual-specific independent variables, while conditional logit model emphasis on the alternative-specific attributes of each choice and uses them as independent variables. Besides, there is one model called mixed logit model which is an approach to capturing the heterogeneity in the decision making of consumers. Unlike conditional logit model, mixed logit model as well as random parameters logit do not obey the independence of irrelevance alternatives (IIA) assumption, where the latter concerns unconditional and unobserved heterogeneity in preferences of respondents (Goibov *et al.*, 2012). However, Train (2003) stated that an assumption related to the distribution of the random parameters should be made while estimating random parameters logit. Thus, if researches aim to relax the IIA assumption and further examine the sources of heterogeneity among respondents, mixed logit model and random parameters logit will be estimated.

In our study, we consider the consumers' decision for purchasing VietGAP vegetables, assuming that the utility consumers derive from one or another vegetable within a particular choice set consists of all attributes related to these options, that why we choose conditional logit model. Moreover, two important assumptions in conditional logit model are that (i) every respondent in the population has identical preference structure, this mean that the coefficients of the variables in the models to be the same for all respondents; and (ii) choice set selections must obey the independence of irrelevant alternatives (IIA). It means that the introduction or removal of an alternative has no impact on the probabilities that two alternatives are chosen. We assume a linear indirect utility function, which can be estimated with a conditional logit model and generally estimated as:

$$V_{ij} = X_{ij}\beta = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \dots + \beta_nX_n + \beta_mP \quad (2)$$

Where X_{ij} is vector of the attributes of j^{th} alternative which is chosen by consumer i^{th} ; and β is vector of coefficients to be estimated. And computation the marginal WTP for attribute j is:

$$WTP_j = - \frac{\beta_j}{\beta_m} \quad (3)$$

Where $\beta_{\text{attribute}}$ coefficient is relevant to the attribute of interest; β_m is coefficient of price (P). Each of these ratios is understood to be a price change associated with a unit increase in a given attribute (Loureiro and Umberger, 2007)

Sample Description and Research Design

The empirical data was collected in face-to-face interviews from the respondents by a questionnaire which was organized in three parts. After some questions about the respondents' lifestyle and shopping behaviour for household, the consumers would be asked some general information related to socio-economic characteristics. In the second section, we made an effort to gather information regarding consumers' perception toward VietGAP vegetables. Likert scale questions will be utilized to investigate perception score of consumers in a five point scale form from strongly disagree to strongly agree. Final part was devoted to the discrete choice experiment (DCE).

The survey was conducted at five big supermarkets (Big C, Savico Megamall, Co.op Mart, Fivimart, Metro) and six vegetable stores (Hapro Food, Rau Sach Lien Thao, Rau Bac Tom, Rau Sach Song Hong, Nong San Ngon, Thuc Pham Sach Bac Tom) around Hanoi centre which are chosen by a random selection of zones on a map. A total of 300 consumers have been chosen randomly for conduct the survey in September and October 2015. They are primary food shoppers responsible for household purchases in the metropolitan Hanoi city. They are not only consumers who have ever bought VietGAP vegetables for the last three years but also consumers who have never bought VietGAP vegetables before. There are around 10% of respondents are investigated through in-depth interviews and almost interviews left were lasted between 20 and 25 minutes with questionnaire. As a result, the 68% of respondents are in the age group of 25 to 40 years old; 85% of the test persons are female, 15% are male, and 74.3% of them have children under the age of 18 years old living in their household. It is also observed that the average household size for the respondents is less than five people (4.19 people). The education level is quite high, 77.33% of the sample completed graduate degree, only 6.7% of respondents in the group of high school or less. In addition, there are 58% and 42% of the respondents who are purchasers and non-purchasers of VietGAP vegetables respectively, and almost of them (42.67%) in the group of household income from 10 million to 20 million VND per month (around 454.5 – 909 USD per month in September 2015). In comparison to the population statistics, the random sample of our study shows on higher age group, a higher percentage of female, suitable household size, a higher level of education, and a higher household income.

