AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

ECONOMIC ANALYSIS OF CONSUMERS' AWARENESS AND WILLINGNESS TO PAY FOR GEOGRAPHICAL INDICATORS AND OTHER QUALITY ATTRIBUTES OF HONEY IN KENYA

By

NABWIRE Ephamia Juma Charity

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in Agricultural and Applied Economics

Department of Agricultural Economics

University of Nairobi

November 2016

DECLARATION AND APPROVAL

DECLARATION

This thesis is my original work and has not been presented for any award in any other university.

NABWIRE Ephamia Juma Charity

Reg. No.A512/60012/2013

Signature..... Date..16/11/2016.....

APPROVAL

This thesis has been submitted for examination with our approval as supervisors:

Dr. David Jakinda Otieno

Department of Agricultural Economics, University of Nairobi

Signature..... Date..16th November 2016

Prof. Willis Oluoch-Kosura

Department of Agricultural Economics, University of Nairobi

Signature..... Date...Nov. 16, 2016.

Dr. Amos Gyau, World Agroforestry Centre

Signature..... Date..17-11-2016...

Dr. Judith Beatrice Auma Oduol, World Agroforestry Centre

Signature..... Date..17/11/2016.....

DEDICATION

To my only sister Angela and my brothers Justus, Tony, Shanon, Douglas and Michael, for your cooperation, love, understanding and prayers during this study that encouraged me.

ACKNOWLEDGEMENTS

First, I thank God for giving me strength and divine wisdom throughout my time of study; for the far He has taken me.

I am highly indebted to my supervisors; Dr. David Jakinda Otieno and Prof. Willis Oluoch-Kosura, both of the University of Nairobi for their unlimited guidance throughout the study. I sincerely thank my supervisors, Dr. Amos Gyau and Dr. Judith Oduol both of World Agroforestry Centre (ICRAF) for believing in me and awarding your time, advice and encouragement throughout the study.

My sincere gratitude goes to ICRAF for the funding of the field research of this study and for the financial support for my upkeep. This helped me to concentrate better in my academics. I would like to express my gratitude to African Economic Research Consortium (AERC) for providing the funding for the software used in this research and my master's studies at the University of Nairobi. This thesis would not have been completed without their financial support.

Sincere thanks also go to all Collaborative masters in Applied Agriculture Economics (CMAAE) 2013 lecturers for their valuable academic inputs. Thanks to my colleagues CMAAE class of 2013 for providing a team learning environment. Thanks to all enumerators involved in data collection for their committed efforts and to all consumers who took part in the focus group discussion and survey for their important information to this research.

Last but not least, I would like to thank my family members, for without their encouragement and support, I would not have completed this study.

TABLE OF CONTENTS

DECLARATION AND APPROVAL .....**Error! Bookmark not defined.**
DEDICATION ii
ACKNOWLEDGEMENTS iii
TABLE OF CONTENTS iv
LIST OF TABLES vii
LIST OF FIGURES vii
LIST OF ACRONYMS viii
ABSTRACT ix
CHAPTER ONE 1
1.0 INTRODUCTION 1
1.1 Background Information 1
1.2 The Research Problem Statement 4
1.3 Purpose and Objectives of the Study 5
1.4 Research Hypotheses 6
1.5 Justification of the Study 6
1.6 Study Area 7
1.7 Thesis Organization 9
CHAPTER TWO 10
2.0 LITERATURE REVIEW 10
2.1 Trends in Honey Production, Marketing and Use 10
2.2 Knowledge Gaps in Consumer Awareness and Preferences 12
2.3 Review of Preference Analysis Methods 16
References 19
CHAPTER THREE 25
3.0 HONEY VALUE CHAIN AND CONSUMER'S CHARACTERISTICS 25
3.1 Background Information 25
3.2 Methodology 27
3.2.1 Conceptual Framework 27
3.2.2 Sampling and Data Collection 29
3.2.3 Data Analysis 31

3.3 Results and Discussion 31
3.3.1 The Honey Value Chain in Kenya 31
3.3.2 Characteristics of the Respondents and their Households 34
3.4 Conclusions and Implications 36
References 37
CHAPTER FOUR 40
4.0 CONSUMER AWARENESS OF GI LABELLING 40
4.1 Background Information 40
4.2 Methodology 42
4.2.1 Model Specification 42
4.3 Results and Discussion 47
4.3:1 Awareness of GI in Kenya 47
4.3.2 Honey Consumption Patterns 50
4.3.3. Determinants of Consumers' Awareness of GI 51
4.4 Conclusions and Implications 55
References 56
CHAPTER FIVE 60
5.0 CONSUMER'S PERCEPTIONS AND WILLINGNESS TO PAY FOR GEOGRAPHICAL INDICATION LABELLING 60
5.1 Background information 60
5.2 Methodology 62
5.2.1 Definition of Attributes 62
5.2.2 Choice Experiment Design 65
5.2.3 Data and the experimental context 67
5.2.4 Model Specification 68
5.3 Results and Discussions 71
5.3.1 Consumers' Preferences for Various Honey Attributes 71
5.3.2 Consumer Perceptions of Honey Attributes 73
5.3.3 Consumers Preference for GI Label and Other Quality Honey Attributes 74

5.3.4 Factors Influencing Consumers WTP for GI 80
5.4 Conclusion and Implications 84
References 85
CHAPTER SIX 90
6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS 90
6.1 Summary 90
6.2 Conclusions and Policy Recommendations 92
6.3 Contribution to Knowledge and Suggestions for Future Research 94
Appendices 95
Appendix 1: Maps of the Study Areas in Kenya 95
Appendix 2: Checklist Questions Used in the Focused Group Discussions 96
Appendix 3: Household Survey Questionnaire 97
Appendix 4: Ngene Choice Experiment Syntax 103
Appendix 5: List of All Choice Sets Used in the CE Survey 104
Appendix 6: Probit Commands 111
Appendix 7: Random Parameter Logit (RPL) Commands 111
Appendix 8: Summary of Honey Consumption Patterns 112

LIST OF TABLES

Table 1: Socioeconomic Characteristics of the Respondents 35

Table 2: The expected sign and VIF values of Variables affecting consumer awareness of GI 46

Table 3: Factors influencing GI awareness of honey consumers 54

Table 4: Description of attributes and their levels 63

Table 5: Variables used in the preference analysis 71

Table 6: A summary of consumer preferences for different honey features 73

Table 7: RPL estimates for GI and other Quality Attributes of Honey 75

Table 8: Marginal WTP estimates for GI and quality attributes of honey.....80

Table 9: Factors influencing WTP for GI and quality attributes of honey 83

LIST OF FIGURES

Figure 1: Honey Production Trends in Kenya 11

Figure 2: Conceptual Framework 28

Figure 3: A Value Chain of Honey Flow in Kenya. 33

Figure 4: Honey issues encountered by consumers 51

Figure 5: Example of choice card presented to respondents during the survey.....66

Figure 6: A chart depiction of consumer perceptions of honey quality factors.....74

LIST OF ACRONYMS

ASALs	Arid and Semi-Arid Lands
CBD	Central Business District
CE	Choice Experiment
COO	Country of Origin
COOL	Country of Origin Label
EU	European Union
FGD	Focus Group Discussion
GI	Geographical Indication
GM	Genetically Modified
KEBs	Kenya Bureau of Standards
KIPI	Kenya Institute of Property Rights
Kshs	Kenya Shillings
Kgs	Kilograms
LCM	Latent Class Model
MNL	Multinomial Logit
MWTP	Marginal Willingness to Pay
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
RPL	Random Parameter Logit
RP	Revealed preference
TRIPS	Trade Related Intellectual Property Rights
USA	United States of America
USD	United States Dollar
WTP	Willingness to Pay

ABSTRACT

Geographical indication (GI) identifies a product as originating from a given territory, region or country. This form of product-labelling signifies reputation for quality, safety and authenticity. It is a form of value-based label that can curb honey adulteration through enabling product traceability. This study analyzed honey consumers' awareness of GI and their willingness to pay for quality attributes of honey in Kenya. A quantitative experimental research design; choice experiment (CE) based on a *D-optimal* design was used. Primary data was collected through consumer surveys using structured questionnaires. Respondents were drawn from three urban centres: Nairobi, Nakuru and Kitui. In addition, consumers' awareness and preferences for geographical and quality honey attributes were analyzed using probit and random parameter logit models, respectively. Results reveal that consumers have limited knowledge of GI. Factors that influence GI awareness are consumers' perceptions, trust, gender, education level and information. Therefore, there is need to increase the spread of GI knowledge and its benefits through consumer education forums. Furthermore, consumers prefer local honey that is organic, with specific origin labels and produced in semi-arid areas. The study therefore recommends stringent labelling of honey with its specific region of origin and organic certification. Consequently, consumers are willing to pay a premium to improve the authenticity of current honey labels: origin and botanical labels for traceability and organic for food safety. Consumers also prefer a joint public-private regulation. There is a niche market for thick honey labelled with its GI, organic, botanical source and certified by both public and private body. This consumer segment would pay up to 430% premium. This study recommends for consumer education across gender and age and implementation of GI labelling for food products trusted by consumers. Stakeholders should be enabled to implement GI labels in Kenya because of high consumer preferences.

CHAPTER ONE

1.0 INTRODUCTION

This chapter provides the context of the study. It also expounds on the motivation of the study which is the issue of honey adulteration. The study's purpose, objectives and hypothesis are also outlined here. This is followed by the study's justification and lastly a description of the study area.

1.1 Background Information

Geographical indication (GI) identify a product as originating from a certain region or country (African Union and European Commission, 2011). Internationally, GI stays protected under the Uruguay round agreement on Trade Related aspects of Intellectual Property Rights (TRIPs) described in article 22 of World Trade Organization (WTO) agreement, where it also allows petition for cases of misuse of GI names (European Commission, 2012). Kenya is a member of the WTO and subscribes to its TRIPs agreement, which provides for the extension of GI protection to other products other than wine. In Kenya, registered GI products are protected by the Trademarks Act under the certification and collective marks that are managed by Kenya Institute of Property Rights (KIPI) (Republic of Kenya, 2009). It is also possible to acquire certification trademarks through the African Regional Intellectual Property Organization (ARIPO) by virtue of the Banjul Protocol on Trademarks, to which Kenya is a member.

GI is popular for protection of wines and spirits in the European Union (EU) and it recently extended to other products (European Commission, 2012). This applies as long as the GI product reputation for quality, safety and authenticity can be linked to its geographical origin. For instance, *Manuka* honey from New Zealand and *Oku* honey from Cameroon are examples

of popular GI honey (Blakeney *et al.*, 2012). However, in Africa very few products have been registered as GIs despite majority of African countries being members of the WTO and having subscribed to several agreements. Nevertheless, South Africa leads with registered GI products, which range from wines, spirits and agricultural foods for example, *Rooibos* tea. In Kenya though GI honey is yet to be registered, tea and coffee are registered through certification marks (Bagal *et al.*, 2013).

Labeling products with GI has the potential of reducing information asymmetry that remains rampant in the local and international product market by assuring product traceability (O'connor, 2013). Recent studies have shown that a considerable number of consumers are increasingly willing to pay a premium in many developed countries for country of origin (COO) or region of origin labels (Lim *et al.*, 2013; Loureiro and Umberger, 2003). However, this important aspect is yet to be evaluated in Kenya.

Some awareness studies have been conducted to gauge consumers' knowledge on various products' peculiar attributes that make them different from others. For instance, Kimenju *et al.* (2005) assessed awareness and attitudes towards GM foods in Kenya and found some level of awareness. Moreover, Kenyan honey brands are popular in the East African region commanding over 40% of honey import markets in both Uganda and Tanzania, because they are deemed to be of better quality (Jackson, 2003). However, Kenyan local consumers and farmers are aware of honey adulteration with concentrated sugar solution, molasses, jaggery, melted sugar and crushed bananas (Muthui, 2012).

A product's attributes are important for consumer choices among different product brand, by giving information about a product composition and geographical origin. Product attributes are further ranked in order of preference by the consumers. For instance, price is the most considered product attribute by consumers when buying honey in Ireland (Murphy, 2000).

Similarly, in Kenya honey viscosity and taste/flavour is the most valued honey attributes (Warui *et al.*, 2014).

Understanding socioeconomic factors that influence consumers' Willingness to Pay (WTP) for a product allows for segmenting consumers for strategic marketing. Consumers' social ideologies like affiliations with product origin, scale of production, animal welfare compliance, beliefs of health benefits of a product and firms with social responsibilities leads to their WTP a premium for food products. Economic factors like the level of education and high income levels also increase WTP (Kimenju and De Groote, 2005).

Consumers' socioeconomic factors interact with product attributes to determine their WTP for a given food product. For example, consumers with lower income levels can be locked out of honey consumption when prices are too high. Similarly, presence of young children in homes increases consumers' considerations of food safety (Ngigi *et al.*, 2010). Likewise, scale of production also influences well-off consumers' WTP (Murphy *et al.*, 2000). Furthermore, fresh local food fetch a premium from consumers (Lai *et al.*, 1997).

Previous studies have identified important quality attributes of honey as preferred by Kenyan honey users (Warui *et al.*, 2014). However, little is known about value chain of the honey sector particularly issues concerning product origin. In addition, consumers' awareness and the monetary value attached to the attributes in Kenya are yet to be determined. Also, it is still unknown, which consumers' socio-economic factors influence their preference and WTP for food products, in particular honey in Kenya. Therefore, the current study analysed consumers' awareness and WTP for GI and other quality attributes of bee honey in Kenya.

1.2 The Research Problem Statement

Food fraud reduces consumer confidence in a given food brand and it is globally estimated to cost between 30 to 40 billion USD annually (Everstine *et al.*, 2013). Additionally, food fraud has led to deaths like in China where about 300,000 children were poisoned and six infants died from 'melamine milk scandal (Everstine *et al.*, 2013). In Africa, Cawthorn *et al.* (2013) found traces of donkey, goat and water buffalo meats passed as beef in retail sections in South Africa. Issues of food safety and adulteration have also been reported in Kenya where vegetables - *kales* sold in Nairobi were tested and results showed they contained harmful traces of the lead metal (Kutto *et al.*, 2011). In the case of honey, in Kenya it is adulterated by addition of concentrated sugar solution, molasses, jaggery, melted sugar and crushed bananas (Muthui, 2012).

Honey is among the foods that are highly adulterated because it is expensive and produced in varying weather and harvesting conditions. However, harm to consumers' health as a result of honey adulteration is yet to be documented, since the perpetrators may never want to be detected. Product adulteration negatively influences market growth by destroying consumer trust (Johnson, 2014). Furthermore, Kenya has a potential of about 75% of bee products production that could yield up to Kshs. 15 billion from honey alone, which is yet to be exploited (Kiptarus *et al.*, 2011). Therefore, any means of guaranteeing honey quality is important to consumers, producers and monitoring authorities.

Currently in Kenya, just like the rest of the world honey bees have reduced in number and there is presence of information asymmetry and inefficiencies (Kiptarus *et al.*, 2011). Cases of traders colluding to control the market in their favour has led to high marketing costs and product adulteration (Oyuga, 2008). Furthermore, urban consumers have adapted by buying unprocessed honey from individuals from upcountry (Mutisya, 2011). One of the suggested solution is collective action among producers to ensure efficient pricing in the honey market

(Oyuga, 2008). More so, the introduction of GI would be an effective way of collective action.

Kenya already acknowledges the benefits of geographical indicators to both consumers and producers (Ramba, 2013). The geographical names are protected under the Kenya Trademarks Act through certification marks or collective marks (Republic of Kenya, 2007). A joint project between the Government of Kenya and the Swiss Government identified a potential for geographical indicators labelling including the honey sector. In fact a number of local honey brands were suggested to include *Kitui* Honey, *Yatta* Honey, *Turkana* honey, *Mwingi* honey, *West Pokot* honey and *Baring*o honey (KIPI, 2009). This is possible since honey from these regions is of high quality with varying flavour and are sold at different prices (KIPI, 2009). Moreover, Kenya has a segment of consumers that would be willing to pay premium for quality as evidenced by imports from Australia (Mutisya, 2011).

However, it is not known if Kenya's primary shoppers who purchase and consume honey are aware and willing to pay a premium for a product labelled with local geographical indicators over an identical product whose origin is not specified. Furthermore, it is uncertain, which key factors determine their awareness and WTP for honey labelled with geographical indicators. More so, policy makers need this information in coming up with policies that concern collective marketing for locally produced agricultural goods.

1.3 Purpose and Objectives of the Study

The purpose of this study was to describe the honey value chain, assess consumers' awareness and willingness to pay for and the factors influencing GI and other quality attributes of honey in Kenya. The specific objectives were to:

- characterize the honey value chain in Kenya.
- assess honey consumers' awareness of GI labelling.

- determine consumer WTP for GI and other quality attributes of honey.
- analyze factors influencing consumers' WTP for GI and other quality attributes of honey.

1.4 Research Hypotheses

1. Socio-demographic factors (age, gender, income, education level) do not significantly influence consumers' awareness of GI labelling in honey.

2. Consumers in Kenya are not willing to pay a significant amount of money for GI and other quality attributes of honey.

3. Socio-demographic and psychographic factors (age, income, education level, perceptions of honey standards) do not influence consumer's WTP for GI and other quality attributes of honey.

1.5 Justification of the Study

The study provides an insight into consumers' awareness and their expectations of local honey in terms of pricing and origin. It also, points out consumer interest in food safety, labelling, traceability and quality of honey. Similarly, the findings from this study are relevant to Kenyan honey producers and marketers in developing formidable marketing strategies in their efforts to boost demand for Kenyan honey in the face of rising competition from honey imports. It likewise informs policymakers who are in the process of making laws and policies on geographical indicators and traceability of agricultural food products. In addition, the study fills the gap in Kenyan agribusiness strategy, particularly the value-addition strategic objective that missed on GI as a possible market targeting intervention (Republic of Kenya, 2012). Moreover, the study contributes to Agricultural Sector Development Strategy (ASDS) 2010–2020 that focuses on value addition of agricultural produce, improving market access for farmers and development of Arid and Semi-Arid Areas

(ASALS), found under the subsector strategic focus on livestock. This is because beekeeping is viable in areas with erratic rains, mainly the ASALs. Furthermore, beekeeping contributes to food security, increased household incomes of up to Kshs.15 billion through value added bee products for over 10,000 small scale farmers, employment creation for over 1,000 individuals, youth and groups, increased access to markets and conservation of the environment (Kiptarus *et al.*, 2011).

1.6 Study Area

Kenya produces honey from different regions, with 80% coming from ASALs (Republic of Kenya, 2001). Kitui County leads in beekeeping activities with farmers from this county investing in more than 389,000 beehives followed by Baringo County with 176,000 among others (Kiptarus *et al.*, 2011). Honey consumption takes place all over Kenya for food, cultural, preservation and medicinal reasons. In addition, 80% of marketed honey ends up in Nairobi (Baiya and Nyakundi, 2007). Purposive sampling was used to identify three areas in the country for data collection. These were Nairobi, Nakuru and Kitui areas (maps are shown in Appendix).

According to the Kenya National Bureau of Statistics (KNBS) (2014), Nairobi has a population of 3.1 million with 4515 population density per square kilometre. According to World Bank, Nairobi is the eighth richest county with a per capita GDP of kshs. 108,100 (kshs. 100 = 1$). Majority of marketed honey in Kenya is sold in Nairobi. In addition, producers from neighbouring countries; Uganda and Tanzania travel for long distances and sell honey in Nairobi (Jackson, 2003). Moreover, Nairobi contributes up to 60% of Kenya's gross domestic product (GDP), though there is a high incidence of poverty and income inequality; reflected by a Gini coefficient of 0.59. This shows the importance of class as a factor of mobilization and determinant of opportunities (Dafe, 2009).

A stratified sampling method was used in Nairobi County in relation to income levels. Nairobi is put into three stratus; the rich who can easily spend up to Kshs. 200,000 (kshs. 100 =1$) a month; middle income who spend between Kshs. 24,000 (kshs. 100=1USD) and 120,000 (kshs. 100=1$) per month; and the poor in Kenya who spend less than Kshs. 24,000 (kshs. 100=1$) a month . Honey is a special product that is easily afforded by well-off individuals. So, Nairobi's rich estates were listed. Eventually, Westlands was picked as a commercial centre with a high number of shopping malls unlike other upmarket estates in Nairobi. For middle income estates, Kasarani was picked. But in order to also capture the low income honey consumers, the list of poor suburbs of Nairobi was made and Kawangware was picked purposively as a low income area according to the Kenya National Bureau of Statistics (KNBS) (2014).

Nakuru is a highland area and according to Kenya National Bureau of Statistics (KNBS) (2014), it has a population of 1,603,325. According to World Bank, Nakuru is the fourth richest county in Kenya with a consumer per capita income of Kshs. 141,300 (kshs. 100 =1$) and it has Gini index of 0.376. Agriculture is the main source of livelihood as most of the residents grow food and cash crops as compared to commercial, industrial, tourism, and tertiary activities. The region has a history of honey production by communities around Mau forest, particularly the indigenous *Ogiek* people, for cultural and spiritual purposes (Micheli, 2013). Specifically, respondents in the major retail outlets found in the Central Business District (CBD) were interviewed.