Moreover, leafy vegetable types contribute about one-half of the total quantities of vegetable groups consumed daily of consumers in Hanoi city (Chen, 2007). In this study, we will focus on two representative leaf vegetables, namely, leaf mustard and choysum to analysis due to importance of consumed quantities and popularity to Hanoi people at survey period time (from September to November). Additionally, they are one of the first kinds of vegetables which were awarded the VietGAP certification by Fruit and Vegetable Research Institute in 2009 (Thuan et al., 2010). They are bought and consumed regularly by most Hanoi consumers (Figuié, 2003) and which consumers express the highest safety concerns due to overused pesticides. Furthermore, these vegetables can substitute each other because of their stable and similar price, a similar taste, size as well as the same usage.

Choice Experiment Design

In this study, DCE is used due to the well suitability for research on preferences for products which are not on the market yet (Bateman et al., 2002). Four main attributes of vegetables were employed that could most impact on consumers' decision to purchase VietGAP vegetables. These attributes and their levels were selected based on the result of discussions with experts as well as the results of pretest from focus group discussions conducted in June

2015. Specifically, a number of stakeholders, consumers were chosen by random customers entering the produce sections of the supermarkets and stores to discuss which attributes they actually want to buy vegetables, how they can be, and how much they willing to pay for adding new attributes. Additionally, we combine with the debate over the results obtained from several previous consumer researches regarding the attributes preferred by vegetable eaters and their WTP for these attributes (Ara, 2003; Onozaka *et al.*, 2006; Yue and Tong, 2009; Bonilla, 2010; Huong, 2012; Mac, 2014; Sporleder *et al.*, 2014; Wu *et al.*, 2015). The descriptions of the attributes and their levels are shown in Table 1.

Table 1:
Attributes and Their Levels

	Status quo	Level 1	Level 2	Level 3
1. Availability (AVA)	Fresh markets	Stores	Supermarkets	-
2. Certification label (LAB)	Without label	VietGAP without label	VietGAP certified by Government	Organic label is certified by NGOs
3. Traceability information (TRACE)	Untraceable	Traceability information covering farming	Traceability information covering farming, distribution and processing	Traceability information covering farming, distribution and processing, circulation and marketing
4. Premium price ¹ (PRICE)	10.000 VND/kg	13.000 VND/kg	17.000 VND/kg	22.000 VND/kg

Note: ¹The exchange rate was rounded at 22.000VND for one USD during September - October 2015

Firstly, availability is one of the obstacles obstructing consumers in the approach of VietGAP vegetables due to specialized supply chains in a limited number of "VietGAP vegetables" shops and supermarkets. Secondly, certification label is considered because Vietnam has not had the common label for VietGAP vegetables. There are too many labels on the market; consumers are uncertain whether more labels on vegetables indicate a healthy and safely produced vegetable. Each of the organizations as well as each food product has its own label even some of them are without control from the Government. Consumers are uncertain which label can be trusted leads to the asymmetric information and distrust between producers and consumers. In this study, VietGAP certification is certified by government organizations along with criteria which based on Global GAP and ASEANGAP standards while Organic certification is certified by NGOs organizations which adopted Participatory Guarantee Systems (PGS) organic standards which drafted by the PGS Coordination Committee in line with International Foundation for Organic Agriculture Movements (IFOAM) basic standards. A difference approach between organic certification and other certification is that the direct participation of farmers and consumers in the certification process is encouraged or even require by PGS. Thirdly, consumers express their strongly concern about the origin of vegetables because no one guarantees that non-standard vegetables cannot infiltrate into VietGAP or organic ones in the process of harvesting, processing, distributing, and marketing. Finally, premium price is identified to imply the marginal value of different attribute levels of products. The scales of premium price are defined through the result of pretest in June, 2015. Moreover, the *status quo* in the study was indicated by an ordinary vegetable in fresh market, without traceability as well as certification being sold at market price which respondents purchase regularly.

After defining the key attributes and their levels, a full factorial design encompasses all alternatives that can be created from the combinations of these attribute levels. A total of 192 vegetable profiles can be gained according to the setting in Table 1. However, there are only 16 manageable possible choice sets in these orthogonal designs which were divided randomly into two questionnaires with four sets apiece. Hence, the conditional logit model was evaluated by using 1,200 answered choice sets. The respondents were presented two alternatives versus the *status quo* and asked to select the most preferred one. By observing their decision to choose the most preferred alternative among three choice sets in each card, we can explore their preferences.

Empirical Model and Variables

The empirical model of the indirect utility levels fundamental to the conditional logit at the attributes of each choice was formulated as equation:

$$V_{ij} = \beta_1AVA_1 + \beta_2AVA_2 + \beta_3LAB_1 + \beta_4LAB_2 + \beta_5LAB_3 + \beta_6TRACE_1 + \beta_7TRACE_2 + \beta_8TRACE_3 + \beta_9PRICE$$

(4)

Where V_{ij} is the observable utility level that consumer i^{th} gets from choosing the j^{th} vegetable characteristics. These parameters are estimated by Maximum Likelihood Techniques. The description of variables used in equation (4) is represented in the Table 2.

Table 2:
Description of variables included in the conditional logit model

Variables	Symbol	Description	Expected sign
Availability	AVA1	0 if vegetables are available in the fresh market; 1 if vegetables are available in stores	+
	AVA2	0 if vegetables are available in the fresh market; 1 if vegetables are available in supermarkets	+
Certification Label	LAB1	0 if without label; 1 if VietGAP without label	±
	LAB2	0 if without label; 1 if VietGAP label is certified by Government	+
	LAB3	0 if without label; 1 if organic label is certified by NGOs	+
Traceability	TRACE1	0 if untraceable; 1 if traceability information covering farming	+
	TRACE2	0 if untraceable; 1 if traceability information covering farming, and distribution and processing	+
	TRACE3	0 if untraceable; 1 if traceability information covering farming, distribution and processing, and circulation and marketing	+
Premium Price	PRICE	Premium Price compare to current price in the market	-

Results

Consumers' Perception of Vietgap Vegetables

In order to gain insight into the consumers' perception, by using a 1 to 5 Likert scale with 1 indicating strongly disagree and 5 indicating strongly agree. The respondents were asked to reveal their agreement or disagreement with VietGAP vegetable attributes. The frequency of responses is listed in Table 3.

Table 3:
Hanoi Consumers' Perception of Vietgap Vegetables

Statements (agreement in %)	1	2	3	4	5	Mean (μ) Standard deviation (σ)
VietGAP vegetables are tastier than conventional ones	5.00	16.00	44.67	29.67	4.66	$\mu = 3.130$ $\sigma = 0.82643$
VietGAP vegetables have better appearance than conventional ones	3.33	13.67	46.00	31.00	6.00	$\mu = 3.2267$ $\sigma = 0.83578$
VietGAP vegetables were produced where synthetic fertilizers, pesticides residue do not exceed the maximum residue limits (MRLs)	2.00	1.33	25.67	52.33	18.67	$\mu = 3.84333$ $\sigma = 0.65212$
VietGAP vegetables can prevent health risks better than conventional ones	2.33	1.33	26.67	54.00	15.67	$\mu = 3.79333$ $\sigma = 0.64396$
VietGAP vegetables are healthier than conventional ones	2.33	2.00	22.00	57.67	16.00	$\mu = 3.830$ $\sigma = 0.6411$
VietGAP vegetables are not diverse and abundant	2.33	11.33	28.00	52.00	6.33	$\mu = 3.4867$ $\sigma = 0.74315$
VietGAP farming is good for the environment	3.00	2.33	21.67	51.67	21.33	$\mu = 3.86$ $\sigma = 0.77373$
VietGAP vegetables are much more expensive than conventional ones	3.00	2.67	26.67	53.33	14.33	$\mu = 3.7333$ $\sigma = 0.71556$