According to World Bank, Kitui County has a Gini index of 0.388. It is the thirtieth county with GDP per capita of kshs. 37,300 (kshs.100 =1 $). It is a semi-arid region with a population size of 1,012,709 people according to Kenya National Bureau of Statistics (KNBS) (2014). Agriculture is the main livelihood activity, though residents get food aid because of unreliable rainfall. It was among the identified sites for geographic labelling of

honey before by KIPI (2009). Almost every man in Kitui owns a bee hive, though not all have bee colonies; this makes it the leading honey producing region in Kenya. More so, some consumers in the area buy honey from neighbours and others buy beer and herbal medicines that contains honey from Nairobi (Muthui, 2012). Kitui town was purposively picked to capture more cosmopolitan respondents as compared to its rural dwellers. This study area could reveal peri-urban honey consumers' preferences in the country.

1.7 Thesis Organization

This thesis has six chapters. The context of the study has been set in this introductory chapter. The next chapter provides a review of relevant literature. The honey value chain and consumer's characteristics are described in chapter three. In chapter four, consumers' awareness of GI in Kenya is presented. The analysis of consumers WTP for GI is documented in chapter five. Important conclusions and policy recommendations are offered in the sixth chapter.

CHAPTER TWO

2.0 LITERATURE REVIEW

This Chapter provides a review of past literatures that are relevant to the honey sector in Kenya, Geographical Indications and preferences analysis methods. Important knowledge gaps are also identified here.

2.1 Trends in Honey Production, Marketing and Use

In Kenya, bee keeping has been practiced since the prehistoric time by mainly small scale farmers found in dry areas in Kenya (Gachora, 2003). Its policies have focused on improved bee product markets and practices. This has improved honey production with use of modern hives as opposed to conventional hives and handling. Being a rural enterprise, beekeeping contributes significantly to improved livelihoods of most rural communities in Kenya (Shiluli *et al.*, 2012). Nevertheless, the honey industry also sustains the urban areas by employing individuals in confectionery, pharmaceutical, herbal, brewing, cosmetics, transport, supply of packaging material and other players along the beekeeping value chain. Hence, it contributes to food security, household income, employment creation, access to markets and environmental conservation. However, the sector faces several challenges; low production and technology adoption, low capacity building. In addition, honey production has been on a declining trend in Kenya (Figure 1), caused mainly by the declining bee colonies due to climate change (Kiptarus *et al.*, 2011).

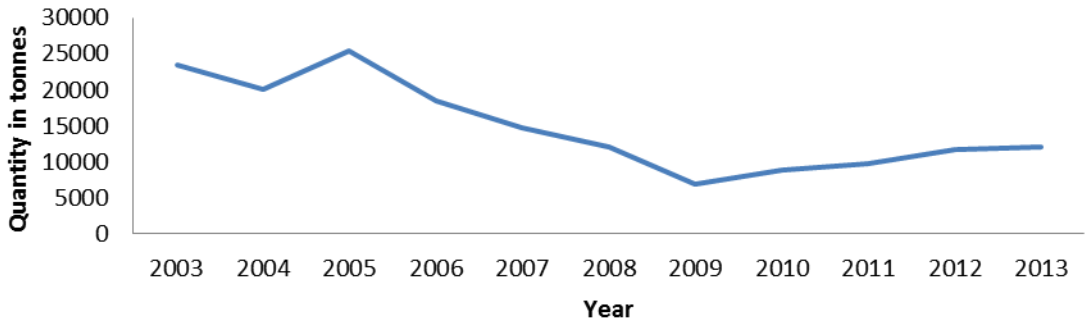


Figure 1: Honey Production Trends in Kenya

Source: FAOSTAT (2016).

Honey produced in Kenya is mainly sold locally supplemented by imports from Australia to meet the increasing local demand. Farmers sell through different channels; the longest chain involves local traders through middlemen/hawkers to packers/honey processing firms and then to retail outlets mainly in major urban centres. Although urban honey consumers prefer unprocessed honey to avoid adulterated honey (Mutisya, 2011). Value addition increases income and in return enhances food security, health/housing and education levels of bee farmer families (Ominde, 2014). GI is a form credence value addition that involves less tampering of the produce and has a potential of improving farmer's income.

Consumers prefer honey to its substitutes because of its natural medicinal value. Honey demand has expanded with increased consumer awareness of food-borne health issues. Nevertheless, honey uses vary; food, cure ailments, preservative, alcohol and beer ingredient, beauty, barter trade and ceremonial like in weddings and bride price payment (Republic of Kenya, 2013). Honey bought for table use is considered for its purity more. Consumers mainly buy honey from supermarkets, some source it directly from rural areas to avoid adulterated honey found even in high end retail outlets (Mutisya, 2011).

Honey is among the products identified by a project conducted by the Swiss and the Kenyan Government as a potential for GI labelling (KIPI, 2009). However, this is still at the pilot stage, with a legal means for positive GI protection. Hence, it is still possible to realise the benefits of GI labelling; premium pricing by increased differentiation as a brand and mitigation of inefficiencies of imperfect information (Republic of Kenya, 2007). Though, this is challenged by lack of adequate access to technical assistance and capacity building (Ramba, 2013). Also, there is a knowledge dearth on awareness and consumer preferences for GI labels; the latter motivated the current study.

2.2 Knowledge Gaps in Consumer Awareness and Preferences

Consumer product knowledge (awareness) influences their decision making process and their perceptions of a product. Furthermore, more knowledgeable consumers have better cognitive capacity to evaluate comparative alternatives (Awada and Yiannaka, 2011). In this context of GI labelling, consumers with higher levels of GI awareness are able to evaluate traceability labels more accurately and become less favourable and amenable to non-labelled goods. However, unanimous lack of consumer awareness towards an innovation (value-based labels) may hinder its acceptance and adoption (Larceneux and Carpenter, 2008). Moreover, risk perceptions influences consumer awareness of foods purchased (Lin *et al.*, 2004), in this case, exposure to adulterated honey and its negative effects may increase awareness of mitigating strategies like GI labelling.

Origin labels are crucial in providing a consumer traceability information. If consumers can process this information, they reduce their perceived risk in buying a product. However, those with prior knowledge of the product, in a hurry and lack interest may not read origin labels. Moreover, family income that facilitates access to food labels in high end stores and interest in preparing healthy meals in the home explains label readership (Schupp *et al.*, 1998).

Lusk *et al.* (2006), noted that previous work by agricultural economists had failed to adequately identify why consumers desire COOL.Abraham (2015), found that COO is important where the brand is unfamiliar and highly knowledgeable consumers on product and country. Although, in some cases origin label is not an important cue in the choice processes (Liefeld, 2004), but if used as a quality assurance mark it increases consumer loyalty (Profeta *et al.*, 2012). This should be in addition to direct indications of quality, including mandatory information cues such as best-before dates and species names, but also including quality marks (Verbeke, 2009).

Consumer awareness of origin labels are dynamic and vary across the continents. For EU consumers, Verbeke *et al.* (2012), found majority of European consumers knew about Protected Designation of Origin (PDO), then Protected Geographical Indication (PGI) and lastly Traditional Speciality Guaranteed. This varied with gender and age, so consumer education could be segment specific. Another study by Velčovská and Sadílek (2014) revealed that EU consumers have limited knowledge and they are willing to learn more about PGI and PDO labels, which influences their perceptions of product credibility. Although the United States of America (USA) consumers are not keen with origin labelling laws and are indifferent to an important aspect of the implementation of current mandatory COO information rules. Therefore, consumer information influences product performance expectation and preferences (Crosby and Taylor, 1981). This in turn requires an understanding of, which consumers are aware of GI labelling and what factors are associated with their awareness. Moreover, there is need to help multiple stakeholders involved with GI labelling to address consumer expectations and concerns in developing countries.

Consumers nowadays have higher preference for local foods, especially for easily perishable foods like beef (Loureiro and Umberger, 2005). This makes traceability a value based label that is necessary in consumer choice. Loureiro and Umberger (2005), found consumers in the

USA prefer local beef because of food safety issues and would pay small indirect premium for costs related to a mandatory COOL and traceability-enabled attribute (Lim *et al.*, 2013). Consumer preferences for local foods is also influenced by consumers' risk handling behaviour; their attitude on risk associated with beef, their risk aversion to risks from use of beef and perceptions of the food-safety level of imported beef (Lim *et al.*, 2014)

Kenyan consumers have positive preference for nutritional benefits of food bio-fortification and would pay a premium for bio-fortified pearl millet products. This was influenced by demographic factors; whether one is a household head or otherwise, previous exposure to bio-fortified products, household monthly income and awareness, about nutritional benefits of consuming bio-fortified products pearl millet product (Okech-Ongudi *et al.*, 2015). Furthermore, preference for healthy foods like quality of leafy vegetables is affected by safety, nutrition, price, sensory, convenience, environmental friendliness, hygiene and ethics. This was determined by income levels, confidence and consistency, subjective knowledge, reference point, income and age of children the consumer (Ngigi *et al.*, 2010). Also, Brouwer *et al.* (2015), reported that a risk on health status of household members influence their WTP values. Further, income is a key factor for rural consumers, WTP.

In the EU origin labels are highly accepted and studies have gone further to test consumer preferences for various classes of origin labels. Menapace *et al.* (2009), reported that, EU's food oil consumers WTP values varied from COO, but higher for GI labelled compared to non-GI from the same country. However, consumers were indifferent in valuing PDOs and PGIs. Also, Aprile *et al.* (2012), assessed EU's olive oil consumers preferences and WTP for GI's quality labels; PDO and PGI, organic and other product quality attributes. They employed choice experiment and Random parameter logit (RPL) and showed that various forms of GI labelling have varied implication as a signal of quality. Their results revealed that PDO led, followed by organic farming label, a quality cue describing the product as extra-

virgin olive oil and lastly a PGI label. These shows that GI labelling is not a panacea to all food safety issues and other quality attributes should equally be evaluated along GI.

Formulation of GI labelling policies involves the premium that consumers are willing to pay for the credence value added. To determine consumers WTP and their preferences, product attributes are essential to get the trade-offs they are willing to make for a given positive gain from product improvement. Danish consumers value more organic to local honey that is value added Campbell *et al.* (2012). The Italians too value the price of honey, product of Italy, certification by a public institution and provision of information whether written or by use of information technology Menozzi *et al.* (2010). Recently, honey origin is fetching more attention as revealed by Cosmina *et al.* (2016), especially local honey, followed by organic then landscape of production and lastly if honey was liquid. Furthermore consumers would pay more for local honey as compared to organic.

For market segmented strategies, it is necessary to evaluate consumer factors that influence their preferences for honey and its quality attributes. In Nigeria important honey attributes includes nutrient honey content, low sugar content and medicinal value. Consumer factors were marital status, educational status, annual income, farm size and household size (Nwibo, 2012). Arvanitoyannis and Krystallis (2006), used education, age, income, occupation, gender, marital status, presence of children and working women to cluster consumers into three groups; common consumers, those that were young and indifferent to honey and the enthusiastic who would pay a premium for organic honey in Romania. Lastly, Roman *et al.* (2013), found that honey factors; nutritional, taste, prophylactic, and medicinal values; their economic factors and knowledge influenced decision to buy honey, while psychological and social factors influenced choice of varieties of honey.

Previous studies on honey sector in Kenya have shown the different honey value chains, its production, its use, its challenges and opportunities (Berem *et al.*, 2011; Oyuga, 2008; Gatere *et al.*, 1985). More so studies on safety of local honey reveals adulteration by middle men. Previous studies seem to focus on other aspects of honey and give minimal or no considerations at all for use of labels and other forms of certification as a way of curbing honey adulteration. Origin, food safety, floral source and third party certification are among new innovative means of meeting consumer satisfaction. This is despite, the literature review on various aspects of honey revealing the need to use innovative ways to curb honey adulteration. Consumer awareness and acceptance of such labels is essential to its success. However, little is known about the honey consumers' awareness and WTP for and the factors influencing, their preference for GI and other quality attributes of honey in Kenya. The current study attempts to fill this knowledge gap.

2.3 Review of Preference Analysis Methods

Non-market valuation methods are broadly grouped into two categories; revealed preference (RP) and stated preference (SP). In RP methods, buyers and sellers reveal their preferences directly through their actions, which create the price of the commodity. But, in cases where the product does not exist in the market or a pretest, the SP method is used since it is hypothetical (Adamowicz *et al.*, 1998).

The RP methods also known as indirect methods are based on analysis of real behavior of individuals to build economic models of choice for a given product. This facilitates valuation of goods that exist in the market by observing the choice made by consumers when buying goods. The first RP method is Travel cost method that considers the value of time and money people spend in the use of a good. It is mainly applied in environmental studies where the values placed by visitors on environmental amenity services are inferred from the costs that they incur in order to experience the services. Chen *et al.* (2004), used travel cost method to

evaluate the recreational benefits of a beach along the eastern coast of Xiamen Island in China. They found that the beach had an economic value and charging fees for visitors would provide for its maintenance.

The second RP method is Hedonic Pricing Method, where a good is valued in relation to characteristics of factors surrounding a good. It is mainly used to infer a premium that households were likely to pay to buy a property near an environmental amenity (Boyle, 2003). Yim *et al.* (2014), applied the Hedonic Pricing Method because of a high variation in meal prices, to examine important attributes influencing average customer meal prices in restaurants in Seoul, Korea. They identified determinants of food prices and significant surrounding factors that influence the average meal prices. However RP methods are limited in that they condition valuation on current and previous levels of the non-market good. In addition, they are unable measure non-use values (Adamowicz *et al.*, 1998). Due to these limitations, research on value of the non-market goods has been adopting the stated preference methods.

The SP method on the other hand uses simulated market to elicit WTP and Willingness To Accept value for changes in service provision and it is the appropriate method for use and non-use values of a good (Boyle, 2003). Stated Preference methods include conjoint analysis, contingent valuation method and choice experiment (CE). Contingent valuation method compares one policy scenario with a business as usual scenario. It involves describing the good or programme to be valued, the respondents are asked directly to identify the maximum amount of money they would pay. It has the limitation of being sensitive to biases in survey design and implementation (Adamowicz *et al.*, 1998).

The CE method is a type of conjoint analysis where respondents take choices across goods with varying attributes. However, it differs from conjoint analysis whereby individuals go

beyond ranking and rating bundles of product attributes (Louviere *et al.*, 2010). The main advantage of CE over contingent valuation is its ability to simultaneously elicit values for a range of goods and services (Boxall *et al.*, 1996). CE is useful for eliciting passive use values basing it on random utility theory (RUT) (Adamowicz *et al.*, 1998). CE method is developed in transport and marketing areas of research (Louviere *et al.*, 2008; Louviere *et al.*, 2000). Theoretically, it is grounded on Lancaster's characteristics theory of value (Lancaster, 1966) and random utility model guides its econometric basis (McFadden and Manski, 2001). The CE advocates for a good or service to be valued in terms of its attributes and their levels.

The first application of CE method in non-market valuation was by Adamowicz (1994). Over time a number of studies in various fields have employed this method: for example environment studies include, (Michaud *et al.*, 2012; Boxall and Adamowicz, 2002). Health sector too (Kruk *et al.*, 2009; Green and Gerard, 2009). Moreover, Ruto *et al.* (2008) and Otieno *et al.* (2011) employed CE in valuing animal genetic resources and determining the demand for disease free zone in Kenya. To inform proper way of providing public and private goods and services, Bonger *et al.* (2004), recommends the use of CE.

The honey sector in Kenya has been developing since the pre-colonial period (JIACAF, 2009), it however faces product adulteration problems (Muthui, 2012). The current study applies the CE to elicit consumer preferences for honey quality attributes and GI. The main aim is to inform policy of the potential of GI labelling in curbing information asymmetry in the honey sector in Kenya.

References

Abraham A. M. (2015). "The Role of Consumer Knowledge Dimensions on Country of Origin Effects: An Enquiry of Fast-consuming Product in India". *Vision: The Journal of Business Perspective,* 19(1), 1-12.

Adamowicz L., W. (1994). "Combining Revealed and Stated Preferences Methods for valuing Environmental amenities". *Journal of Envronmental Economics and Management,* 26(1994), 271-292.

Adamowicz W., Boxall, P., Williams, M. and Louviere, J. (1998). "Stated preference approaches for measuring passive use values: choice experiments and contingent valuation". *American journal of agricultural economics,* 80(1), 64-75.

African Union and European Commission. (2011). Report of workshop on Geographical Indications & "Power Of Origin. Kampala.

Aprile M. C., Caputo, V. and Nayga, R. M. (2012). "Consumers' valuation of food quality labels: the case of the European geographic indication and organic farming labels". *International Journal of Consumer Studies,* 36(2), 158-165.

Arvanitoyannis I. and Krystallis, A. (2006). "An empirical examination of the determinants of honey consumption in Romania". *International journal of food science & technology,* 41(10), 1164-1176.

Awada L. and Yiannaka, A. (2011). "Consumer perceptions and the effects of country of origin labeling on purchasing decisions and welfare". *Food Policy,* 37(1), 21-30. doi: http://dx.doi.org/10.1016/j.foodpol.2011.10.004

Bagal M., Belletti, G., Marescotti, A. and Onori, G. (2013). Study on the potential of marketing of Kenyan Coffee as Geographical Indication. In R. SA (Ed.), *study on the potential for marketing agricultural products of the ACP countries using geographical indications and origin branding* Lausanne: European Commission.

Baiya H. and Nyakundi, B. (2007). Plan Bee: Linking Kenyan Beekeepers to the Market Synthesis Report *SITE Enterprise Promotion*. Nairobi.

Berem R. M., Owuor, G. O. and Obare, G. (2011). "Value addition in honey and poverty reduction in ASALs: Empirical evidence from Baringo County, Kenya". *Livestock Research for Rural Development,* 23(12), 243.

Blakeney M., Coulet, T., Mengistie, G. and Mahop, T., M. (2012). Extending the protection of Geographical indicattions: Case studies of Agricultural products in Africa: Earthscan: ISBN ISBN 9780415501026.

Bonger T., Ayele, G. and Kumsa, T. (2004). "Agricultural extension, adoption and diffusion in Ethiopia". *Ethiopian Development Research Institute (EDRI) Research Report,* 1.

Boxall P., C. and Adamowicz, L., W. (2002). "Understanding Heterogeneous Preferences in Random Utility Models: A Latent Class Approach". *Environmental and Resource Economics,* 23, 421-446.

Boxall P., C., Adamowicz, L., W., Swait, J., Williams, M. and Louviere e, J. (1996). "A comparison of stated preference methods for environmental valuation ". *Ecological Economics*, 18(1996), 243-253.

Boyle K., J. (2003). Introduction to Revealed Preference Methods. In P. Champ, K. Boyleand T. Brown (Eds.), *A Primer on Nonmarket Valuation* (Vol. 3, pp. 259-267): Springer Netherlands: ISBN 978-1-4020-1445-1.

Brouwer R., Job, F., van der Kroon, B. and Johnston, R. (2015). "Comparing Willingness to Pay for Improved Drinking-Water Quality Using Stated Preference Methods in Rural and Urban Kenya". *Applied Health Economics and Health Policy*, 13(1), 81-94. doi: 10.1007/s40258-014-0137-2

Campbell D., Mørkbak, M. R. and Olsen, S. B. (2012). Response latency in stated choice experiments: impact on preference, variance and processing heterogeneity. Paper presented at the 19 th Annual Conference of the European Association of Environmental and Resource Economists, Prague, Czech Republic, 27–30 June 2012.

Cawthorn D.-M., Steinman, H. A. and Hoffman, L. C. (2013). "A high incidence of species substitution and mislabelling detected in meat products sold in South Africa". *Food Control*, 32(2), 440-449.

Chen W., Hong, H., Liu, Y., Zhang, L., Hou, X. and Raymond, M. (2004). "Recreation demand and economic value: An application of travel cost method for Xiamen Island". *China Economic Review*, 15(4), 398-406. doi: http://dx.doi.org/10.1016/j.chieco.2003.11.001

Cosmina M., Gallenti, G., Marangon, F. and Troiano, S. (2016). "Attitudes towards honey among Italian consumers: A choice experiment approach". *Appetite*, 99, 52-58. doi: http://dx.doi.org/10.1016/j.appet.2015.12.018

Crosby L. A. and Taylor, J. R. (1981). "Effects of consumer information and education on cognition and choice". *Journal of Consumer Research*, 43-56.

Dafe F. (2009). "No business like slum business? The political economy of the continued existence of slums: A case study of Nairobi". *Development Studies Institute, London School of Economics Working Paper*, 12.

Everstine K., Spink, J. and Kennedy, S. (2013). "Economically motivated adulteration (EMA) of food: common characteristics of EMA incidents". *Journal of Food Protection®*, 76(4), 723-735.

Gachora M. (2003). Towards Realization of Kenya‟s Full Beekeeping Potential: A Case Study of Baringo District. . (Phd), University of Bonn, Bonn,Germany.

Gatere K., Kasolia, J. D. and Mwangeka, R. (1985). "Production and marketing of honey and beeswax in Kenya". 175-178.

Green C. and Gerard, K. (2009). "Exploring the social value of health-care interventions: a stated preference discrete choice experiment". *Health economics*, 18(8), 951-976.

Jackson M. (2003). "Honey Market in Uganda". *Apiacata*, 4(2003).

JIACAF. (2009). Development of Beekeeping in Developing Countries and Practical Procedures – Case Study in Africa Akasaka, Japan: Japan Association for International Collaboration of Agriculture and Forestry.

Johnson R. (2014). Food fraud and “Economically Motivated Adulteration” of food and food ingredients. Paper presented at the Vols. 7–5700, R43358, pp. 1–40). Washington, DC: Library of Congress.