Source: Calculated from field survey data, 2015

A majority of respondents perceived that VietGAP vegetables have more health benefits than conventional vegetables. There are 71% of respondents agreed that „VietGAP vegetables were produced where synthetic fertilizers, pesticides residue do not exceed the maximum residue limits (MRLs)“. Similarly, „VietGAP vegetables can prevent health risks better than conventional ones“ is also agreed by 69.67% of respondents and around 73% of respondents agreed that „VietGAP vegetables are healthier than conventional vegetables. However, the taste and appearance of VietGAP vegetables are not very pronounced; 44.67% and 46% of the respondents are neutral with these statements

respectively. They were not sure how taste of VietGAP vegetables are and how deference of appearance they are to compare with conventional vegetables because these type of vegetables are really difficult for them to distinguish. Regarding the availability of VietGAP vegetables, almost of the respondents (58.33%) said that there is a lack of information and lack of diversity of types of VietGAP vegetables are main constraints for them to purchase. Additionally, 73% of the respondents claimed that VietGAP farming is good for the environment than conventional ones. Moreover, the respondents are also extremely price oriented; 67.66% of them stated that VietGAP vegetables are much more expensive than conventional ones and almost of these respondents agreed that it is barrier for them to buy VietGAP vegetables.

Factors Affecting Consumers' Decision to Purchase and WTP for Vietgap Vegetables

Using the 1,200 choice sets elicited from 300 consumers, the estimated conditional logit model, result is the empirical specification of equation (4) which is reported in Table 4.

Table 4:
Discrete choice conditional logit results

Variable name	Coef.	Std. Err.	z	P > z	[95% Conf. Interval]	
AVA1	0.2026649*	0.1045366	1.94	0.053	-0.002223	0.407552
AVA2	0.9203999***	0.1301586	7.07	0.000	0.665293	1.175506
LAB1	0.9115067***	0.1629088	5.60	0.000	0.592211	1.230802
LAB2	1.743750***	0.1400418	12.45	0.000	1.469273	2.018227
LAB3	2.073974***	0.2090546	9.92	0.000	1.664235	2.483714
TRACE1	1.234714***	0.1270885	9.72	0.000	0.985624	1.483803
TRACE2	1.424863***	0.1699563	8.38	0.000	1.091755	1.757972
TRACE3	1.663900***	0.1359837	12.24	0.000	1.397377	1.930423
PRICE	-0.1631989***	0.0209130	-7.80	0.000	-0.204187	-0.122210
Log likelihood: -1078.1887						
Number of obs: 3600						
Prob > Chi2: 0.0000						
Pseudo R2: 0.1831						

Note: (***) and (*) indicates the significant level at 1% and 10% respectively

Source: Calculated from field survey data, 2015

It can be seen that eight out of nine variables are highly statistically signification at 1% levels except AVA1 which is statistically signification at 10%, and the relationship with the utility function is as expected. These estimated parameters indicate how much individual's utility increases or decreases when each attribute goes up or goes down by one unit. Firstly, the parameter of AVA1 indicates that if VietGAP vegetables are sold more at vegetable stores, it will increase the utility of consumers by amount of 0.203. Likewise, the parameter of AVA2 reveals that consumers will increase their utility by amount of 0.9203 if VietGAP vegetables are sold more in supermarket systems. The reason is revealed by 36% of respondents that they feel more secure about the vegetables in the supermarkets more than other places like food stores or traditional fresh markets because these products are checked at least by supermarket systems. On the other hand, they could choose a great variety of vegetables from many suppliers and combine to buy other products when they go to supermarkets while there are only food products in almost stores.

Secondly, the certification label variables is positive statistically significant as expected, it means that increments on the utility of consumers will occur if vegetable products have quality certification. The utility of consumers will be on increase from VietGAP vegetables without label to NGOs organic label on vegetables, in other words, the highest utility increment will appear if there is the presence of organic label certifying by NGOs on vegetables. Thus, in the DCE, there was a positive effect on the respondents' purchase behaviour when organic certification label was certified by NGOs as compared to governmental certification label or no certification label at all.

Regarding to the presence of traceability information of vegetables will increase the level of utility by amount of 1.66 if traceability information covering farming, distribution and processing, circulation and marketing whereas this amount is only 1.23 if traceability only stop at farming information. This results are fit with the actual situation when almost consumers are making heavy demands on safe foods which are guaranteed from farm to fork. Notably, the information of parameter of PRICE in Table 4 implies that increasing increments on the price of vegetables will decrease the associated utility level provided by the choice by amount of 0.16.

Overall, respondents give the highest priority to the presence of the label on the vegetable products, followed by information of traceability, availability and price of products. Specifically, respondents' utility increases a highest amount if the organic label which certified by NGOs appears on the vegetable, increases considerably when VietGAP label certified by government organizations on the vegetable products, increases when traceability information

covering farming, distribution and processing, circulation and marketing occurs on the produce, increases if VietGAP vegetables are availability in the supermarket systems as well as vegetable stores, and decreases if price of vegetables increase as the result of choosing non-conventional vegetables.

Estimating WTP for Different Vietgap Attributes

Based on the estimated results in Table 4, we can calculate the WTP measures the marginal value of change (or price premium for a good) in a single vegetable attribute which represents the marginal rate of substitution between price and the vegetable attribute or the marginal WTP for a change in any of attributes. Each of the estimation was computed by using the ratio of the coefficient associated with the attribute of interest over the *PRICE* coefficient as mentioned in equation (3). The results are listed in Table 5 and Figure 1.

Table 5:
WTP for each VietGAP vegetable attribute

Attribute	WTP (thousand VND/kilogram) ¹
AVA1	1.24 *
AVA2	5.64 ***
LAB1	5.59 ***
LAB2	10.68 ***
LAB3	12.71 ***
TRACE1	7.57 ***
TRACE2	8.73 ***
TRACE3	10.20 ***

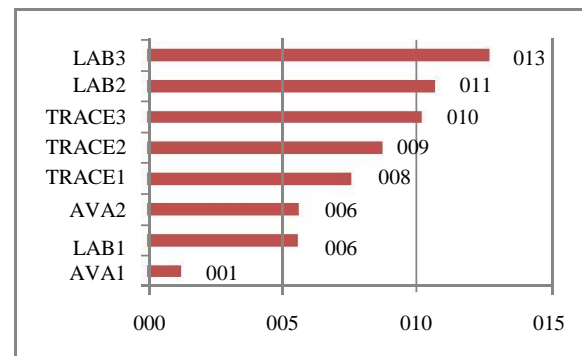


Figure 1: WTP ranking for each VietGAP vegetable attribute²

Note: (***) and (*) are significant at 1% and 10% respectively

¹The exchange rate was rounded at 22.000VND for one USD during September - October 2015 ²The unit of measurement is thousand VND per kilogram vegetable

The results indicate that although the quality certification label certified by government organizations carries a positive premium (10.68 thousand VND per kilogram of leafy mustard or choysum), this is not the largest premium among the considered attributes. This premium implies that, on average, 10.68 thousand VND per kilogram is the premium that makes consumers have to compare the two levels of utility, associated without quality certification label of the vegetables, and the payment of 10.68 thousand VND per kilogram with the presence of a certification label which certified by government organizations. The quality certification label, which has been certified by NGOs, gains the highest premium of 12.71 thousand VND per kilogram of vegetable, while the VietGAP vegetable without label carries a smallest premium (5.59 thousand VND per kilogram). This may denote that the quality certification label is a nearly compulsory requirement for consumers in order to purchase a vegetable produce.

On the other hand, other attributes indicating that the product has more traceability information covering farming, distribution and processing, circulation and marketing and that is next priority from consumers with the payment of 10.20 thousand VND per kilogram vegetable. This finding is according to expectation of consumer's behaviour as mentioned in Mac (2014) who found that Hanoi consumers much paid attention to information of vegetable origins but this research did not estimate how much they willing to pay for giving more traceability information from farm to fork.

In addition, the availability of vegetables is also an important factor which affects to selection of consumers although it is ranked near the last of priority compared to certification label and traceability information. This implies that consumers will accept the VietGAP vegetables with quality certification label, full traceability information and selling in the supermarket systems. It is showed clearly through the field survey. There were 57.14 percent of respondents in the group of non-purchasers who revealed that they could not find the VietGAP vegetables to buy even though they are really want to buy due to lack of products in the supermarket systems. This conclusion is quite similar with the claim as mentioned in Hai *et al.* (2013) in term of organic vegetables which showed that the lack of information about organic market and inconvenience are the main reasons for limitation in consumption of the organic vegetables in Hanoi.