Kenya National Bureau of Statistics (KNBS). (2014). Statistical abstract. Nairobi.

Kimenju S., C. and De Groote, H. (2005). Consumers’ Willingness to Pay for Genetically Modified foods in Kenya. Paper presented at the 11thInternational Congress of the EAAE (European Association of Agricultural Economists), The Future of Rural Europe in the Global AgriFood System, Copenhagen, Denmark, .

Kimenju S., C., De Groote, H., Karugia, J., Mbogoh, S. and Poland , D. (2005). "Consumer awareness and attitudes toward GM foods in Kenya". *African Journal of Biotechnology,* 4(10), 1066-1075.

KIPI. (2009). MoU Swiss-Kenya project on Geographical indications (SKGI). Nairobi.

Kiptarus, Asiko, G., Muriuki, J. and Biwott, A. (2011). Beekeeping In Kenya: The Current Situation. Paper presented at the 42nd International Apicultural Congress, Buenos Aires, Argentina.

Kruk M., E., Paczkowski, M., Mbaruku, G., de Pinho, H. and Galea, S. (2009). "Women's preferences for place of delivery in rural Tanzania: a population-based discrete choice experiment". *American journal of public health,* 99(9), 1666.

Kutto E. K., Ngigi, M. W., Karanja, N., Kange’the, E., Bebora, L. C., Lagerkvist, C. J., . . . Okello, J. J. (2011). "Bacterial contamination of kale (brassica oleracea acephala) along the supply chain in nairobi and its environment". *East African Medical Journal,* 88(2), 46–53.

Lai Y., Florkowski, W., Huang, C., Bruckner, B. and Schonhof, I. (1997). Consumer Willingness to pay for inproved attributes of fresh vegetables:A comparison between Atlanta and Berlin. Paper presented at the WAEA, Reno.

Lancaster K., J. . (1966). "A New Approach to Consumer Theory". *Journal of Political Economy,* 74(2), 132-157.

Larceneux F. and Carpenter, M. (2008). "Third party labeling and the consumer decision process: the case of the PGI European label".

Liefeld J. P. (2004). "Consumer knowledge and use of country-of-origin information at the point of purchase". *Journal of Consumer Behaviour,* 4(2), 85-87. doi: 10.1002/cb.161

Lim K. H., Hu, W., Maynard, L. J. and Goddard, E. (2013). "U.S. Consumers’ Preference and Willingness to Pay for Country-of-Origin-Labeled Beef Steak and Food Safety Enhancements". *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie,* 61(1), 93-118. doi: 10.1111/j.1744-7976.2012.01260.x

Lim K. H., Hu, W., Maynard, L. J. and Goddard, E. (2014). "A Taste for Safer Beef? How Much Does Consumers' Perceived Risk Influence Willingness to Pay for Country-of-Origin Labeled Beef". *Agribusiness,* 30(1), 17-30. doi: 10.1002/agr.21365

Lin C.-T. J., Jensen, K. L. and Yen, S. T. (2004). Determinants of Consumer Awareness of Foodborne Pathogens. Paper presented at the AAEA annual meeting, Denver CO.

Loureiro M. L. and Umberger, W. J. (2003). "Estimating consumer willingness to pay for country-of-origin labeling". *Journal of Agricultural and Resource Economics*, 287-301.

Loureiro M. L. and Umberger, W. J. (2005). "Assessing Consumer Preferences for Country-of-Origin Labeling". *Journal of Agricultural and Applied Economics,* 37(01), 49-63. doi: doi:10.1017/S1074070800007094

Louviere J., J., Flynn, N., T. and Carson, R., T. (2010). "Discrete Choice Experiments Are Not ConjointAnalysis". *Journal of Choice Modelling,* 3(3), 57-72.

Louviere J., J., Hensher, D., A. and Swait, J., D. (2000). Stated choice methods: analysis and applications: Cambridge University Press: ISBN 0521788307.

Louviere J. J., Street, D., Burgess, L., Wasi, N., Islam, T. and Marley, A. A. (2008). "Modeling the choices of individual decision-makers by combining efficient choice experiment designs with extra preference information". *Journal of Choice Modelling,* 1(1), 128-164.

Lusk J. L., Brown, J., Mark, T., Proseku, I., Thompson, R. and Welsh, J. (2006). "Consumer behavior, public policy, and country-of-origin labeling". *Applied Economic Perspectives and Policy,* 28(2), 284-292.

McFadden D. and Manski, C., F. . (2001). "The Econometric Analysis of Discrete Choice". *The Scandinavian Journal of Economics,* 103(2(Jun., 2001)), 217-229.

Menapace L., Colson, G., Grebitus, C. and Facendola, M. (2009). "Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels".

Menozzi D., Mora, C., Chryssochoidis, G. and Kehagia, O. (2010). "Traceability, quality and food safety in consumer perception". *ECONOMIA AGRO-ALIMENTARE,* 12(1), 137-158

Michaud C., Llerena, D. and Joly, I. (2012). "Willingness to pay for environmental attributes of non-food agricultural products: a real choice experiment". *European Review of Agricultural Economics*. doi: 10.1093/erae/jbs025

Micheli I. (2013). "Honey and Beekeeping among the Okiek1 of Mariashoni, Mau Forest Escarpment, Nakuru District, Kenya".

Murphy M. (2000). The Importance of Price to the Irish Honey Industry *Pricing Strategy*. Ireland: Cork Institute of Technology.

Murphy M., Cowan, C., Henchion, M. and O'Reilly, S., Vol. 102 Iss: 8, pp. (2000). "Irish consumer preferences for honey: a conjoint approach". *British Food Journal,* 102(8), 585 - 598. doi: 10.1108/00070700010348424

Muthui B., N. (2012). Physiochemical properties of honey from Mwingi and selected urban areas in Kenya, effect of adulterations and some community awareness levels of honey adulteration. (Master of science), Kenyatta University, Nairobi.

Mutisya J., S. (2011). An entrepreneurial assessment of the market access for honey and honey product in the city of Nairobi, Kenya. (PhD Dissertation), University of Nairobi, Nairobi, Kenya.

Ngigi M., W., Okello, J. J., Lagarkvist, C., Karanja, N. and Mburu, J. (2010). Assessment of developing-country urban consumers' willingness to pay for quality of leafy vegetables: The case of middle and high income consumers in Nairobi, Kenya. Paper presented at the 3rd African Association of Agricultural Economics, AAEA/ AEASA Conference Cape Town, South Africa.

Nwibo S., U. (2012). "Assessment of willingness to pay for honey among farming households in Abakalilki local government area of Ebonyi state, nigeria". *Journal of Agriculture and Veterinary Sciences,* 4(December 2012).

O'connor B. (2013). GIs and other instruments for protecting producers' assets in the origin and tradition of their products:factors of success in ACP countries. Paper presented at the Geography of food:reconnecting with origin in the food system, Brussels.

Okech-Ongudi S., Ngigi, M. and Kimurto, P. (2015). "Determinants of consumers' choice and potential willingness to pay higher prices for Biofortified pearl millet products in Kenya".

Ominde G. O. (2014). Influence of value addition in bee-farming products on the livelihood of bee-farmers in Kakamega central sub-county, Kenya. University of Nairobi, Nairobi, Kenya.

Otieno D. J., Ruto, E. and Hubbard, L. (2011). "Cattle Farmers' Preferences for Disease-Free Zones in Kenya: An application of the Choice Experiment Method". *Journal of Agricultural Economics,* 62(1), 207-224.

Oyuga J., K. (2008). Honey market structure and pricing efficiency in the pastoral areas of Baringo District, Kenya. (Masters), university of Nairobi, Nairobi, Kenya.

Profeta A., Balling, R. and Roosen, J. (2012). "The relevance of origin information at the point of sale". *Food Quality and Preference,* 26(1), 1-11. doi: http://dx.doi.org/10.1016/j.foodqual.2012.03.001

Ramba M., G. (2013). Protection of Geographical Indications in Kenya. Paper presented at the EU/ARIPO/KIPI Workshop on Geographical Indications, Nairobi-Kenya.

Republic of Kenya. (2001). Apiculture (Bee Keeping) Industry Sub-sector. Nairobi.

Republic of Kenya. (2007). Draft Geographical indications Bill. Nairobi: GoK.

Republic of Kenya. (2009). The Trade Marks AcT: Chapter 506 Nairobi: National Council for Law Reporting.

Republic of Kenya. (2012). National Agribusiness Strategy ;Making Kenya's agribusiness sector a competitive driver of growth. Nairobi: GoK.

Republic of Kenya. (2013). State Department of livestock regional pastoral livelihoods resilience project *Vulnerable and marginalised groups framework*. Nairobi: Ministry of livestock and fisheries.

Ruto E., Garrod, G. and Scarpa, R. (2008). "Valuing animal genetic resources: a choice modeling application to indigenous cattle in Kenya". *Agricultural Economics*, 38(1), 89-98.

Schupp A., Gillespie, J. and Reed, D. (1998). "Consumer awareness and use of nutrition labels on packaged fresh meats: a pilot study". *Journal of Food Distribution Research*, 29, 24-30.

Shiluli M., Magenya, O., E, V., Kanda, R., Gesicho, M., Kidula, N., Miruka, M., . . . Simioni, E. (2012). Beekeeping in Trans Mara: a baseline study *13nth KARI Biennial Scientific Conference;book of abstracts*. Nairobi: KARI.

Velčovská Š. and Sadílek, T. (2014). "The system of the geographical indication–important component of the politics of the consumers'protection in European Union". *Amfiteatru Economic*, 16(35), 228.

Verbeke W. (2009). "Market differentiation potential of country-of-origin, quality and traceability labeling". *The Estey Centre Journal of International Law and Trade Policy*, 10(1), 20.

Verbeke W., Pieniak, Z., Guerrero, L. and Hersleth, M. (2012). "Consumers' awareness and attitudinal determinants of European Union quality label use on traditional foods". *Bio-based and Applied Economics*, 1(2), 213-229.

Warui M., Gikungu, M., Bosselmann, A., Hansted, L. and Mburu, J. (2014). An assessment of high quality honeys with a potential for Geographical Indication (GI) labeling and initiatives that add value to the honey sector in Kenya. Paper presented at the Apimondia conference.

Yim E., S., Lee, S. and Kim, W., G. (2014). "Determinants of a restaurant average meal price: An application of the hedonic pricing model". *International Journal of Hospitality Management*, 39(0), 11-20. doi: http://dx.doi.org/10.1016/j.ijhm.2014.01.010

CHAPTER THREE

3.0 HONEY VALUE CHAIN AND CONSUMER'S CHARACTERISTICS

This chapter covers the honey value chain and consumer characteristics. Descriptive statistics was used, to analyse primary data collected for 478 respondents drawn from Nairobi, Kitui and Nakuru counties through multistage sampling. The study reveals that honey consumers prefer local honey that is labelled by the specific region of origin name, organic but they are indifferent to type of processing. The main sources of honey are the supermarket and farm gate. Urban honey consumers are youthful, learned with high income levels.

3.1 Background Information

The livestock sector in Kenya contributes up to 10% of the national GDP and the beekeeping subsector's share is about 2% of the agricultural GDP (Kiptarus *et al.*, 2011; Muya, 2004). Moreover, beekeeping enables farmers to earn revenue and be food secure by providing honey, beeswax and pollen as food. For medicine the subsector provides propolis, bee venom and royal jelly. The subsector is also known to conserving the natural environment and through pollination it enhances biodiversity in food and seed production (Kiptarus *et al.*, 2011; Muya, 2004). For instance, every three food bites made in the world is as a result of pollination, which bees are essential (Carrol, 2006).

Value chain analysis enables stakeholders to understand which role, strengths, opportunities and challenges faced by different actors in adding value to the product before it gets to the final consumer. The honey value chain is unique and the main actors in developing countries include those that supply inputs, honey producers, those that bulk, those that process, transporters who may also trade the product, those who sell in the export market, those who sell at wholesale, retail sellers and end users (Kilimo Trust, 2012).

The value chains in developing nations are usually unstructured with small scale farmers and processors, this makes the quality of honey sold to be of less quality. In addition, farmers use traditional ways of honey production and handling, this makes them to produce below potential. This forces other actors to operate below their potential because of low supply. Consumers though are supplemented with quality imports from diverse imports, which is usually quite expensive (Kilimo Trust, 2012).

Honey production is an alternative source of livelihood for farmers living in areas with erratic rainfall, mainly the ASALs. As an investment opportunity, honey production has minimal land and the capital requirements as compared to other agricultural activities. This makes it viable for low income earners (Carrol, 2006). Moreover the demand for honey is always growing, especially the urban dwellers whose disposable income has increased and they are more mindful of the benefits consuming natural foods like honey. However, the supply of honey has dwindled over time and cannot meet the local level of honey demand. This is set to worsen with climate change, increased use of chemical pesticides, farmers continued use of rudimentary means of honey production and financial challenges (Kiptarus *et al.*, 2011). As a result the supply side should be improved through informed means like research focusing on its value chain.

To be able to understand better the Honey sector in Kenya with regards to product origin, it was necessary to evaluate the value chain from both past studies and primary data. This covers how producers are linked to where consumers source their honey, the average honey supply, consumers demand, service providers at every stage of the chain and how the actors relate with each other. The challenges and opportunities experienced by the actors are also researched. The current study sought to describe honey consumers characteristics and the value chain of honey in Kenya.

3.2 Methodology

3.2.1 Conceptual Framework

The current issues in the Kenyan honey sub-sector include poor coordination as a result of weak institutional support and infrastructure leading to fragmentation of the sector at all levels. In addition, there is low intake of honey by consumers due to limited promotion and their dismal knowledge of honey's properties, benefits and uses. Furthermore, consumers experience high prices for local honey due to inadequate supply (Baiya and Nyakundi, 2007). There are also, marketing challenges due to poor marketing infrastructure, inadequate marketing information, poor market organization and unethical marketing practices that has encouraged fake honey in the market (Watson and van Binsbergen, 2008). Because of these challenges the apiculture sector is operating below its potential. It is therefore, hypothesized that encouraging the labelling of honey with their local origin, will make consumers to be willing to pay a premium. This in turn reduces honey adulteration, increase quantity and quality of honey produced in the country and lead to rural development (Figure 2).

There are a number of rationales for GI labelling. Since majority of the products are traditional, handled by rural communities over generations and have gained reputation on the markets for specific qualities. Any premium derived from such activities could lead to rural development. Another rationale is to minimize information problems in the market that may lead to moral hazard and adverse selection. Consumers who are interested with exclusivity of a given honey product in the market, may take advantage since the product reputation is protected by law (ARIPO, 2012).

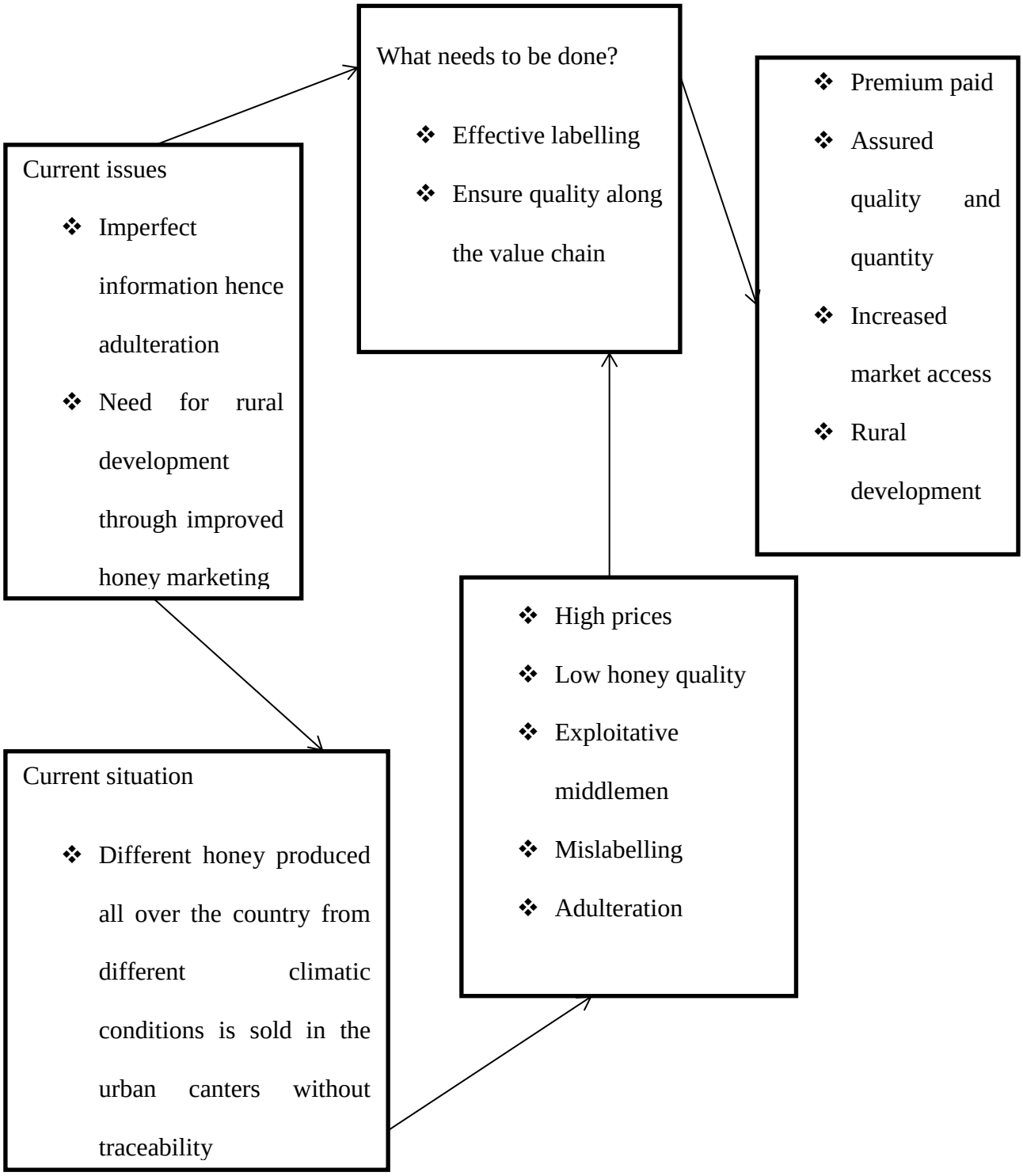


Figure 2: Conceptual Framework

3.2.2 Sampling and Data Collection

The target population included urban households residing in Nairobi, Nakuru and Kitui counties. In order to test the theoretical concept stated in this study, the survey method was employed. The survey was conducted through direct interviews conducted in October through November 2014. Direct interviews were preferred since clarifications could be made as issues arose. This yielded satisfying responses. In addition, only household shoppers that consumed honey were allowed to answer the questionnaire. This reduced getting biased results from non-users. Respondents to the final survey were mainly honey consumers in Kenya. The sampling unit was a honey consumer and their household.

Focus group discussions (FGDs) were held in each of the three study sites and participants were chosen purposively based on key informants along the honey value chain, they were made up of equal numbers of both genders. The key informants ranged from technocrats, marketers, consumers and some producers in the honey sector. They had varied education backgrounds and experience in the honey sector. FGDs were held mainly to verify the issues, acquire timely information and the relevance of GI labelling in the local honey sector. Participants confirmed the relevance of questions that rose from this study to honey users. Further their recommendations were used to streamline the questionnaires used in the final survey.

The study employed a multistage sampling method. This is because there was no prior list of all honey consumers in Kenya. In addition, the method is most suited since there was a possibility of consumption diversity within the study areas in terms of knowledge levels and preferences of different quality honey attributes. First, a purposive sampling of three counties for data collection was done. Nairobi County qualified because majority of the urban population are found here. Also Majority of marketed honey (80%) ends up in Nairobi (Baiya and Nyakundi, 2007). Kitui County was also picked since it represented the leading area of

honey production, hence an in-depth knowledge on honey by residents. Nakuru County qualified as another net urban honey consumption region that was near the second largest honey producing zone, Baringo.

In Nairobi, stratified sampling was used. Three income strata were used for high income settlements, middle income and the low income suburbs of Nairobi; Westlands, Kasarani and Kawangware respectively. Consumers were interviewed randomly from these households found in all the three strata. This was necessary in capturing consuming households that bought directly from farmers or through informal channels and those that bought from other retail outlets. It was well established that majority of honey was bought from supermarkets and in processed form (Mutisya, 2011; Carroll, 2002).

In Kitui, Kitui town was picked purposively, because it was more cosmopolitan and high heterogeneity among consumer socio demographics was expected. Also most of the urban settlers buy the honey consumed in the households (KIT and IIRR, 2010) . Honey consumers were randomly sampled in major streets and markets of Kitui town.

In Nakuru, the retail outlets around the CBD were picked purposively. Consumers were randomly picked to respond to questionnaires. Nakuru is near Baringo and Marigat: high honey producing zones.

Having three data collection areas, respondents were apportioned depending on heterogeneity of the population and the distribution. A total of 478 questionnaires were fully answered from the three study areas as; 233 respondents in Nairobi, 119 respondents in Kitui and 126 respondents in Nakuru counties.

3.2.3 Data Analysis

This study uses data from both primary and secondary literature for various actors along the honey value chain in Kenya. The data collected for this section was mainly qualitative. It was analysed in STATA software version 12 to estimate the descriptive statistics; means and percentages.