Discussion and Conclusion

This study investigated Hanoi consumers' decision to purchase for different VietGAP vegetable attributes. The choice experiment method was employed to identify consumers' valuation of the VietGAP vegetable attributes. Conditional logit model was estimated by using the primary data gathering from a sample of 300 individuals in five big supermarkets and six vegetable stores in the center of Hanoi. Two types of VietGAP vegetables of focus were leaf mustard and choysum.

Findings disclose that all of consumers reveal significant demand for vegetables that are sold in supermarket system, organic label certified by NGOs, ensuring traceability information covering farming, distribution and processing, circulation and marketing on the vegetable products. Interestingly, although the price of VietGAP vegetables is significant determinant of vegetable choice in the DCE but there is a trivial decreasing in amount consumers' utility, in other words, price was ranked last after quality certification label, traceability information, and availability of produce. This is not surprising since the average monthly per household income of almost respondents was higher than population statistics whereas the mustard and choysum prices were used in the choice experiment ranged from 10 thousand to 22 thousand VND per kilogram which were not so high compare to some other types of vegetables.

Overall, the limitation of information in current market share of VietGAP vegetables is one of the obstacle for consumers to non-purchase. Moreover, organic certification label is certificated by NGOs which is valued most highest by Hanoi consumers, followed by traceability information covering farming, distribution and processing, circulation and marketing. The WTP of consumers is the least for VietGAP vegetables which are sold in stores and VietGAP vegetables without label when compared with the other attributes. These findings are expected to provide evidence to the producers, market actors, and policy makers increase the availability of safe vegetables in supermarkets as well as increase the diversity of VietGAP vegetables through the adoption new technology in cultivating. Furthermore, the justifiable demand of the consumers regard to guarantee of food safety is the credibility of the agency ensuring it. There are several possible agencies that can guarantee food safety through a system of label and certification, namely, farmer groups, wholesaler groups, retailers groups, NGOs, and government organizations. To acquire this means there is a promotion of horizontal and vertical coordination, and participating of NGOs as well as the representative of Consumer Protection Agency in standardized certification process. It is also essential to have an official information channel to provide the public at large with accurate information to consumers, for instance, where they can buy the trustworthy products, how to check the origin of products. Moreover, the trust can be gained if there is a regular inspection of the VietGAP farming and it should have official sanction mechanisms in case of non-compliance.

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Appendix: Choice set example

The following are descriptions of the attributes that may vary from alternative A to alternative B:

Availability (AVA):

Whether the vegetables occur in supermarkets, stores or fresh markets.

Certification Label (LAB):



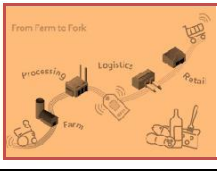

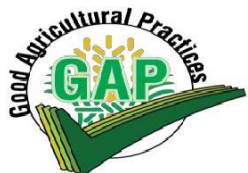

Whether the vegetables is certified (VietGAP or organic) or not. VietGAP label certifying based on Global GAP and ASEANGAP while Organic label certifying adopted Participatory Guarantee Systems (PGS).

Traceability information (TRACE): This implies that consumers have full information about specific farming information covers vegetable farm, where the product come from, how the product is grown, what standard is has to obey; information of collecting and processing covers gathering time, and location of distribution and processing; information of circulation and marketing, covers wholesaler, transportation, and carrier.

Premium price (PRICE):

Price differences between the conventional vegetables, which consumers regularly buy and VietGAP vegetables.

If you can CHOOSE ONLY ONE of the following items, which one would you choose?

25	Availability	Quality certification label	Traceability information	Price	I
					would choose
A	Vegetables are sold in fresh market 	Organic label is certified by NGOs 	Traceability information covering farming, distribution and processing, circulation and marketing 	22,000 VND/kg	<input type="checkbox"/>
B	Vegetables are sold in safe vegetable store 	VietGAP label is certified by Government 	Traceability information covering farming 	17,000 VND/kg	<input type="checkbox"/>
C	Neither Option A nor B is preferred				<input type="checkbox"/>

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