3.3 Results and Discussion

3.3.1 The Honey Value Chain in Kenya

A number of studies have tackled the traditional honey value chain in Kenya (Kimitei *et al.*, 2012; Kosgei *et al.*, 2011; KIT and IIRR, 2010). In addition, these studies reveal main market actors to be; individual farmers, cooperatives, Community Based Organizations, Non-Governmental Organizations, traders, processors, packers and other actors in the value chain (Baiya and Nyakundi, 2007; Jiwa, 2003; Carroll, 2002). Also, the beekeeping production tools include hives, bee protective clothing, bee smokers, hive tools, containers for honey and beeswax (Republic of Uganda, 2012). Bees collect nectar from agricultural crops, fruit trees, ornamentals and wild flowers (Carroll, 2002). Hive products are processed both on farm by processing centres owned by the community and by commercial processors. Honey among other hive products, is processed by extraction, pressing, and straining (FAO, 2001). All the same, the production of hive products is way below its potential (Republic of Kenya, 2001). Even though better production technologies have been introduced, majority of farmers keep on using indigenous knowledge, skills and equipment (Mugendi, 2012; Muriuki, 2004). This is despite the fact that honey contributes a significant source of income to farmers mainly in the ASALs where due to erratic climate other agricultural activities are not viable (Kimitei and Korir, 2012; Gatere *et al.*, 1985).

Farmers face many challenges; drought, pests and diseases of honey bee, lack of apiary equipment and death of colony, marketing problems and shortages of bee forage and lack of adequate apiary skills (Kosgei *et al.*, 2011). However, there is a market for local honey (Mutisya, 2011; Oyuga, 2008). Even though, honey marketing is inefficient because of disaggregated market information, unethical marketing practices and high consumer prices due to low supply (Kimitei *et al.*, 2012; Orina 2012; Okinyi *et al.*, 2005). Other identified challenges in the honey sector in Kenya include, limited processing of honey and its products, incomplete institutional support and technological transfer, partial establishment of inspectorate services for quality control and lack of value adding through processing and packaging (Kiptarus, 2005).

However, to the best of our knowledge none of the studies in Kenya has incorporated consumer perceptions with regard to local honey origin aspects. This study therefore made inquiries from consumers about their preferences for different aspects of honey origin. The findings are informative for consideration during future GI labelling and honey handling.

Results from the current study show that, about 95% of respondents prefer local honey from Kenyan regions to imported brands. This is similar to results recorded by (Cosmina *et al.*, 2016; Wu *et al.*, 2015); most consumers prefer locally produced honey to imported ones. Moreover, the most preferred local honey brands sold in major retail outlets include *Kitui* woodlands, pure natural honey, green forest, *Baringo*, *Tharaka*, *Asali poa*, *Mwingi* natural honey, *Baraka* honey and *Kipepeo*. This finding is in line with results reported by (Mutisya, 2011). They also account for over 16% of the entire honey market share. Nevertheless, honey from Australia is highly preferred by those who wish for imported honey brands. Though, approximately 84% of the respondents chose labelling of honey with the specific region of origin unlike just the COO (Wu *et al.*, 2015). This is attributed to honey characteristics

varying with the specific regions (Escuredo *et al.*, 2014; Orina 2012; De Alda-Garcilope *et al.*, 2012).

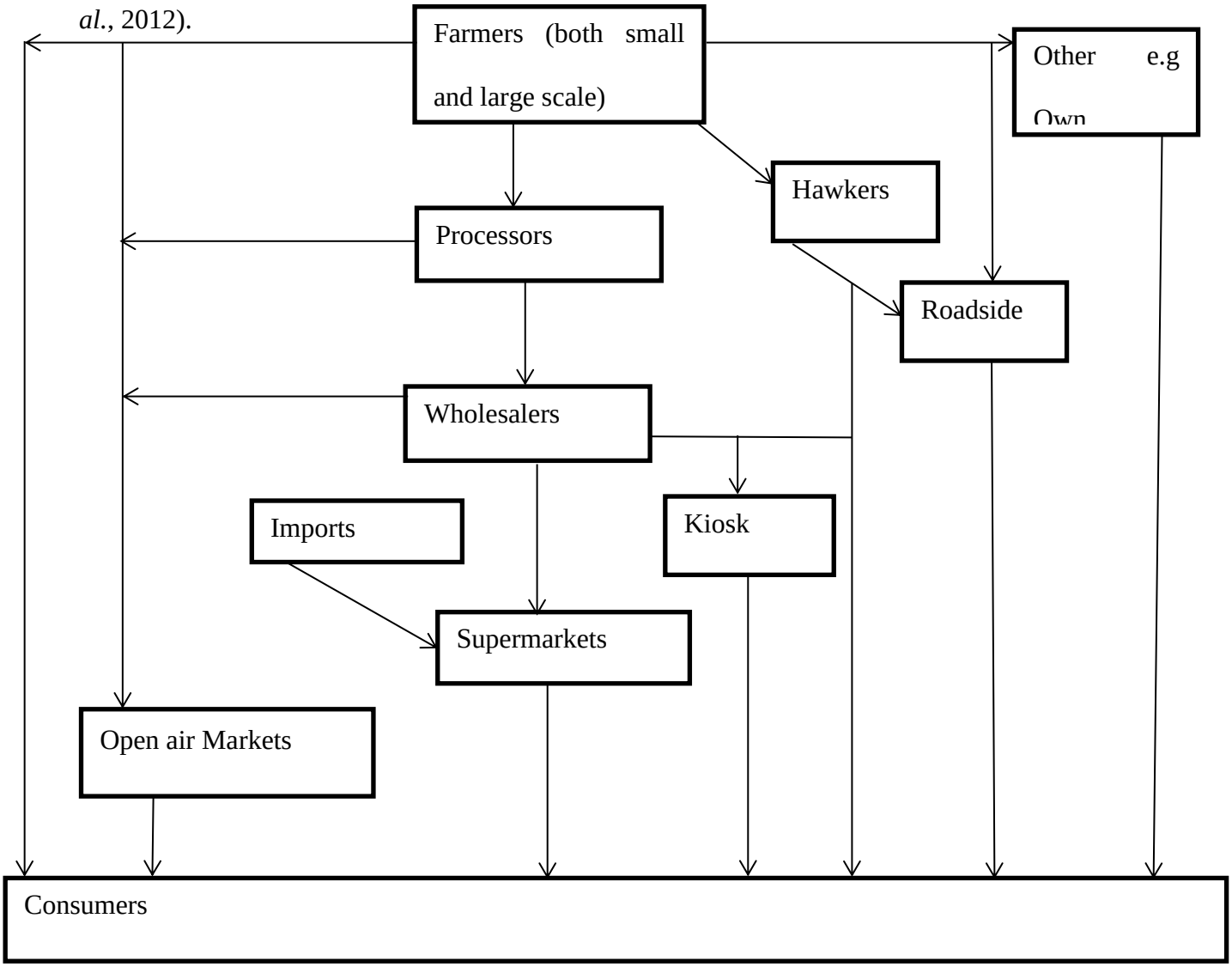


Figure 3: A Value Chain of Honey Flow in Kenya. Source: Survey Data (2014).

About 86% of Kenyans fancy honey produced in ASALs to that from highlands. This complement the fact that 80% of Kenyan honey is produced in ASALs areas (Republic of Kenya, 2008). Most of them consider the fact that bees utilise flowers to make honey hence the need for a little rain, but for it to be sweeter dry weather is equally necessary. Those who prefer organic honey account for 91%. This is contributed by consumers concern for food safety rising all over the world (Cosmina *et al.*, 2016). Those who prefer non-organic honey claim bees that feed on anything would yield honey with high medicinal content. Slightly above half of the respondents at 53% prefer unprocessed honey, this leaves around 48%

going for processed honey. These findings are justified by Mutisya (2011), who notes that most processed honey is adulterated in Kenya mainly by middlemen.

Majority of consumers buy from supermarkets, farmers and hawkers with about 36%, 37% and 12% respectively. Hence, only less than 15% buy from other sources like kiosks, market and own production. Results are similar to Mutisya (2011), who found that supermarket and farmers are the main outlet of food products in Kenya. A diagrammatic representation of the honey value chain sector in Kenya above (in figure 3) is drawn from past literature and current findings. This is necessary to provide some overview of the sectors flow of goods among several actors.

3.3.2 Characteristics of the Respondents and their Households

Table 1 presents a summary of honey consumer characteristics. The results are based on responses from 478 interviewees. More males responded (about 66%) as compared to females (about 34%). This is in agreement with national census of 2009, where there are more proportionate males in major urban areas in the country (Republic of Kenya, 2011). The higher number of male respondents could be attributed to the study being urban based and majority of the male gender are found there because they have got better income incentives than their female counterparts (Agesa and Agesa, 1999). The consequence of this is the persistent gender gap, in terms of access to resources that fuel consumer purchasing power and preferences. However, it is important to consider female members' responsibility of food preparation and therefore, they should also be targeted by food traceability and safety programmes.

The average age of the respondents is 32years. The minimum age of the respondents is 18 and a maximum of 60. This is because the researcher had interest only in persons that take part in buying household foodstuffs. The average household size is 4 people consuming on

average 1kg of honey per month, most commonly twice a day. Although only about 64% of honey users, consume it on a regular basis.

The mean number of years of formal education of the respondents is about 13, with approximately 81% of the respondents having a secondary (at least secondary education). The average monthly household income is approximately Kshs. 36447 (Kshs. 100=1$).These figures (for education and income) for urban honey consumers are relatively higher compared to those reported by other studies in Kenya (De Groote and Kimenju, 2012).

Table 1: Socioeconomic Characteristics of the Respondents

Variable	Statistics
Average age of the respondent (years)	32.49(9.73)
Average Years of schooling completed(years)	12.54 (2.92)
Average monthly household income (Kshs)	36446.6(55156.1)
Average Household size	4.0(1.88)
Average volume of honey consumed (Kgs per Month)	1.1(1.5)
Average time of honey use (daily)	2(1)
Level of Education (% respondents)Primary	18.6
Secondary	35.6
College/diploma	30.8
Bachelor degree	13.6
Other (MSc, PhD)	1.4
Gender of respondent (%male)	65.9
Religion (% Christian)	96.7
Aware of GI labelling(% Yes)	35
Consumes Honey regularly (weekly)	64.0

Note: Standard deviations are in parentheses (for continuous variables).

Source: Survey Data (2014).

3.4 Conclusions and Implications

The Kenyan honey value chain is highly disjointed with actors producing below potential that has seen the local honey demand surpassing supply. For instance honey production is rudimentary with several challenges; although it still sustains many small scale farmers in areas with erratic rainfall. Moreover, consumers prefer local honey that is specified by the specific region of origin name, organic, from ASALs but they are indifferent to type of processing. The main sources of honey are the supermarket and farm gate. A typical urban honey consumer is a youth, male, who has spent about 13 years spent in education and high income levels, from a household with 4 members that uses 1kg of honey per month, twice daily.

This calls for stakeholders to provide necessary environment for increased honey production and value addition locally, because there is demand for local safe honey, that is used for medicinal and health reasons. Honey that has additional label the reveal the specific region of origin is bound to attract many sales as revealed by consumer preferences. Lastly, honey marketing strategies for urban areas could target the youth elites since they are the majority.

References

Agesa J. and Agesa, R. U. (1999). "Gender differences in the incidence of rural to urban migration: Evidence from Kenya". *The Journal of Development Studies,* 35(6), 36-58. doi: 10.1080/00220389908422601

ARIPO. (2012). The protection of Geographical Indications (GIs) in Africa. Paper presented at the Information Seminar on the Implementation of the EU-ESA Interim EPA, Mauritius.

Baiya H. and Nyakundi, B. (2007). Plan Bee: Linking Kenyan Beekeepers to the Market Synthesis Report *SITE Enterprise Promotion*. Nairobi.

Carrol T. (2006). A beginner's guide to beekeeping in Kenya: Legacy Books Press. Nairobi.

Carroll T. (2002). "A study of the beekeeping sector in Kenya June 2001 - January 2002". *Self Help Development International (SHDI).*

Cosmina M., Gallenti, G., Marangon, F. and Troiano, S. (2016). "Attitudes towards honey among Italian consumers: A choice experiment approach". *Appetite,* 99, 52-58. doi: http://dx.doi.org/10.1016/j.appet.2015.12.018

De Alda-Garcilope C., Gallego-Picó, A., Bravo-Yagüe, J., C. , Garcinuño-Martínez , R. M. and Fernández-Hernando, P. (2012). "Characterization of Spanish honeys with protected designation of origin ''Miel de Granada'' according to their mineral content". *Food chemistry,* 135(2012), 1785–1788.

De Groote H. and Kimenju, S. C. (2012). "Consumer preferences for maize products in urban Kenya". *Food & Nutrition Bulletin,* 33(2), 99-110.

Escuredo O., Dobre, I., Fernández-González, M. and Seijo, M. C. (2014). "Contribution of botanical origin and sugar composition of honeys on the crystallization phenomenon". *Food chemistry,* 149(0), 84-90. doi: http://dx.doi.org/10.1016/j.foodchem.2013.10.097

FAO. (2001). "Revised codex standard for honey". *Codex stan,* 12, 1982.

Gatere K., Kasolia, J. D. and Mwangeka, R. (1985). "Production and marketing of honey and beeswax in Kenya". 175-178.

Jiwa F. (2003). "Honey Care Africa's Tripartite Model;An Innovative Approach To sustainable Beekeeping In Kenya". *Apimondia Journal*.

Kilimo Trust. (2012). "Development of Inclusive Markets in Agriculture and Trade (DIMAT): The Nature and Markets of Honey Value Chains in Uganda".

Kimitei R., K. and Korir, B., K. (2012). Indigenous Beekeeping for Sustainable Beekeeping Development: A Case Study in Kibwezi District, Kenya. Paper presented at the National Council for Science and Technology, Kenyatta International Conference Centre (KICC),Nairobi.

Kimitei R., K., Korir, B., K. and Kaguthi, P. (2012). Honey Production and Marketing System, Challenges and Opportunities In South Eastern Kenya *13nth KARI Biannual conference;book of absracts*. Niarobi: KARI.

Kiptarus, Asiko, G., Muriuki, J. and Biwott, A. (2011). Beekeeping In Kenya: The Current Situation. Paper presented at the 42nd International Apicultural Congress, Buenos Aires, Argentina.

Kiptarus J., K. (2005). Focus On Livestock Sector: Supply Policy Framework Strategies Status And Links WIith Value Addition. Paper presented at the Value Asses Food & Export Investment, The Grand Regency Hotel, Nairobi.

KIT and IIRR. (2010). Financing the honey chain in Kitui, Eastern Kenya *Value Chain Finance: Beyond microfinance for rural entrepreneurs*. Nirobi, Kenya: Royal Tropical Institute, Amsterdam International Institute of Rural Reconstruction: ISBN 139789460220555.

Kosgei R., Sulo, T. and Chepng'eno, W. (2011). "Structure, conduct and performance of honey marketing in West Pokot district, Kenya". *European Journal of Management,* 11(4).

Mugendi K., D. (2012). Adoption Of Bee Farming As An Adaptation Strategy For Rainfall Variability Effects On Food Security Among The Vulnerability Communities In Kenya: Case Of Kitui County. (Masters), University Of Nairobi, Nairobi.

Muriuki J., M. (2004). Beekeeping technology adoption and its effects on reaource productivity in Southern Kenya Rangelands. (masters), University of Nairobi, Nairobi.

Mutisya J., S. (2011). An entrepreneurial assessment of the market access for honey and honey product in the city of Nairobi, Kenya. (PhD Dissertation), University of Nairobi, Nairobi, Kenya.

Muya B. I. (2004). "An analysis report on Kenya's apiculture sub-sector". *BENFLO consultants, Nairobi*.

Okinyi B., P., Mbae, R., M. , Ruhi, Z., W. and Mbithi, J. (2005). Survey Of Honey Quality In Kenyan Markets. In A. a. E. L. D. i. t. M. o. Livestock (Ed.). Nairobi: Government of Kenya.

Orina N., I. (2012). Quality And Safety Characteristics Of Honey Produced In Different Regions Of Kenya. (Master of Science), Jomo Kenyatta University of Technology, Nairobi, Kenya.

Oyuga J., K. (2008). Honey market structure and pricing efficiency in the pastoral areas of Baringo District, Kenya. (Masters), university of Nairobi, Nairobi, Kenya.

Republic of Kenya. (2001). Apiculture (Bee Keeping) Industry Sub-sector. Nairobi.

Republic of Kenya. (2008). Session Paper No2 Of 2008 On National Livestock Policy. Nairobi.

Republic of Kenya. (2011). Kenya Population Datasheet.

Republic of Uganda. (2012). The National Bee Keeping Training and Extension Manual. Kampala: GoU.

Watson D., J. and van Binsbergen, J. (2008). Livelihood diversifi cation opportunities for pastoralists in Turkana, Kenya *ILRI Research Report 5* (pp. 43). Nairobi, Kenya: ILRI (International Livestock Research Institute).

Wu S., Fooks, J. R., Messer, K. D. and Delaney, D. (2015). "Consumer demand for local honey". *Applied Economics,* 47(41), 4377-4394. doi: 10.1080/00036846.2015.1030564

CHAPTER FOUR

4.0 CONSUMER AWARENESS OF GI LABELLING

This chapter discusses consumer awareness of origin labels; it was motivated by honey adulteration problem. Urban honey consumers were interviewed in multistage sampling method to evaluate their knowledge of GI and the factors influencing their awareness. The results reveal limited consumer knowledge of GI. Also positive determinants of GI awareness are gender, trust, education, source of honey and seeking prior information. However, the negative significant influencer includes consumers' confidence in honey produced by local farmers. Therefore, consumers should be educated on GI as it is implemented in the country.

4.1 Background Information

No interest without awareness, consumers would only be willing to buy and by extension pay a premium for what they know. So it is important to gauge their prior knowledge of GI. Product awareness is the ability of the decision-makers in organizational buying centres to recognize or recall a product brand (Homburg *et al.*, 2010). In this case, Kenyan consumers' ability to identify geographical indicated products from others. Moreover there are popular honey brands that have been awarded Protected Geographic Indication (PGI) internationally, such as *Oku* honey from Cameroon, which is white in colour with naturally creamy texture (Boto *et al.*, 2013). In addition, *Manuka* honey from New Zealand is sold for medicinal values and *Coorg* honey from India is popular for biodiversity conservation (Belletti *et al.*, 2011). Some more brands have been proposed for having a potential like the Nile honey from Uganda (Boto *et al.*, 2013).

In Kenya, coffee and tea have been registered for geographical protection through certification marks; *Ngoro Ngoro* Mountain coffee, *Gathuthi* tea, Kisii. Moreover, potential honey included *Kitui*, *West Pokot* and *Baringo* Honey (O'connor, 2013; ARIPO, 2012).

However, local Geographical labelled honey is yet to be registered. Local consumers still have access to imported honey brands that are geographically indicated.

Studies have been done in developed nations to gauge the awareness and preference of different GI labels (Cottrill, 2015; Awada and Yiannaka, 2011; Menapace *et al.*, 2009). To characterise different food products with regard to geographical spatial distribution (De Alda-Garcilope *et al.*, 2012). Also, consumer WTP for different GI labels(Seetisarn and Chiaravutthi, 2011). In addition, reviews on the economics of GI and ways of evaluating GI (Belletti *et al.*, 2011; Menapace *et al.*, 2009). Moreover, there has been increased interest on investigating GI in developing continents like Africa (ARIPO, 2012; Blakeney *et al.*, 2012). To be specific, in Kenya coffee has been studied as potential GI product (Bagal *et al.*, 2013).

Following the challenges of information asymmetry problems mainly honey adulteration, it is expected that consumers would be aware of food labels that ensure food quality like geographical indicators. However, consumers may be aware of food safety risk but still be unaware of solutions to it like organic foods. Since GI aims at reducing information cost (WIPO, 2009), it is important to note that, Kenyans are aware of innovations that reduce transaction costs and have adopted them like M-banking in Kenya (Kirui *et al.*, 2010). Also, mass media is important for awareness (Ajayi, 2014).

Previous studies in Kenya have widely covered various food product aspects; genetic modification, organic, types of standardisation bodies and environmental issues like climate change (Okello *et al.*, 2011; Kimemia and Oyare, 2006; Kimenju and De Groote, 2005). Furthermore, awareness studies of different quality product labels have been done both locally and internationally for organic products and genetically modified(GM) foods (Kimemia and Oyare, 2006; Kimenju and De Groote, 2005). However, there is literature gap on consumer awareness of GI in developing nations and specifically honey urban consumers

in Kenya. Therefore, this study sought to assess consumers' awareness and the factors influencing their awareness of GI.

4.2 Methodology

4.2.1 Model Specification

The study analyses determinants of consumers' probability to be aware of Geographical indications. The dependent variable has a binary outcome; a consumer is either aware of GI labelling or not aware. In such a case Logit or probit models are used. The difference between the two models lies in this assumption about the distribution of the errors; the logit model assumes standard logistic distribution of errors and; Probit model assumes normal distribution of error terms. However, logit model has limitations, since it has a simple mathematical form. It does not assume normality, linearity and homogeneity of variance for the independent variables. Therefore, this study employs a probit model. The dependent variable is dualistic and takes the value of one if the consumer is aware or zero otherwise. The probit model can be specified according to Greene (2003):

$$P(\alpha_i = 0) = \emptyset\left[\frac{-\beta_a^i X_i}{\sigma}\right] \qquad 1$$

Where; "α_i" is the dependent variable if individual *i* responded to be aware of GI labelling and 0= otherwise; "*P*" is a vector of respondent's consumption characteristics; "β"is a vector of coefficients and *"ϕ"* is the cumulative probability distribution. The probability that individual *i* know about GI, is estimated empirically as;

$$\Pr[Yi = 1] = Xi\beta + \varepsilon i \qquad 2$$

$X_i$is a vector of socioeconomic and food demand characteristics that are posited to influence consumers' awareness of GI labelling; $\boldsymbol{\beta i}$ is a vector of parameters estimated while εi is the statistical random term specific to individual honey consumer. In this study, the independent

variables considered are the consumer perceptions and socioeconomic characteristics. The dependent variable is Consumer awareness of GI.

Additionally, marginal effects are estimated to measure instantaneous effects of changes in any explanatory variable on the predicted probability of being aware, while holding other variables constant. The marginal effects are computed as:

$\beta m = \beta i[\frac{\delta(\beta i X i + \varepsilon i)}{\delta \beta i X i}]\beta i$ For continuous independent variables 3

Or $\beta m = \Pr[\gamma i = 1] - \Pr[\gamma i = 0]$ for dummy-coded variables 4

The descriptive statistics, probit model and the marginal effects were estimated using the statistical package STATA version 12. Furthermore, factors hypothesized to influence consumers' awareness of GI labelling selected for the binary logit regression are shown in Table 2.

Mass media is an important means of sending out information to masses at the same time, which makes it an important avenue for consumer education. This study considers radio as a form of mass communication that consumer's access food safety information. In addition about 80% of Kenyans possess a radio and receive news through it. This is attributed radio being affordable as compared to television and newspaper (Kenya National Bureau of Statistics (KNBS), 2010).

It is considerably expected that education level positively impacts consumer awareness level (Teisl *et al.*, 1999). Furthermore education system is one of the avenues that populations are taught on important issues, like HIV/AIDS. Besides,Lin *et al*. (2004) found that consumers that had attained at least college education had a higher likelihood to be aware of food pathogens unlike those with lesser education. Similarly, Ishak and Zabil (2012), found a higher level of consumer awareness of their rights among those with tertiary education as

compared to those with secondary education or lesser. It is therefore hypothesised that higher education level of consumers positively influences GI awareness in Kenya. Furthermore, when consumers have prior knowledge then they are more likely to be aware of food safety mechanisms. Therefore it is hypothesized that consumers who seek prior knowledge before buying honey are more likely to know about GI.

Gender and age are empirical in awareness studies. Even though, Tzimitra-Kalogianni *et al.* (2002) reported a high awareness level among women of food-related Private-label brands in Greece. A similar study in Zimbabwe by Nyengerai (2014) revealed the contrary, where by women had lower perception, quality and value for Private-label brands. In addition, effect of age on awareness is arguable, young consumers may be more aware because they are better at using modern technology mainly the internet and mobile phones in accessing information unlike their older counterparts (Okello *et al.*, 2014; Dommeyer and Gross, 2003). However, older people are more experienced in shopping and could increase their awareness as compared to young group (Nabirasool and Prabhakar, 2014).

Supermarket as compared to other retail outlets offers a great variety of items arranged in an aisle. Consumers are at liberty to select among different brands of the same products that are attractively labelled, which is a good source of consumer information on foods they buy. Grunert *et al.* (2015), found that consumers who are supermarket literate are more likely to have brand awareness with a more positive brand image as compared to those with little knowledge in China. In addition, (Pambo *et al.*, 2014) revealed that those who shop in the supermarket in Kenya are likely to be more aware of food fortification.

There is empirical evidence of varying consumer awareness with their regions of residence. Lin *et al.* (2004), found that consumer awareness of different food pathogens varied with the specific region they came from. Furthermore, Ishak and Zabil (2012) revealed consumers'

awareness varied with location and more-urban dwellers were less aware of their rights in Malaysia. However, it is also possible that City residents may be more aware of GI because they have access to more information channels like public campaigns than their rural counterparts.

Consumer trust in food products influence their attitude and eventually purchase decision. More so, Chen (2013), found consumer trust in manufacturers and retailer positively impacts food safety decisions. Therefore, the current study hypothesizes that if a consumer trusts their potential listed GI food product, then they are likely to be more aware of GI as compared to those that luck trust.

Consumers' strong perception of local honey at farm level is a pre-requisite of GI implementation, its impact on awareness is also important. The challenge of honey adulteration in the country made it necessary to see into consumers' confidence in local honey at farm gate. Previous studies have however reported that confidence in farmers is not directly related to food safety perception (Chen, 2013). Nevertheless, because GI relates to product origin, the current study hypothesizes that consumers who are confident in local honey at farm level maybe more aware of GI.

Marriage and members of the same households (household size) in this study are considered as an organisation just like formal groups. There is usually structured flow of information in such organisation, which makes it members to be more aware than the rest (Pambo *et al.*, 2014). Therefore, it is expected that if a consumer is married or from a larger household size, they are likely to be more aware about GI.

Table 2: The expected sign and VIF values of Variables affecting consumer awareness of GI

Variable	Description	Expected Sign	VIF value
Kitui	1= Kitui resident, 0=Nairobi resident	-	1.31
Nakuru	1= Nakuru resident, 0=Nairobi resident	-	1.2
Honey Volume	1=>0.5 kg of honey per month, 0=otherwise	+	1.09
Radio	1= Respondent always listens on the radio, 0=Otherwise	+	1.06
Marital Status	1= married, 0 = otherwise	±	1.46
Trust	1=Trust mentioned potential GI product, 0=Otherwise	+	1.11
Gender	1 = male, 0 = female	±	1.03
Age	Respondent's years of living	±	1.45
Quality	1= At least agrees that farmer gate honey is quality, 0=Otherwise	±	1.07
Household size	Number of household residents	±	1.12
Education Level	0= up to secondary education, 1= tertiary education	+	1.13
Supermarket	1= buys honey from supermarket, 0=farm gate)	+	1.45
Other honey sources	1= buys honey from other honey sources, 0=farm gate)	±	1.4
Prior information	1= Respondent seeks honey information prior, 0= Otherwise	+	1.08

Source: Survey Data (2014).

The more honey a household uses in a month is expected to positively impact on GI awareness. This is because a product bought in large volumes is likely to stay longer and cost more, therefore consumers are careful when buying it and would consider aspects of food safety including GI.

Suitability of selected factors for econometric analysis as shown in Table 2 was tested for multicollinearity. This was tested using the variance inflation factors (VIF), which was

computed for each of the consumer characteristics. The VIF computation involves estimation of 'artificial' ordinary least squares (OLS) regressions between each of the consumer characteristics as the 'dependent' variable with the rest as dependent variables (Pambo *et al.*, 2014; Otieno, 2012). The VIF for each factor is calculated as:

$$VIF_i = \frac{1}{1-R_i^2} \qquad 5$$

Where R_i^2 is the R^2 of the artificial regression with the *i*th independent variable as a 'dependent' variable.

The mean VIF was 1.21with individual ranging from 1.46 to 1.03 indicating absence of multicollinearity. Maddala (2001), suggested that variables with VIF<5 have no multicollinearity; hence they are selected for inclusion in the probit regression. In addition, there was a problem of non-constant variance, which was solved by use of robust standard errors. All the same the binary probit regression fit the data well with an R-squared of about 0.20, this is acceptable since, works done by Domencich and McFadden (1975), revealed that R squared values between 0.2-0.4 are correspond to values between 0.7-0.9 for the same in ordinary linear regression. In addition, the analysis had significant chi of 78.42 at 1% and a log-likelihood with the right negative sign of -256.86.

4.3 Results and Discussion

4.3:1 Awareness of GI in Kenya

About 35% of honey consumers claim to know about GI in the urban areas of Kenya. Results show that education and income explain GI awareness significantly at 1%. Kimenju and De Groote (2005), reported almost similar results: about 38% of Nairobi consumers were aware of GM foods. More so, income and education significantly affected GM awareness.

To evaluate the depth of GI knowledge, respondents picked the definition they deemed best for GI, among four definitions that the author provided. The best definition of GI was picked by only 31% of the respondents; in addition, the least definition was selected by the majority 59%. This shows limited levels of GI knowledge depth despite the convincing numbers of those who claim to have heard about it. About 10% of respondents have average knowledge of GI. The paired t-test shows a significant (1%) relationship between the level of education and the definition picked. These findings show the need for creating awareness about GI and its role in development as a whole.

The study also investigated the different sources of GI knowledge; the rationale being the identification of various channels is that most suit future information dissemination. Friends and mass media lead by 36% and 41% respectively. The former shows the relevance of social capital in spreading information. Hence need to explore various channels like social media in information transmission. The latter is backed up by the findings of a number of awareness studies (Ajayi, 2014; Cheng, 2011; Kimenju *et al.*, 2005). Other sources of GI information are mainly different forms of learning like schooling and work experience.

About 73% of respondents claim to know a potential GI product. Honey, tea, rice, Sugar and milk are the products listed to be the likely potential GI goods in Kenya. Honey and tea have been identified before in a baseline study by a joint project between the Government of Kenya and Swiss; although, it is the first time for sugar, rice and milk to be documented (KIPI, 2009). These products have to come from a specific area, which impact the uniqueness of the product; therefore respondents had to state the area source. Honey from *Kitui* or *Baringo*, Milk from *Molo*, rice from *Mwea* and *Ahero*, Sugar from *Mumias* and tea from *Kericho* were the most commonly listed potential GI foods. When asked if they trust their listed potential GI products, about 83% trust them. Consumer's trust for food products is

important since it influences even the level of consumer's WTP for certified animal-friendly products (Nocella *et al.*, 2007).

Approximately 57% of urban Kenyan honey consumers know a potential GI honey; about 53% of these have used this honey. Those that have consumed the potential GI honey claim it to be better from other brands by it being pure, tasty, natural, quality, sweeter, thick and colour. These are honey attributes that consumers rank to be important or missing in the honey market. These attributes originate from various rainfall and specific cultures observed by residents of an area. However, some consumers are indifferent on potential GI honey and others. Those that have not consumed potential GI honey that they mentioned earlier blame it on its unavailability, lack of labels, expensive, lack of interest, and lack of information. Some consumers claim potential GI honey as untrustworthy because of adulteration; this is a show of mistrust in local standard bodies.

GI labelling has plenty of benefits for both consumers and producers (Teuber, 2011). Its importance in quality assurance is agreed on by majority of respondents by about 65%. This is in line with the recent consumer concern of product quality (Ngigi *et al.*, 2010) and use of GI as a quality indicator (Menapace and Moschini, 2011). Moreover, about 35.8% of honey consumers agree that GI labelling could enhance rural development. Since the study is urban it therefore shows the concern that urban consumers have for rural farmers' welfare. Protection of reputation of product follows closely by 35.6%, this is important in conserving traditional and cultural values of different products (O'connor, 2013; Smith, 1973). The last ranked GI benefit is spread of information with about 26% this could explain the limits of GI knowledge in Kenya as recorded in the study.

4.3.2 Honey Consumption Patterns

Honey is consumed regularly by roughly 64% urban residents in Kenya. The main honey use for about a half of the population is bread spread. These results are in line with Mutisya (2011), who found honey's main use is food. Honey is mainly used as medicine by about 22% of respondents. This is mentioned for its ability to naturally cure common cold (Muthui, 2012). Most individuals that are advised by their doctors not to consume sugar use honey as a sweetener. They account for 18% of the respondents. Baby use, honey as a preservative and cookery accounts jointly for 4% of respondents. Other honey uses include licking, alcohol production, beauty, and as water additive.

The main reasons picked by those who don't consume honey regularly include it being expensive to about 31% of them. Other reasons follow by 25%; honey being too sugary, used for medicinal purpose only, causing allergy, consumers' preference for substitutes, stomach-ache respectively. About 23% of these report unavailability of honey. Nearly 15% find honey quality sold by major retail outlets to be untrustworthy. This is a major issue in the world honey market (CIAFS, 2012), and it leads to different standards for curbing adulteration. However, 6% could not tell why they don't consume honey regularly.

Majority of honey consumers in Kenya find medicinal and health benefits combined as their motivation of honey consumption (41%). Medicinal use slightly supersedes the healthy lifestyle motivation, they account for 26% and 27% each. Those who find religious and customary reasons and those who have no idea of what motivates their honey consumption are jointly only about 3%.

On average, consumers use honey twice a day. However, almost half of the respondents use honey once a day, twice are only about 28% and three times are approximately 12%. The other times of use include once in a while, once or twice a week and a lot of times.

As shown in the figure 4, more than half of all respondents claim fake honey or adulterated honey as the main issue with honey (67%).This is a well-documented problem in honey industry locally and Worldwide (CIAFS, 2012; Muthui, 2012). Honey crystalizing is second issue picked by 14% of respondents. About 7% mention other issues including; hygiene, stomach problems and odour. For a detailed summary of honey patterns, see appendix 7.

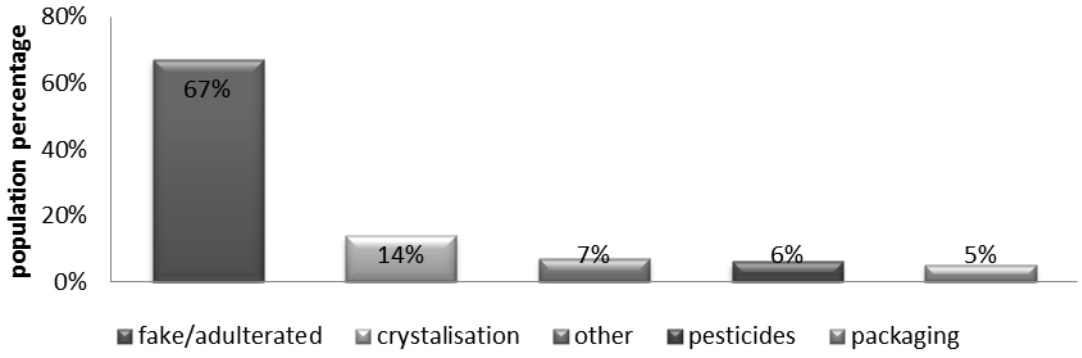


Figure 4: Honey issues encountered by consumers

Source: Survey Data (2014).

4.3.3. Determinants of Consumers' Awareness of GI

Among the independent variables, as shown in table 3 below, positive significant determinants of GI awareness are seeking prior information, buying honey from supermarket and other sources other than the farm gate, if one is of male gender, having at least secondary education and consumer trust in a food product they had listed as a potential GI good. However, the negative significant influencers include consumers' confidence in honey produced by local farmers. Whereas the mean coefficient values describes the probable effect of each independent variable on GI awareness, the marginal effects measures the concrete influence of small changes in each of the explanatory variables on consumers' awareness levels (Greene and Hensher, 2002).

From the results we note that information is a substantial determinant of GI awareness. If a consumer seeks prior information about different labelling aspect of honey, then their chance of knowing about GI increases unlike those that don't seek prior information by 13%.

The negative relationship between consumers' confidence in local honey producers and awareness of GI means that when consumers are contented with the quality of products they buy, they may not be interested to know about other food labels that may insinuate quality. There is however no significant difference across countries for confidence in local honey handled by farmers. Likewise, Verbeke (2009), found that consumers rely more on other quality marks other than origin marks. More so, buying honey from the supermarket and other sources other than the farm gate increases consumer's awareness of GI by 14% and 16% respectively. This is because Supermarkets provide additional information for a variety of product brands, displayed in an attractive way.

Consumer trust is crucial for product loyalty and the belief in its nutritional content (Nocella *et al.*, 2007; Moon and Balasubramanian, 2004). Results show that consumers, who trust potential GI food they had identified, have higher likelihood of being aware of GI relative to those who don't trust. This is also main determinant of GI awareness. However, Consumers trust in their listed potential GI products significantly varies across the counties, with Nakuru leading by about 74% and Kitui the least with 45%. This means when implementing GI products, its adoption will also vary across regions.

Honey is a special product that relates well with the origins nature like climate, floral source and the culture of those who handles it(Stolzenbach *et al.*, 2011; Kaškonienė and Venskutonis, 2010). Hence, ability to consume more than 0.5 kgs of honey bought per month in the household increases the likelihood of GI awareness by 0.08, *ceteris peribus*. The study also reveals that majority of large volumes of honey are bought from farmers who come from

a specific area. This is already relates to GI. This also relates to the purity of honey, since the less honey is processed or the shorter the value chain the more likely that it is unadulterated (Oyuga, 2008).

If a respondent is of male gender, their likelihood of consumer's GI awareness increases as compared to their female counterparts. Furthermore, about 70% of those who know about GI and still 80% of those who picked the best GI definition are male. This is despite the immense decision making and food preparation roles women play as the shoppers of meals consumed in the households. Likewise, Tzimitra-Kalogianni *et al*. (2002) found that male consumers were more aware of Food-Related Private–Label Brands.

Having attained tertiary education increases awareness relative to those with secondary school education or lower. In addition, the main other sources (about 6%) of GI knowledge is through learning institution. Furthermore, majority of Nairobi residents have post-secondary education and are more aware of GI relative to their counterparts in Kitui and Nakuru. These results are similar to Lin *et al*. (2004), who found that consumers with at least college education were more likely to have heard of pathogen unlike those with less education. This shows the relevance of consumer education in spreading awareness. Hence relevant stakeholders should adopt this avenue in increasing consumer awareness.

Table 3: Factors influencing GI awareness of honey consumers

Variable definition	Coefficient	Standard errors	P-value	Marginal effects	Standard errors	P-value
Kitui	0.197	0.173	0.254	0.072	0.064	0.262
Nakuru	0.005	0.158	0.975	0.002	0.057	0.975
Honey Volume	0.225	0.135	0.097*	0.081	0.049	0.096*
Radio	0.069	0.134	0.607	0.025	0.048	0.606
Married	-0.127	0.170	0.456	-0.045	0.060	0.449
Trust	1.036	0.158	0.000***	0.339	0.044	0.000***
Gender	0.238	0.136	0.081*	0.084	0.047	0.075*
Age	-0.005	0.008	0.542	-0.002	0.003	0.541
Quality	-0.564	0.143	0.000***	-0.210	0.054	0.000***
Household Size	0.056	0.036	0.119	0.020	0.013	0.119
Education	0.357	0.135	0.008***	0.129	0.048	0.008***
Supermarket	0.393	0.154	0.010***	0.144	0.057	0.011**
Other honey sources	0.428	0.174	0.014**	0.159	0.066	0.016**
Prior information	0.379	0.147	0.010***	0.131	0.048	0.007***
Constant	-1.762	0.386	0.000***			
Log-Likelihood	-256.860		Psuedo-R2 (%)		20.03	
χ(ρ-value)	78.42(0.0000)		N (respondents)		478	

Notes: Standard errors in parentheses; Significance levels: *** 1%, ** 5%* 10%. Source: Survey Data (2014).

Therefore, we reject the null hypothesis and conclude that socio-demographic factors influence consumer GI awareness.

4.4 Conclusions and Implications

The study reveals that a 35% of consumers are aware of GI through friends and mass media. However, they have limited GI knowledge. Never the less, about 83% of consumers trust tea, milk, honey, rice and sugar as having a potential for GI labelling. But, potential GI honey should be pure, tasty, natural, quality, sweeter, thick and with a distinct colour. Consumers perceive the benefits of GI labelling as mainly for quality assurance. Majority of honey consumers (64%), use it regularly as bread spread. However, high honey prices hamper its use, motivated mainly for its medicinal and health benefits. The main issue is honey adulteration.

Further, results revealed that positive significant determinants of GI awareness are seeking prior information, the more honey volumes a household consumes, if one is of male gender, having tertiary education and consumer trust in a food product they had listed as a potential GI good. Therefore, stakeholders should educate female honey shoppers and those that are confident with farm gate honey, on GI labels and its benefits since women mostly play a major role in their household's food choices. Also, trusted foods should be prioritised when implementing GI. Also, keen consumers that are learned and those that buy large volumes of honey should be provided with sufficient information to aid in their choice among honey brands.

References

Ajayi J., O. (2014). "Awareness of Climate Change and Implications for Attaining the Millennium Development Goals (MDGS) in Niger Delta Region of Nigeria". *Agris on-line Papers in Economics and Informatics,* VI.

ARIPO. (2012). The protection of Geographical Indications (GIs) in Africa. Paper presented at the Information Seminar on the Implementation of the EU-ESA Interim EPA, Mauritius.

Awada L. and Yiannaka, A. (2011). "Consumer perceptions and the effects of country of origin labeling on purchasing decisions and welfare". *Food Policy,* 37(1), 21-30. doi: http://dx.doi.org/10.1016/j.foodpol.2011.10.004

Bagal M., Belletti, G., Marescotti, A. and Onori, G. (2013). Study on the potential of marketing of Kenyan Coffee as Geographical Indication. In R. SA (Ed.), *study on the potential for marketing agricultural products of the ACP countries using geographical indications and origin branding* Lausanne: European Commission.

Belletti G., Paus, M., Reviron, S., Deppeler, A., Stamm, H. and Thévenod-Mottet, E. (2011). "The Effects of Protecting Geographical Indications Ways and Means of their Evaluation". *Publication,* 7(07.11).

Blakeney M., Coulet, T., Mengistie, G. and Mahop, T., M. (2012). Extending the protection of Geographical indicattions: Case studies of Agricultural products in Africa: Earthscan: ISBN ISBN 9780415501026.

Boto I., Philips, S., Fay, F. and Vassilakis, G. (2013). The Geography of food: reconnecting with origin in the food system. Paper presented at the Brussels Rural Development Briefings: A series of meetings on ACP-EUEU development issues, Brussels.

Chen W. (2013). "The effects of different types of trust on consumer perceptions of food safety: An empirical study of consumers in Beijing Municipality, China". *China Agricultural Economic Review,* 5(1), 43-65. doi: doi:10.1108/17561371311294757

Cheng K.-W. (2011). "The Effect of Contraceptive Knowledge on Fertility: The Roles of Mass Media and Social Networks". *Journal of Family and Economic Issues,* 32(2), 257-267. doi: 10.1007/s10834-011-9248-1

CIAFS. (2012). The world market for honey *Market survey#1*: Capacity to improve agriculture and food security.

Cottrill C. D. (2015). "Location privacy preferences: A survey-based analysis of consumer awareness, trade-off and decision-making". *Transportation Research Part C: Emerging Technologies,* 56, 132-148.

De Alda-Garcilope C., Gallego-Picó, A., Bravo-Yagüe, J., C. , Garcinuño-Martínez , R. M. and Fernández-Hernando, P. (2012). "Characterization of Spanish honeys with protected designation of origin ‘‘Miel de Granada’’ according to their mineral content". *Food chemistry,* 135(2012), 1785–1788.

Domencich T. and McFadden, D. (1975). "Urban travel demand: a behavioural approach". *Amsterdam: North-Hollan Publishing Co*.

Dommeyer C. J. and Gross, B. L. (2003). "What consumers know and what they do: An investigation of consumer knowledge, awareness, and use of privacy protection strategies". *Journal of Interactive Marketing,* 17(2), 34-51.

Greene W. (2003). Econometric Analysis New York.: Macmillan Publishers. New York.

Greene W., H. and Hensher, D., A. (2002). "A latent class model for discrete choice analysis: contrasts with mixed logit". *Transportation Research Part B,* 37(2003), 681–698. doi: 10.1016/S0191-2615(02)00046-2

Grunert K. G., Loebnitz, N. and Zhou, Y. (2015). Supermarket literacy and use of branding in China: The case of fresh meat. Paper presented at the 143rd Joint EAAE/AAEA Seminar, March 25-27, 2015, Naples, Italy.

Homburg C., Klarmann, M. and Schmitt, J. (2010). "Brand awareness in business markets: When is it related to firm performance". *Intern. J. of Research in Marketing,* 27(2010), 201–212.

Ishak S. and Zabil, N. F. M. (2012). "Impact of Consumer Awareness and Knowledge to Consumer Effective Behavior". *Asian Social Science,* 8(13).

Kaškonienė V. and Venskutonis, P., R. (2010). "Floral Markers in Honey of Various Botanical and Geographic Origins: A Review". *Comprehensive Reviews in Food Science and Food Safety,* 9(6), 620-634. doi: 10.1111/j.1541-4337.2010.00130.x

Kenya National Bureau of Statistics (KNBS). (2010). 2009 Population and Housing Censu. Nairobi.

Kimemia C. and Oyare, E. (2006). The status of organic Agriculture, production and Trade in Kenya; Report of the Initial Bckground study of the National Integrated Assessment of Organic Agriculture sector- Kenya. Nairobi.

Kimenju S., C. and De Groote, H. (2005). Consumers' Willingness to Pay for Genetically Modified foods in Kenya. Paper presented at the 11thInternational Congress of the EAAE (European Association of Agricultural Economists), The Future of Rural Europe in the Global AgriFood System, Copenhagen, Denmark, .

Kimenju S., C., De Groote, H., Karugia, J., Mbogoh, S. and Poland , D. (2005). "Consumer awareness and attitudes toward GM foods in Kenya". *African Journal of Biotechnology,* 4(10), 1066-1075.

KIPI. (2009). MoU Swiss-Kenya project on Geographical indications (SKGI). Nairobi.

Kirui O., K. , Okello, J., J. and Nyikal, R., A. (2010). Awareness and use of m-banking services in agriculture: The case of smallholder farmers in Kenya. Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Cape Town,South Africa.

Lin C.-T. J., Jensen, K. L. and Yen, S. T. (2004). Determinants of Consumer Awareness of Foodborne Pathogens. Paper presented at the AAEA annual meeting, Denver CO.

Maddala G. S. (2001). Introduction to Econometrics (Vol. 3rd edition): Wiley and Sons, Inc: ISBN 13978-0470015124.

Menapace L., Colson, G., Grebitus, C. and Facendola, M. (2009). "Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels".

Menapace L. and Moschini, G. (2011). "Quality certification by geographical indications, trademarks and firm reputation". *European Review of Agricultural Economics*, jbr053.

Moon W. and Balasubramanian, S. K. (2004). "Public attitudes toward agrobiotechnology: The mediating role of risk perceptions on the impact of trust, awareness, and outrage". *Review of Agricultural Economics,* 26(2), 186-208.

Muthui B., N. (2012). Physiochemical properties of honey from Mwingi and selected urban areas in Kenya, effect of adulterations and some community awareness levels of honey adulteration. (Master of science), Kenyatta University, Nairobi.

Mutisya J., S. (2011). An entrepreneurial assessment of the market access for honey and honey product in the city of Nairobi, Kenya. (PhD Dissertation), University of Nairobi, Nairobi, Kenya.

Nabirasool D. and Prabhakar, D. (2014). "Role of Media in Consumer Protection". *IOSR Journal of Business and Management (IOSR-JBM),* 16(2), 01-05.

Ngigi M., W., Okello, J. J., Lagarkvist, C., Karanja, N. and Mburu, J. (2010). Assessment of developing-country urban consumers' willingness to pay for quality of leafy vegetables: The case of middle and high income consumers in Nairobi, Kenya. Paper presented at the 3rd African Association of Agricultural Economics, AAEA/ AEASA Conference Cape Town, South Africa.

Nocella G., Hubbard, L. and Scarpa, R. (2007). Consumer trust and willingness to pay for certified animal-friendly products. University of Waikato, Hamilton, New Zealand.

Nyengerai S. (2014). "The Relationship between Gender, Product Category and the Constructs of Private Label Brand Perception in Zimbabwe". *International Journal of Science and Research (IJSR),* 5(622).

O'connor B. (2013). GIs and other instruments for protecting producers' assets in the origin and tradition of their products:factors of success in ACP countries. Paper presented at the Geography of food:reconnecting with origin in the food system, Brussels.

Okello J. J., Kirui, O. K., Gitonga, Z. M., Njiraini, G. W. and Nzuma, J. M. (2014). "Determinants of Awareness and Use ICT-based Market Information Services in Developing-Country Agriculture: The Case of Smallholder Farmers in Kenya". *Quarterly Journal of International Agriculture,* 53(3), 263-282.

Okello J. J., Narrod, C. A. and Roy, D. (2011). "Export standards, market institutions and smallholder farmer exclusion from fresh export vegetable high value chains:

experiences from Ethiopia, Kenya and Zambia". *Journal of Agricultural Science,* 3(4), p188.

Otieno D. J. (2012). "Market and non-market factors influencing farmers' adoption of improved beef cattle in Arid and semi-arid areas of Kenya". *Journal of Agricultural Science,* 5(1), p32.

Oyuga J., K. (2008). Honey market structure and pricing efficiency in the pastoral areas of Baringo District, Kenya. (Masters), university of Nairobi, Nairobi, Kenya.

Pambo K. O., Otieno, D. J. and Okello, J. J. (2014). Consumer awareness of food fortification in Kenya: The case of vitamin-A-fortified sugar. Paper presented at the International Food and Agribusiness Management Association (IFAMA) 24th annual world symposium to be held in Cape Town, South Africa, 16-17 June, 2014, Cape Town, South Africa.Seetisarn P. and Chiaravutthi, Y. (2011). "Thai Consumers Willingness to Pay for Food Products with Geographical Indications". *International Business Research,* 4(3).

Smith D. M. (1973). The geography of social well-being in the United States: An introduction to territorial social indicators: McGraw-Hill: ISBN 0070585504.

Stolzenbach S., Byrne, D., V. and Bredie, W., L, P. (2011). "Sensory local uniqueness of Danish honeys". *Food Research International,* 44(2011), 2766-2774.

Teisl M. F., Levy, A. S. and Derby, B. M. (1999). "The effects of education and information source on consumer awareness of diet-disease relationships". *Journal of Public Policy & Marketing,* 197-207.

Teuber R. (2011). The economics of geographically differentiated agri-food products: Theoretical considerations and empirical evidence. (PhD Doctorial dissertation), Universitätsbibliothek Giessen, Gießen, Germany.

Tzimitra-Kalogianni I., Kamenidou, I., Priporas, C.-V. and Tziakas, V. (2002). "Age and Gender Affects on Consumers' Awareness and Source of Awareness for Food-Related Private–Label Brands". *Agricultural Economics Review,* 3(1), 23-36.

Verbeke W. (2009). "Market differentiation potential of country-of-origin, quality and traceability labeling". *The Estey Centre Journal of International Law and Trade Policy,* 10(1), 20.

WIPO. (2009). The Economics Of Intellectual Property;Suggestions for Further Research in Developing Countries and Countries with Economies in Transition: World Intellectual Property Organization.

CHAPTER FIVE

This Chapter analyses honey consumers perceptions and willingness to pay geographical indications and other quality attributes of honey, inspired by the issue of honey adulteration. The findings reveal that consumers have positive preferences for organic, origin, floral source, thick and either private or a synergy between public and private certification of honey. Their preference is influenced by education, income levels and attitudes towards honey standards. We recommend for labelling of foods with GI to control for adulteration.

5.0 CONSUMER'S PERCEPTIONS AND WILLINGNESS TO PAY FOR GEOGRAPHICAL INDICATION LABELLING

5.1 Background information

The *codex Alimentarius* is a joint FAO/WHO food standards programme that advocates for food safety for various foods marketed internationally. Therefore, it provides for the standard definition of honey and essential attributes of quality honey sold commercially; natural honey comprises of different sugars, organic acids, enzymes and solid particles resulting from honey collection (FAO, 2001).

In evaluating consumers' WTP for quality attributes of honey, the attributes are put into search, experience and credence attributes according to information theory(Nelson, 1974; Darby and Karni, 1973; Nelson, 1970). The latter, can never fully be evaluated even after purchase and consumption and are expensive to judge. If a product attribute is of this nature then branding and client relationship could help to establish quality (Darby and Karni, 1973).

Honey search attributes includes color, price, appearance, packaging material and size. Then experience attributes comprises of aroma, flavor, nose/mouth feel, and aftertaste/after feel (Srinual and Intipunya, 2009). Finally, credence attributes entails labeling with product

origin, method of production and with pollen source (Yeow *et al.*, 2013). Honey remains the most important primary product of beekeeping, since ancient times. It has been put to various uses that affect consumers' perception of its diverse attributes. In developed countries various honey attributes have been extensively studied, which makes it easy classify honey according to place of origin (Piana *et al.*, 2004).

Labelling of honey in the retail outlets is important and consumers consider its origin and expiry date (Carroll, 2002). Furthermore, labelling entails the name honey on the package with floral source or geographical origin (FAO, 2001). Addition of credence attributes like ways of production and plant source of pollen are vital. This is for the reason that at times bees may collect pollen that could be poisonous or cause allergies to some consumers (Yeow *et al.*, 2013).

The main issue in the honey sector worldwide is honey adulteration. This is because, honey is a scarce product that makes its price too high in comparison to its substitutes(Kosgei *et al.*, 2011). Thus majority of the countries have standardization bodies like the EU that at some point banned honey from China for this reason. This however, has led to another level of food fraud, where honey origin is lied about to avoid high tariffs set for banned countries (Everstine *et al.*, 2013).

From past literature a number of honey quality attributes are identified, consumers value different attributes differently and this affects the monetary value they attach to each attribute. In Kenya it is not known the level of Marginal Willingness to Pay (MWTP) for quality honey attributes. To be specific, there is no published study on consumer's WTP for quality honey in relation to product origin. This leaves agribusinesses and policymakers to make policy decisions based on asymmetric information about geographical indicators in the locally produced agricultural products. This study assesses consumers' WTP for and

identified significant factors that influence their WTP for GI and other quality attributes of honey in Kenya.

5.2 Methodology

The study's conceptual framework and Sampling and Data Collection methods are already presented in chapter three.

5.2.1 Definition of Attributes

A review of relevant past studies revealed key honey attributes and their levels that relate to geographical labelling and other quality honey attributes choice decisions. The attributes affect respondents' choices, they are relevant to policy and they are amenable to policy changes with regards to consumer preferences (Bliemer and Rose, 2010).

The attributes are either: Compulsory features necessary to build confidence for honey consumers by providing a regulatory framework. This includes Codex standards governing bee honey essential composition and quality factors, hygiene, contaminants, methods of sampling and analysis of honey. In addition, the Standards Act Chapter 496 of the laws of Kenya is implemented by the Kenya Bureau of Standards (KEBS), which is established under section 3 of the Act to promote the standardization of commodities with reference to their attributes and how they may be handled (Republic of Kenya, 2012).

The Public Health Act Chapter 242 of the Laws of Kenya, sections 9, 10 and 11, provides for sanitation rules and orders for protection of food stuffs and storage of food stuffs(Republic of Kenya, 2012). Also the Food, Drug and Chemical Substances Act Chapter 254 of the laws of Kenya provides for food labeling, additives and standards(Republic of Kenya, 2012).

Voluntary (optional) attributes are the ones that go into CE design; they provide options for consumers to make their preferences. They are well illustrated in table 4.

Table 4: Description of attributes and their levels

Honey quality Attribute	Definition of attributes	Attribute levels
Geographic origin label	GI attribute(whether honey origin is indicated or not)	Yes No
Floral source	(indication of floral source that bees visit or not)	Yes No
Method of production	Food Safety attribute (if organic honey or not)	Organic Non-organic
Honey viscosity	Intrinsic quality cue (Honey resistance to flow)	Loose thick
Certification organization	Quality standardization attribute (level of standardization of honey product)	Public/private/ public and private
Price increase per 500 grams of honey in Kshs	Monetary attribute (price of 500grams of honey in Kenya shillings within 50% of the current price/status quo)	Sh.300, 375, 450

Source: Survey Data (2014).

FGDs were conducted with stakeholders to identify if the identified variables from the literature were relevant to Kenyan local honey consumers. More so, if these variables provided an avenue that is amenable by policy, in curbing the major problem of honey adulteration in the country. It was revealed that GI labelling improves both consumer satisfaction and farmers' revenue from honey. Based on previous studies that used CE to estimate preferences for credence attributes, it is expected that consumers would prefer the honey product with origin label(Loureiro *et al.*, 2002).

Food labels are used by consumers to correctly match with products, enable producers to adapt production to meet consumer demands and expectations, and promote social or political economic objectives Akerlof (1970). The current study considers origin labelling; it is specific to location of origin of the end-product, inputs, or production. This is motivated by the fact that Geography can be correlated or is a determinant of product realized quality. In the EU consumers prefer and are willing to pay a premium for GI more than non-GI labeled products (Menapace *et al.*, 2009). Kenya Stands to gain more if she adopts GI labeling for her quality produce in the agricultural sector. However if Kenyan consumers prefer products to

be labeled by GI is a dearth of knowledge. This attribute will reveal Kenyan consumers preference for origin labels.

For honey sold internationally, labelling entails the name honey on the package with floral source or geographical origin (FAO, 2001). In developed nations honeys are further labelled with floral source; multiflora or single floral honeys, for example Acacia honey (Piana *et al.*, 2004). Honey floral source influences the final taste and colour of honey (Anupama *et al.*, 2003) and consumers vary in their preferences for different taste. Although honey is produced from all over Kenya under different climatic conditions and floral sources, it is not known how much consumers value floral source label.

Organic foods are perceived to be safer and their demand is growing with increased consumer awareness of the effects foods they use (Valerian *et al.*, 2011). There are stringent requirements for production of organic honey along the value chain, which ensures safety. Organic honey fetches a premium of up to 300% in the market because of its safe (Kimemia and Oyare, 2006). It is important to analyse consumer preferences for organic honey as a quality attribute. More so, in Kenya there is an increase of the middle income consumers who are aware of food born health risks and would be interested in a products mode of production (Ngigi *et al.*, 2010).

Honey is a viscous liquid when freshly harvested. Its viscosity varies with honey water content, temperature and floral source(Srinual and Intipunya, 2009). Some consumers tend to think loose honey has been diluted. Kenyan honey consumers are therefore hypothesized to prefer viscous honey to the loose one.

A number of studies have reviewed the role of public regulation and private safety and quality standards (Henson and Reardon, 2005), third-party certifications(Hatanaka *et al.*, 2005), grades and standards along the supply food chains (Berdegué *et al.*, 2005). Kenya has

a standardizing institution, the KEBs and yet it still experiences the challenges of honey adulteration. Other alternatives like private standardization and a synergy between public and private standardization are considered in this study, consumers' preferences for the three standardization bodies is evaluated.

Price helps in the identification of welfare interaction effect between the attributes (Bliemer and Rose, 2010). It provides for WTP for other attributes. The price levels are derived from the mean price of honey currently 300 for a 500 gram packaged plastic honey filled clear container. The others 375 and 450 are within the half mean price level (Gonzalez *et al.*, 2010).

5.2.2 Choice Experiment Design

Choice experiment was used to generate hypothetical alternatives, from the attributes and levels, which were put together to create choice sets. This produced a full factorial design, which is made up of all possible combinations of the different levels of each attribute. The combinations of attributes and their levels were too many; this makes it too costly and tedious to have respondents to attend to them all (Kuhfeld, 2005). The current design had six attributes, two with three levels and four attributes with two levels, $(4^2 \times 2^3) = 128$ possible alternatives.

A fractional factorial design was then used, which uses the minimum multiplier of the different numbers of attributes and levels in the study, 36 product scenarios of two alternatives were derived in the orthogonal design. These were blocked into 6 profiles of 6 scenarios with two alternatives each. Each honey consumers interviewed in the pilot survey, responded to 6 scenarios, which was analyzed using Multinomial Logit Model(MNL) to acquire priors used in another fractional factorial design, that estimated both main and interaction effects, and alternatives for an efficient design were selected.

This study's design had relatively good level of D-optimality (i.e. D-efficiency measure of 87.48%), which minimized a D-error to 12.52%, this meant that parameters had low standard errors and could use smaller sample size (Scarpa and Rose, 2008). Furthermore, the design had good utility balance (i.e. a B-estimate of 81.95%) surpassing the minimum level (B-estimate of 70%), this shows that none of the alternatives in the choice options had any significant dominance (ChoiceMetrics, 2009). Very few CE designs before achieved the three measures at the same time (Huber and Zwerina, 1996). Additionally, A-efficiency of 73.46% implied that the variance matrix generated reliable estimates(Kuhfeld, 2005). The efficiency procedure in the NGENE (ChoiceMetrics, 2009) statistical software was applied to produce the design (see appendix 4 for comprehensive CE-design syntax).

Attribute	Honey Option A	Honey Option B	Neither
Origin Label	yes	no	
Floral Source Label	No	yes	
Production Method	Non-organic	Organic	
Viscosity	Thick	loose	
Certification Organization	Private	private	
Price	450	300	
Which one would you prefer?			

Figure 5: Example of choice card presented to respondents during the survey

Source: Survey Data (2014).

The final design had 36 paired choice sets that were randomly blocked into six profiles of six choice tasks. Respondents were randomly assigned to one of the six profiles. Each choice task had two alternatives (A and B) and neither option, which was the status quo (conventional honey produced in Kenya and sold at kshs.300 for a 500grams pack). An example of a choice set presented to respondents is shown in the figure 5. (See appendix 5 for the entire choice sets)

5.2.3 Data and the experimental context

The questionnaire briefly introduced what the interview entailed and a criterion for fit respondents (See Appendix 3). Questions of consumer knowledge of GI and preferences for honey they buy followed. Consumers then picked their preferred choice among three alternatives A, B and a neither option. Lastly, data on the demographic and socio-economic characteristics, such as income level, household size, employment status, education and age was collected.

A pilot survey, an FGD and preliminary survey were done to validate and determine the ample number of choice sets. This revealed that consumers could comfortably handle six choice sets, since they were sure about the relevance of the proposed attributes in improving the honey industry.

Respondents were explained for the compulsory and voluntary attributes, their levels and the choice exercise keenly (see Appendix 5), before making choices. Respondents' were also reminded to consider the choice like a real purchase, consider their budget constraints, the kind of honey they consume, this was meant to reduce the hypothetical bias that is inherent in SP studies(Pambo, 2013). This is because results of this study would inform delivery of certain types of GI labeled food products in the retail section.

The study adopted a quantitative research approach using a survey design, as a strategy for collecting and analyzing data that answer research questions in a way that allows the researcher to gather information, summarize, present and interpret data. Both quantitative and qualitative data was collected. The data needed was explained by six honey quality attributes (see table 4) and levels as well as socioeconomic explanatory variables. Both primary data through administering semi-structured questionnaires, FGDs and secondary data was vital in

providing an insight to the study areas and honey consumption in Kenya. These included past literature and government documents.

5.2.4 Model Specification

The CE is anchored in two micro-economic theories. Lancaster's theory of consumer choice (Lancaster, 1966); the theory asserts that a consumer will decide to consume a product because he/she derives utility from the attributes of that product unlike the good as a whole. Attributes, $A_{1,}$ $A_{2,}$ $A_{3,}$ $A4_{\ldots\ldots}$ $A_{n.}$ The functional form of the utility U_{iA} of an individual *i*is then:

$$U_{iA} = B_{i1} U_{A1} + B_{i2} U_{A2} + B_{i3} U_{A3} + \ldots + B_{in} U_{A} \qquad 6$$

Where $U_{A1,}$ $U_{A2,}$ $U_{A3\ldots.}$ U_{An}, are respectively the levels of utility generated by the consumption of the *n* attributes. CE aims at identifying the trade-offs that individual *i* made between the attributes in order to estimateβin.

The Random Utility Theory (RUT) by McFadden and Manski (2001)underpins econometric basis of CE. It stipulates that individual *i*'s indirect utility $U_{\mathrm{ij},}$ is the sum of a deterministic term V_{ij} and a random term (ε):

$$Uij = V_{\mathrm{ij}}(Zj, Si) + \varepsilon(Zj\mathrm{Si}) \qquad 7$$

Where for any respondent *i* a given level utility, is associated with any honey choice set alternative j and depended on quality attributes (Z) and socioeconomic characteristics of respondents (S). The choices made between alternatives are a function of the probability that the utility associated with a particular option j is higher than those for other alternatives.

$$(ij) = ((Zij, Si) + (Zij, Si)) > ((Zik, Si) + (Zij, Si)) \qquad 8$$

The error term (Z_{ij}, S_i) is not observed by the analyst. Assuming its distribution is identically and independently type, *I* extreme, the MNL distribution;

$$\rho_{ni}=\Sigma^{m}_{m=1}S_m(eb'_mX_{ni}/\Sigma_j eb'_mX_{nj}) \quad 9$$

The MNL is popular and a basis of econometric models for discrete choice modelling. However, it has limitations that led to invention of better models that relax its assumptions. First is a RPL model, which generalizes standard multinomial logit model. It relaxes MNL's assumptions by; making the alternatives not to be independent, making the model not to exhibit the independence of irrelevant alternatives property, and; ensuring there is an explicit account for unobserved heterogeneity (Boxall and Adamowicz, 2002). However, RPL does not explain the sources of heterogeneity and assumes distribution of utilities. This makes the second model, Latent Class model (LCM) to be superior by it relaxing the mentioned assumptions of RPL. It allows for multiplication of the conditional distribution with the probability of being in a segment where the segments are the finite analogue to the random parameters distributions. The distributions are well specified and thus the estimation of the joint distribution occurs (Greene and Hensher, 2002). Furthermore, studies have indicated the importance of heterogeneity among respondents for goodness of fit (Campbell *et al.*, 2012).

However, the MNL is subject to various limitations and the RPL model can overcome them. This is achieved through the assumption that parameters were randomly distributed in the population. In this case the heterogeneity is captured by estimating the mean and variance of the random parameter distribution and individuals are assumed to be draws from a taste distribution.

$$P_{ni}= eb'x_{ni}\Sigma_j eb'x_{nj} \quad 10$$

Majorly, the random parameters are specified to be normally or log-normally distributed, which imply behaviourally inconsistent WTP values. In particular, normal and log-normal distributions are problematic because of the possibility of negative signs when a normal distribution is used and fat tails when a log-normal distribution is used. The LCM provides

another alternative to the multinomial logit model and requires, unlike the RPL model, no assumptions about the distribution of preferences. The LCM approach assumes that *M* segments exist in the population, each with a different preference structure.

$$L_{ni}(B)=eV_{ni}(B)/\Sigma^{j}_{j=1}eV_{nj}(B) \qquad 11$$

Changes in welfare due to a marginal change in a given attribute can be calculated using the marginal willingness-to-pay measure:

$$\text{MWTP} = -1\ \frac{\text{B honey}_{\text{attribute}}}{\text{B}_{\text{price for honey}}} \qquad 12$$

The current study used RPL, which is estimated by means of LIMDEP version 10/NLOGIT 5, econometric software (Greene, 2012). Discussions are based on the results from this analysis.

The variables used in the analysis of GI, and their coding are given in table 5. All the indicated utility entered the model as random parameters assuming a normal distribution, except the price attribute that was specified as fixed in order to calculate MWTP, by eliminating the risk of obtaining extreme none zero trade off values (Train, 1998).

Table 5: Variables used in the preference analysis

Variable	Description
Geographic origin label	GI attribute(whether honey origin was indicated or not)areas (1=Yes; 0=Otherwise)
Floral source	(indication of floral source that bees visit or not) (1=Yes;0=Otherwise)
Method of production	Food Safety attribute (if organic honey or not) (1=Yes; 0=Otherwise)
Honey viscosity	Intrinsic quality cue (Honey resistance to flow) (1=Thick;0=loose)
Certification organization	Quality standardization attribute (level of standardization of honey product) (0 = public, 1 = private, 2 = both)
Price increase per 500 grams of honey in Kshs.	Monetary attribute (price of 500grams of honey in Kenya shillings within 50% of the current price/status quo)(Sh.300, 375, 450)

Source: Survey Data (2014).

5.3 Results and Discussions

5.3.1 Consumers' Preferences for Various Honey Attributes

To determine the most important factors that influence honey purchase decisions, consumers were asked to rate nine product characteristics. This was according to their level of importance prior to purchasing honey, using a Likert scale that ranged from not at all important (1) to very important (5). These were honey viscosity, taste, organic, country or specific area of origin, texture, colour, price, packaging, labelling is how consumers' rank these indicators of quality during purchase. How viscous honey is therefore the most important honey attribute used by consumers use to judge if it is quality. This is similar to findings by (Carroll, 2002), who reported honey viscosity to be an important visual attribute before use. The taste of honey followed as quality reason they use to decide whether they will be loyal to a given brand. If farmers certified their honey as organic, then consumers will deem it as quality. The specific country or region of origin is crucial in telling if honey produced will be quality or not. In Kenya, some regions are more famous for good honey

production. Moreover, the recent devolution they seem to be keen interest among people on the origin of products in different regions of Kenya(Burugu, 2010). Honey texture and colour are more important to the price set for Kenyan honey consumers. How honey is packaged or labelled would mean less to consumers without considering the above factors. Similarly, that accounts for the significant number of consumers buying directly from farmers, whose product is barely neither packaged nor labelled.

This suggested that honey origin and sensory characteristics (measured as taste and colour) ranks higher than price, packaging and other labels by the majority of honey consumers' in Kenya. These results compare well to those reported by (Kaneko and Chern, 2005) and indicate that some consumers will accept geographical labelled foods if they get labelled.

It is evident that Kenyan urban consumers prefer local honey, labelled with specific region of origin unlike a COOL, produced in semi-arid area, organically but though majority prefer unprocessed honey they may not be so different from those who want their honey to be processed (Table 6).

The identified popular local brands of honey are *Kitui* woodlands, Pure natural honey, Green forest, *Baringo, Tharaka, Asalipoa, Mwingi* natural honey, Baraka honey and *Kipepeo.* They account for over 16% of the entire honey market share. Australian honey is the main imported honey.Mutisya (2011), found almost similar results; Kitui and pure natural honeys lead. The rationale of consumers preferring Kitui woodlands honey may show their intention to buy GI goods. Even though, Kitui is yet a GI registered product, the use of a name that relates to an area of good quality honey in Kenya makes most consumers to perceive it as a GI. The same trend is realised with *Baringo, Tharaka,* and *Mwingi* natural honey. These are the main quality honey producing zone names.

Table 6: A summary of consumer preferences for different honey features

Honey characteristic	Options	Percentage
Source of honey	Local	95
	Imported	5
Origin label	country of origin	16
	specific region of origin	84
Climate of production	Semi-arid Areas	86
	Highlands	14
Production type	Organic	91
	Non organic	9
Honey form	Processed	47
	Unprocessed	53

Source: Survey Data (2014).

5.3.2 Consumer Perceptions of Honey Attributes

As shown in figure 6 below, 'Organic honey is superior to non-organic honey' is the most strongly agreed upon opinion on average by consumers. In addition, labelling honey with origin and floral source is second. However, consumers agree that there is a need to improve and be strict on honey labelling for food safety. Honey should be thick in viscosity for it to be quality is the fourth opinion. This is similar to findings by Carroll (2002), where honey viscosity is number one quality indicator among Kenyan honey consumers. Most consumers agree that local farmers produce quality honey. Consumers are neutral on the opinion that honey prices in the country are too high. Averagely consumers disagree on the adequacy of the current quality standards of honey, while majority are neutral.

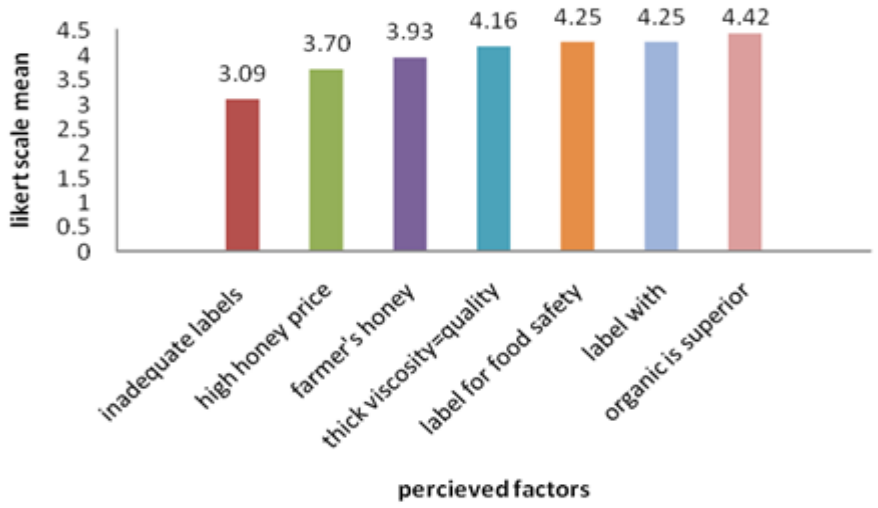


Figure 6: A chart depiction of consumer perceptions of honey quality factors

Source: Survey Data (2014).

5.3.3 Consumers Preference for GI Label and Other Quality Honey Attributes

The survey team conducted a total of 478 respondents completely answered the questionnaire. Therefore, the econometric model includes all the 8,604 observations, a solid base of the results.

In the questionnaire, respondents faced two honey alternatives described by attributes shown in Table 5. The maximum likelihood estimates for the RPL model, estimated for the sample are reported in Table 7. The model is estimated using maximum simulated likelihood procedures in NLOGIT 5.0 econometric software utilizing 100 halton draws for the simulations. The price coefficient is significant with expected negative sign.

All variables are statistically significant at below the 1% level ($p<0.001$), with the exception of private standard body, which is significant at 10% level of significance. This means majority of the variables are relevant and contribute to explaining consumer preferences for the choices presented to them. This being a probabilistic model, the estimated coefficients are

only interpreted by considering their context, sign and significance but not magnitude (McFadden and Manski, 2001).

The log likelihood ratio test rejects the null hypothesis that the coefficient estimates (for geographical indicators and quality attributes of honey) are equal to zero at less than 1% significance level (χ^2=2148.02: ρ<0.0001). Therefore, we reject the null hypothesis that consumers have insignificant preferences for geographical indicators and other quality honey as compared to conventional honey (status quo).

Table 7: RPL estimates for GI and other Quality Attributes of Honey

Variable	Coefficient	Standard Errors
ORIGIN LABEL	1.96***	0.14
FLORAL SOURCE LABEL	0.81***	0.09
ORGANIC	2.38***	0.14
VISCOSITY	1.56***	0.13
PRIVATE	4.27*	2.50
BOTH	0.58***	0.09
PRICE	-0.002***	0.00
Standard deviations of parameter distribution		
NsORIGIN LABEL	0.99430***	0.14888
NsFLORAL SOURCE LABEL	0.27890	0.18135
NsORGANIC LABEL	1.28140***	0.12981
NsVISCOSITY	0.72524***	0.16061
NsPRIVATE	1.91549	1.41207
NsBOTH	0.45898**	0.18924
Log-Likelihood	-1334.64	
McFadden Pseudo-R^2	44%	
χ(ρ-value)	2116.28(0.000)	

Notes: Statistical significance levels: ***1%,**5%,*10%. Corresponding standard errors are shown in parenthesis.

Source: Survey Data (2014).

From the results, consumers show positive preferences for an origin label, there is also niche group that are ready to pay a premium for it. This is shown by a positive sign on origin variable and a significant standard error respectively. Food label are crucial in helping consumers to correctly match with products, enable producers to adapt production to meet consumer demands and expectations, and promote social or political economy objectives (Wu *et al.*, 2015). Specifically, origin labeling is essential in avoiding quality products being offered lower prices in a heterogeneous market setting like unadulterated honey. There are only two types of origin labels; COOL also known as country brands and GI, which denotes a much smaller geographical area of origin like a town. For GI there must be a link between the characteristics of the geographic environment of production and the quality of the product that seeks the GI status (Menapace *et al.*, 2009). The study also found that even though 95% of Kenyans prefer local honey when it came to COO, approximately 84% of the respondents favour labelling of honey with the specific region of origin (GI) when compared to the COO. These results compare fairly with similar studies that revealed consumers had positive attitudes for origin cue of food products (Batt and Liu, 2012; Verbeke and Ward, 2006).Consequently, a conclusion is drawn that just like in the EU, Kenyan consumers value GI more than non-GI labeled products (Menapace *et al.*, 2009). It again proves that Kenya stands to gain more if she adopts GI labeling for her quality produce in the agricultural sector.

Majority of respondents also show positive preferences when asked if they would be willing to pay for floral source label. However, there is yet to be a niche group that would pay higher for this kind of label. This is shown by a positive sign on floral source variable and insignificant standard error respectively. The latter may be attributed to lack of institutional capacity to validate floral source claims in Kenya and belief by a number of respondents that bees feed from a number of forages, which is believed to improve honey's medicinal value. In addition, honey consumers in the current study are urban and may have little knowledge of

floral sources with their value.Results further reveal that an average consumer finds it important to label local honey with both their area of origin and floral source. About 79% of respondents either agree or strongly agree to the same. On average, consumers find floral source label to be at least important; this also makes roughly 59% of respondents. Nevertheless the positive preference for botanical label could be because floral source influence the final taste and colour of honey (Abegaz *et al.*, 2015; Al-Waili, 2003; Anupama *et al.*, 2003) and consumers have different preferences for taste and colour (Marshall *et al.*, 2015; Ruoff *et al.*, 2005). It is therefore important for such an experience attribute to be labelled for them.

Consumers have a positive preference for organic label as shown by positive sign of the coefficient and there is a niche group that would pay higher for this kind of label as shown by significant standard error. Additionally consumer finds it important to label local honey with certified organic label, since about 91% of its respondents prefer organic honey to conventional type. Moreover, 'Organic honey being superior to conventional honey' is strongly agreed upon opinion by 67%of respondents, with a mean of 4.4 on a Likert scale of 1-5. In addition, about 77% of respondents feel that organic label: as a quality cue is very important, in contrast to 6% who feel it is not important at all. They both may be attributed to the increase of the middle income consumers who are aware of health risks and would be interested in a products mode of production (Ngigi *et al.*, 2010).

This study also reveals that Kenyan honey consumers prefer viscous honey to the loose one. This is shown by a positive sign on honey viscosity variable and significant standard error respectively. Moreover, there is niche group that would pay higher for this kind of honey. Honey viscosity is a fairly important quality cue to about 86% of respondents. In addition, about 73% of honey consumers either agree or strongly agree to the opinion that "honey should be thick in viscosity for it to be quality". Furthermore, this results are similar to Warui

et al. (2014), who found thathoney viscosity is an important quality cue to all honey consumers and producers.

Honey consumers have higher positive preferences for private certification as compared to the current status quo of only public certification. However, the preferences for private certification are homogenous. The former is shown by positive sign on private attribute and the latter by insignificant standard deviations of parameter distributions. Likewise, there is also the positive preference for a hybrid certification system of both public and private as compared to the current public certification. Furthermore, consumers' preferences are heterogeneous, to mean there is a niche group for this kind of certification and this is shown by significant standard deviations. This could be attributed to the current limitations by KEBS, since even though majority (84%) of honey users find and use mark of quality as an important indicator of honey quality; there are still issues of honey adulteration, poor packaging and pesticide residue even for those found in supermarkets. Despite this, majority of consumers (95%) still prefer local honey and some have adopted in buying honey directly from farmers. However such honey may not be safe since it is not certified, and there is also loss of revenues by the government through avoided taxes. Therefore, these findings are relevant in overcoming the certification crisis in that, the stakeholders may adopt private certification of the hybrid of both public and private certification. These results compare fairly with findings by (Janssen and Hamm, 2012) that showed consumer's positive preferences for organic certification labels.

Price is also significant with a negative price sign meaning consumers are rational and will go for lower prices if the product is still quality. Price is necessary in calculating consumers' MWTP other attributes by trading them off with price coefficient.

Based on the mean and standard deviation of the estimated parameters can be calculated the share of the population that places positive or negative value on each one of the program attributes. The mean and standard deviation of the coefficient of floral source label and private standardisation body are not significant, indicating that there is no heterogeneity in preferences and that the whole population does not see the benefit of the two. This implies that, as expected, all the population considers this type of label and certification a negative factor.

The nature and strength of origin effects depend on such factors as the product category, the product stimulus employed in the research, respondent demographics, consumer prior knowledge and experience with the product category, and consumer information processing style.

As shown in Table 8, even though, there is a positive consumer preference for thick and privately certified honey as compared to loose and publicly certified honey respectively, the study could not generate significant monetary values attached to these attributes. Nevertheless, the study revealed honey consumers are willing to pay highest for organic label, followed closely by origin label, then floral source label and lastly certification by both Public and Private. However, the values obtained from these results are way higher than the base price for honey as whole of Kshs. 300 for a 500gm found on retail shelf, for example consumers are willing to pay for organic label, about kshs. 1068.23. This could be attributed to the study being hypothetical and the heterogeneity of sampled respondents from different counties. In addition, there are costs involved for honey to qualify as organic like the production and certification costs are much higher compared to conventional honey. However, these values should not be taken in absolute as a price for GI honey, rather be seen as high consumer preferences and pressing need for this labels. More so, the challenge of honey adulteration could have made consumers preferences to be quite high.

Future studies could compare MWTP values from this study with revealed preferences methods once labelling honey with GI is operational in Kenya. But in the meantime a cost benefit analysis study can be done to verify a fair price for GI products in Kenya.

Table 8: Marginal WTP estimates for GI and quality attributes of honey

Variables	Marginal WTP (95% Confidence Interval)	Standard Errors
ORIGIN LABEL	1068.23*** (590 to 1547)	244.21
FLORAL SOURCE LABEL	439.48 ***(231 to 647)	106.06
ORGANIC	1293.13 ***(692 to 1894	306.82
VISCOSITY	849 (473 to 1225)	191.85
PRIVATE	2325.76 (-527 to 5178)	1455.32
BOTH	314 ***(160 to 468)	78.61

Notes: Significance levels; ***1%, **5%, * 10%. Source: Survey Data (2014).

; All the marginal WTP estimates are significant below the 1% level, except for the private standardisation body attribute, which is completely insignificant.

Therefore we reject the null hypothesis that there is no significant difference in monetary value that Consumers are willing to attach to quality local geographical indicated honey. The findings are similar to Argentinean consumers who are willing to pay a price premium to acquire better quality products (Rodríguez *et al.*, 2007).

5.3.4 Factors Influencing Consumers WTP for GI

To determine the source of heterogeneity on consumers' preferences, interaction variables were created between honey quality attributes and consumer characteristics. This was tried for several characteristics but only four were statistically significant as presented in Table 9 below. These include; the interaction between origin label attribute and education; the

interaction between organic attribute and consumers income level; the interaction between consumers' degree of agreeing that KEBS has set adequate standards for honey sector in Kenya and certification by both public and private bodies; and the interaction between presence of an elderly person in a household and organic attribute.

However the highly significant standard deviations of the parameters indicate that there is unaccounted preference heterogeneity, which probably could be explained by other variables not included in the model. The top part of Table 9 belowis the RPL estimates, which was discussed earlier under Table 7.

The results in the middle part of Table 9 show that if a consumer at least agrees the standards set by KEBS are adequate; this reduces their likelihood of their WTP for GI, relative to those who disagree. In addition, their odds of having positive preferences for both public and private certification are reduced by about 32% as compared to those who disagree with the same. This also means that the 40% of consumers who think the local standard body is adequately doing its job may never prefer both private and public bodies to be better than the current public body. The possible explanation are the identified issues of honey adulteration in the country along the value chain, poor labelling and packaging of products as recorded earlier by consumers. More so, consumers are aware of such issues and 67% of them complained of honey adulteration as the main honey issue. An average consumer finds it important and about 79% at least agree to labelling local honey with both its area of Origin and floral source. This results are in tandem with the notion that GI can as well be a quality and food safety attribute since it enables traceability of products (Verbeke and Ward, 2006). In addition, some consumers prefer locally produced food products since they are deemed fresher (Awada and Yiannaka, 2011) and they even pay for premium for fresher foods (Lai *et al.*, 1997). For example the attribute "Colorado Grown" carries a higher premium than organic and Genetically Modified Organism-free attributes (Loureiro *et al.*, 2002). In

addition, the average consumer prefers a mandatory, discrete label with a high-quality standard while poor consumers prefer a mandatory, discrete label with a low standard (Bernard and Bernard, 2009).

Likewise, an interaction between consumer education level and origin attribute has a negative significant effect on the WTP values for origin labels. This contradicts theory in that more learned persons may be willing to pay higher for traceability labels (Nwibo, 2012; Seetisarn and Chiaravutthi, 2011). However, this result can be debated since origin labels are yet to be implemented in the country and this makes the more learned persons to be more skeptical about hypothetical cases.

Also, the interaction between organic attribute and consumers' income level reveals consumers with higher incomes would prefer organic labels. An explanation would be consumers with higher incomes may care more about their health and environmental effects from what they consume (Roitner-Schobesberger *et al.*, 2008; Batte *et al.*, 2007; Wier and Calverley, 2002). The proceeding statement is backed up with the fact that all respondents falling in the highest income category agree that organic honey is superior to conventional honey. The rest of income categories have at least a few people who at most are neutral to the same statement. They may be learned enough to know the benefits of organic foods; because of the high correlation between education and income or they may just want to buy luxury since some organic products may not necessarily be up to standards (Sheng *et al.*, 2009). This results compare fairly with Dickinson *et al.* (2003), who found that consumers would pay even more if traceability are bundled with other characteristics such as animal welfare or enhanced food safety. In addition, respondents who had bought organic vegetables tend to be older, with higher education level and a higher family income than those who had not bought them (Roitner-Schobesberger *et al.*, 2008; Batte *et al.*, 2007; Wier and Calverley, 2002).

Table 9: Factors influencing WTP for GI and quality attributes of honey

Variable	Mean coefficient	Standard Error	P-value
ORIG|	2.04103	0.25587	0.0000***
FLOR|	0.71612	0.07514	0.0000***
ORGANIC|	1.93457	0.27299	0.0000***
VISC|	1.15873	0.10090	0.0000***
PRIVATE|	2.30660	0.52081	0.0000***
BOTH|	0.77787	0.12857	0.0000***
PRICE|	-0.00156	0.00074	0.0348**
Non-random parameters			
BOTHKEBS|	-0.32941	0.15591	0.0346**
ISSUEORI|	0.02008	0.05293	0.7044
EDORI|	-0.18953	0.08499	0.0257**
HHSIPRIC|	0.00017	0.00015	0.2641
ORGAEDUC|	-0.06177	0.10138	0.5423
INCORGA|	0.12890	0.07314	0.0780*
OLDOG|	0.43552	0.16589	0.0087***
Standard deviations			
NsORIG|	0.79843	0.13109	0.0000***
NsFLOR|	0.10746	0.22704	0.6360
NsORGANI|	1.32821	0.11241	0.0000***
NsVISC|	0.94525	0.12391	0.0000***
NsPRIVAT|	0.03903	1.03771	0.9700
NsBOTH|	0.46030	0.16725	0.0059***
Log-Likelihood	-1623.21	χ(ρ-value)	2435.602 (0.000)
McFadden Pseudo-R2	42.87%		

Notes: Significance levels; ***1%, **5%, * 10%.

Source: Survey Data (2014).

An interaction between the presence of an elderly person (above 50 years old) and organic attribute have a positive significant influence on the WTP value. A possible explanation could be the old people worry more for food safety because they are more prone to other old age diseases such as diabetes and blood pressure and the purity of what they consume may improve their health(Prasad *et al.*, 2012). In addition, consumers with higher incomes prefer organic honey, they may care more about their health and environmental effects from what

they consume (Roitner-Schobesberger *et al.*, 2008; Batte *et al.*, 2007; Wier and Calverley, 2002). It is known that there is a positive correlation between age and income, as a result of accumulated wealth over years. Therefore we reject the null hypothesis and conclude that socio-demographic and psychographic factors (age, income, education level, perceptions of honey standards) influence consumer's WTP for GI and other quality attributes of honey.

5.4 Conclusion and Implications

Adulteration is the major issue for honey consumers. They have consequently adapted by sourcing their honey directly from farmers or buying imported brands. However, they are equally willing to pay a premium to improve the authenticity of current honey labels; origin for traceability and organic for food safety. In addition, consumers are not satisfied with the current standards set by the local public body and wish for it to work together with private body to fulfil its mandate or be replaced by a private standard body. However, honey consumers are not ready to be manned by private body alone. There is a niche market for thick honey labelled with its GI, organic, botanical source and certified by both public and private body. In addition, this consumer segment would pay up to 430% premium.

Consumers want quality honey and are willing to pay a premium. Among the highly preferred components of quality honey are traceability, standardization and food safety labels. Hence mechanisms should be put in place to ensure consumer trust for locally produced honey is reinstated. This consequently increases the market for local small scale farmers.

References

Abegaz S. M., Belay, A., Solomon, W. K., Geremew, B. and Adgabe, N. (2015). "Botanical origin, color, granulation and sensory properties of the Herenna Forest Honey". *Food chemistry,* 167, 213-219.

Akerlof G., A. . (1970). "The Market for Lemons: Quality Uncertainty and the Market Mechanism". *Quarterly Journal of Economics,* 84(488-500).

Al-Waili N. S. (2003). "Effects of daily consumption of honey solution on hematological indices and blood levels of minerals and enzymes in normal individuals". *Journal of medicinal food,* 6(2), 135-140.

Anupama D., Bhat, K., K. and Sapna, V., K. (2003). "Sensory and physico-chemical properties of commercial samples of honey". *Food Research International,* 36(2), 183-191.

Awada L. and Yiannaka, A. (2011). "Consumer perceptions and the effects of country of origin labeling on purchasing decisions and welfare". *Food Policy,* 37(1), 21-30. doi: http://dx.doi.org/10.1016/j.foodpol.2011.10.004

Batt P. J. and Liu, A. (2012). "Consumer behaviour towards honey products in Western Australia". *British Food Journal,* 114(2), 285-297.

Batte M. T., Hooker, N. H., Haab, T. C. and 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.

Berdegué J., A., Balsevich, F., Flores, L. and Reardon, T. (2005). "Central American supermarkets' private standards of quality and safety in procurement of fresh fruits and vegetables". *Food Policy,* 30(3), 254-269.

Bernard J. C. and Bernard, D. J. (2009). "What is it about organic milk? An experimental analysis". *American journal of agricultural economics,* 91(3), 826-836.

Bliemer M., C, J. and Rose, J., M. (2010). "Construction of experimental designs for mixed logit models allowing for correlation across choice observations". *Transportation Research Part B: Methodological,* 44(6), 720-734.

Boxall P., C. and Adamowicz, L., W. (2002). "Understanding Heterogeneous Preferences in Random Utility Models: A Latent Class Approach". *Environmental and Resource Economics,* 23, 421-446.

Burugu J. N. (2010). "The county: understanding devolution and governance in Kenya".

Campbell D., Mørkbak, M. R. and Olsen, S. B. (2012). Response latency in stated choice experiments: impact on preference, variance and processing heterogeneity. Paper presented at the 19 th Annual Conference of the European Association of Environmental and Resource Economists, Prague, Czech Republic, 27–30 June 2012.

Carroll T. (2002). "'A study of the beekeeping sector in Kenya June 2001 - January 2002'". *Self Help Development International (SHDI).*

ChoiceMetrics. (2009). "Ngene 1.0 user manual and refernce guide: the cutting edge in experimental design".

Darby M., R. and Karni, E. (1973). "Free competition and the optimal amount of fraud". *Journal of law and economics*, 67-88.

Dickinson D. L., Hobbs, J. E. and Bailey, D. (2003). A comparison of US and Canadian consumers' willingness to pay for red-meat traceability. Paper presented at the American Agricultural Economics Association Annual Meetings, Montreal, Canada.

Everstine K., Spink, J. and Kennedy, S. (2013). "Economically motivated adulteration (EMA) of food: common characteristics of EMA incidents". *Journal of Food Protection®,* 76(4), 723-735.

FAO. (2001). "Revised codex standard for honey". *Codex stan,* 12, 1982.

Gonzalez C., Johnson, N. and Qaim, M. (2010). "Consumer Acceptance of second generation GM foods: The case of biofortified cassava in the North-East of Brazil". *Journal of Agrucltural Economics,* 42(1), 1-18.

Greene W., H. and Hensher, D., A. (2002). "A latent class model for discrete choice analysis: contrasts with mixed logit". *Transportation Research Part B,* 37(2003), 681–698. doi: 10.1016/S0191-2615(02)00046-2

Greene W. H. (2012). "LIMDEP Version 10/NLOGIT Version5 *Econometric Modeling GuidePlainview,*NY;Econmetric Software".

Hatanaka M., Bain, C. and Busch, L. (2005). "Third-party certification in the global agrifood system". *Food Policy,* 30(3), 354-369.

Henson S. and Reardon, T. (2005). "Private agri-food standards: Implications for food policy and the agri-food system". *Food Policy,* 30(3), 241-253.

Huber J. and Zwerina, K. (1996). "The importance of utility balance in efficient choice designs". *Journal of marketing research*, 307-317.

Janssen M. and Hamm, U. (2012). "Product labelling in the market for organic food: Consumer preferences and willingness-to-pay for different organic certification logos". *Food Quality and Preference,* 25(1), 9-22.

Kaneko N. and Chern, W. S. (2005). "Willingness to pay for genetically modified oil, cornflakes, and salmon: Evidence from a US telephone survey". *Journal of Agricultural and Applied Economics,* 37(03), 701-719.

Kimemia C. and Oyare, E. (2006). The status of organic Agriculture, production and Trade in Kenya; Report of the Initial Bckground study of the National Integrated Assessment of Organic Agriculture sector- Kenya. Nairobi.

Kosgei R., Sulo, T. and Chepng'eno, W. (2011). "Structure, conduct and performance of honey marketing in West Pokot district, Kenya". *European Journal of Management,* 11(4).

Kuhfeld W., F. (2005). "Marketing research methods in SAS". *Experimental Design, Choice, Conjoint, and Graphical Techniques. Cary, NC, SAS-Institute TS-722*.

Lai Y., Florkowski, W., Huang, C., Bruckner, B. and Schonhof, I. (1997). Consumer Willingness to pay for inproved attributes of fresh vegetables:A comparison between Atlanta and Berlin. Paper presented at the WAEA, Reno.

Lancaster K., J. . (1966). "A New Approach to Consumer Theory". *Journal of Political Economy,* 74(2), 132-157.

Loureiro M. L., Hine, S. and Association, A. A. E. (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), 477-488.

Marshall S., Gu, L. and Schneider, K. R. (2015). "Health Benefits and Medicinal Value of Honey".

McFadden D. and Manski, C., F. . (2001). "The Econometric Analysis of Discrete Choice". *The Scandinavian Journal of Economics,* 103(2(Jun., 2001)), 217-229.

Menapace L., Colson, G., Grebitus, C. and Facendola, M. (2009). "Consumer preferences for country-of-origin, geographical indication, and protected designation of origin labels".

Mutisya J., S. (2011). An entrepreneurial assessment of the market access for honey and honey product in the city of Nairobi, Kenya. (PhD Dissertation), University of Nairobi, Nairobi, Kenya.

Nelson P. (1970). "Information and consumer behavior". *Journal of Political Economy,* 78(March-April), 311-329.

Nelson P. (1974). "Advertising as information". *Journal of Political Economy,* 82, 729-754.

Ngigi M., W., Okello, J. J., Lagarkvist, C., Karanja, N. and Mburu, J. (2010). Assessment of developing-country urban consumers' willingness to pay for quality of leafy vegetables: The case of middle and high income consumers in Nairobi, Kenya. Paper presented at the 3rd African Association of Agricultural Economics, AAEA/ AEASA Conference Cape Town, South Africa.

Nwibo S., U. (2012). "Assessment of willingness to pay for honey among farming households in Abakalilki local government area of Ebonyi state, nigeria". *Journal of Agriculture and Veterinary Sciences,* 4(December 2012).

Pambo K. O. (2013). Analysis of consumer awareness and preferences for fortified sugar in Kenya. (Master of Science), University of Nairobi, Nairobi.

Piana M., L., Oddo, L., P., Bentabol, A., Bruneau, E., Bogdanov, S. and Declerck, C., G. (2004). "Sensory analysis applied to honey: state of the art". *Apidologie,* 35(2004), S26–S37. doi: 10.1051/apido:2004048

Prasad S., Sung, B. and Aggarwal, B. B. (2012). "Age-associated chronic diseases require age-old medicine: Role of chronic inflammation". *Preventive Medicine,* 54, Supplement, S29-S37. doi: http://dx.doi.org/10.1016/j.ypmed.2011.11.011

Republic of Kenya. (2012). Food , Drugs and Chemicals Substances Act. National Council for Law Reporting Retrieved from www.kenyalaw.org.

Republic of Kenya. (2012). Public Health Act; CAP. 242. Nairobi: National Council for Law Reporting.

Republic of Kenya. (2012). Standards Act: CAP 496. Nairobi: National Council for Law Reporting with the Authority of Kenya.

Rodríguez E., Lacaze, V. and Lupín, B. (2007). "Willingness to pay for organic food in Argentina: Evidence from a consumer survey". *International marketing and trade of quality food products*, 297.

Roitner-Schobesberger B., Darnhofer, I., Somsook, S. and Vogl, C. R. (2008). "Consumer perceptions of organic foods in Bangkok, Thailand". *Food Policy,* 33(2), 112-121.

Ruoff K., Karoui, R., Dufour, E., Luginbühl, W., Bosset, J.-O., Bogdanov, S. and Amadò, R. (2005). "Authentication of the botanical origin of honey by front-face fluorescence spectroscopy. A preliminary study". *Journal of agricultural and food chemistry,* 53(5), 1343-1347.

Scarpa R. and Rose, J., M. (2008). "Design efficiency for non-market valuation with choice modelling: how to measure it, what to report and why*". *Australian journal of agricultural and resource economics,* 52(3), 253-282.

Seetisarn P. and Chiaravutthi, Y. (2011). "Thai Consumers Willingness to Pay for Food Products with Geographical Indications". *International Business Research,* 4(3).

Sheng J., Shen, L., Qiao, Y., Yu, M. and Fan, B. (2009). "Market trends and accreditation systems for organic food in China". *Trends in Food Science & Technology,* 20(9), 396-401.

Srinual K. and Intipunya, P. (2009). "Effects of crystallization and processing on sensory and physicochemical qualities of Thai sunflower honey". *Asian Journal of Food and Agro-Industry,* 2(04), 749-754.

Valerian J., Domonko, E., Mwita, S. and Shirima, A. (2011). "Assessment of the Willingness to Pay for Organic Products amongst Households in Morogoro Municipal".

Verbeke W. and Ward, R. W. (2006). "Consumer interest in information cues denoting quality, traceability and origin: An application of ordered probit models to beef labels". *Food Quality and Preference,* 17(6), 453-467.

Warui M., Gikungu, M., Bosselmann, A., Hansted, L. and Mburu, J. (2014). An assessment of high quality honeys with a potential for Geographical Indication (GI) labeling and initiatives that add value to the honey sector in Kenya. Paper presented at the Apimondia conference.

Wier M. and Calverley, C. (2002). "Market potential for organic foods in Europe". *British Food Journal,* 104(1), 45-62.

Wu S., Fooks, J. R., Messer, K. D. and Delaney, D. (2015). "Consumer demand for local honey". *Applied Economics,* 47(41), 4377-4394. doi: 10.1080/00036846.2015.1030564

Yeow S., H, C., Chin, S. T., S., Yeow, J., A. and and Tan, K., S. (2013). "Consumer Purchase Intentions and Honey Related Products". *Journal of Marketing Research & Case Studies,* 2013(2013), 15. doi: 10.5171/2013.197440

CHAPTER SIX

This chapter provides a summary of the thesis objectives, methods and findings. The thesis conclusion and the recommendation follow. Lastly, there is study's contribution to knowledge and the gaps for future studies.

6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

The study analysed honey consumers' awareness of geographical indicators and willingness to pay for it and other quality attributes of honey in Kenya. It employs a choice experiment (CE) based on a *D-optimal* design, which is a quantitative experimental research design. In addition, primary data was collected through consumer surveys using structured questionnaires and about 478 respondents were drawn from major urban centres: Nairobi, Nakuru and Kitui, using multistage sampling method. Furthermore, consumers' awareness and preferences for geographical and quality honey attributes was analysed using probit and RPL model respectively. The study as well uses STATA 12 and LIMDEP version 10/NLOGIT 5, econometric software in the analysis, respectively.

Results show that about 95% of consumers prefer local honey from Kenyan regions to imported honey. Moreover, the most preferred local honey brands sold in major retail outlets include *Kitui* woodlands, Pure natural honey, Green forest, *Baringo, Tharaka, Asalipoa, Mwingi* natural honey, *Baraka* honey and *Kipepeo*. For imported brands honey from Australia is highly preferred. Furthermore, almost all respondents favour labelling of honey with the specific region of origin unlike just the country of origin. Similarly, about all of Kenyans prefer honey produced in Semi-Arid areas to that from Highlands. This complements the fact that majority of Kenyan honey is produced in ASALs majority of consumers prefers organic honey for food safety reasons. Slightly above half of the

respondents prefer unprocessed honey, and the rest prefer processed honey. This has been noted earlier as processed honey is adulterated in Kenya mainly by middlemen. Lastly, majority of consumers buy from supermarkets, farmers and hawkers respectively.

Slightly over a third of Kenyans are aware of GI labelling of food products. This is highly influenced by higher levels of income and education. However only a third of them have in depth knowledge of this, majority have a rough idea. The main sources of GI knowledge are friends and media. Even though GI is yet to be fully implemented in Kenya, consumers already identify their ideal local GI foods. Honey from *Kitui* or *Baringo*, Milk from *Molo* and *Kinangop*, rice from *Mwea* and *Ahero*, Sugar from *Mumias* and tea from *Kericho.* In addition, about 83% consumers trust the potential GI foods listed. To be specific over half of honey consumers have an ideal local honey that could qualify to be a GI and a half of them have used it before. This honey is desirable since it is pure, tasty, natural, quality, sweeter, thick and colour. However, those that have not consumed potential GI honey that they have mentioned blamed it on its unavailability, lack of labels, expensive, lack of interest, and lack of information. Some still claim it to be untrustworthy because of adulteration. Similarly consumers rank benefits of GI labelling to be quality assurance, boosting rural developments, and protecting reputation of product respectively.

Results of probit regression showed that the likelihood to become aware of GI increased with access to prior information, buying honey from supermarkets and other sources other than the farm gate and in large volumes, having tertiary education and consumer trust. Male consumers also had a higher chance of becoming aware about GI. Results, however, showed a negative relationship between the likelihood to become aware about GI and consumer's high confidence in the quality of honey produced by local farmers. Therefore, we reject the null hypothesis and conclude that socio-demographic factors influence consumer GI awareness.

All attributes; Origin, floral source, organic labels, viscosity, certification by both public and private bodies are statistically significant at below the 1% level of significance ($p<0.005$), with the exception of private standard body, which is significant at 10% level of significance. This shows positive preferences by consumers towards these attributes. With a significant negative price sign, MWTP were calculated and consumers are willing to pay up to 430% premium for organic label. We therefore reject the null hypothesis that consumers have insignificant preferences for geographical indicators and other quality honey. The study concludes that there exists a niche markets for all attributes with the exception of private standardization. Lastly, factors that influence consumers WTP are identified as confidence in the current standard body, higher education, presence of the elderly in the household and low income levels of respondents. The null hypothesis that there is no significant difference in monetary value that Consumers are willing to attach to quality local geographical indicated honey was rejected.

6.2 Conclusions and Policy Recommendations

Consumers knowledge of GI is limited, there is need to create public awareness through consumer education before implanting the same. Furthermore, the study shows that honey consumers are reasonably learned (able to read labels), and are aware of major honey issues in the country so they have opted to source for honey from the rural areas. To capitalize on the reading ability of honey users, the study suggests genuine labelling of GI and other quality aspects of food products. Indicating the aspired consumption of honey for its food and medicinal value, while reiterating safety measures could show fears inherent in consumers regarding honey adulteration. These measures are geared towards promoting consumers' recognition of GI labelling and consequently its role in bringing sanity in the food industry.

Another fact is majority of consumers have experienced honey adulteration, this shows consumers' concern on the level of quality standards set for honey in the country. However,

local farmers stand a better chance of competing with honey imports only if they are trained on hygiene and the control of other actors along the value chain to ensure honey purity. In addition, those who do not consume honey regularly complain of its unavailability, this advocates for the need to improve supply chains capacity and KEBs roles in implementing standards set for honey. Moreover, consumers are willing to pay a premium for pure honey that is organically produced and labelled with its origin and botanical source.

Despite, consumers having positive preferences for private certification, there is yet to be a distinct group that would pay for GI. Still, this shows local honey consumers have positive preferences for private certification as compared to the current public certification. Private companies that are interested in private certification have an investment opportunity in Kenya. Another option to the current Public certification that is equally preferred by local consumers is for the Private standardization to work closely with Public standardization, there is already niche market for this. Therefore the study recommends a move from the current public certification to either private or a hybrid of public and private standardisation.

The government of Kenya has a role to play in protecting and promoting local foods whose trade names relate to food products that relate to a given region. With the revelation of high WTP values of GI, the government can use this avenue to protect both consumers and producers. Furthermore, it should create awareness among potential GI producers through public seminars.

6.3 Contribution to Knowledge and Suggestions for Future Research

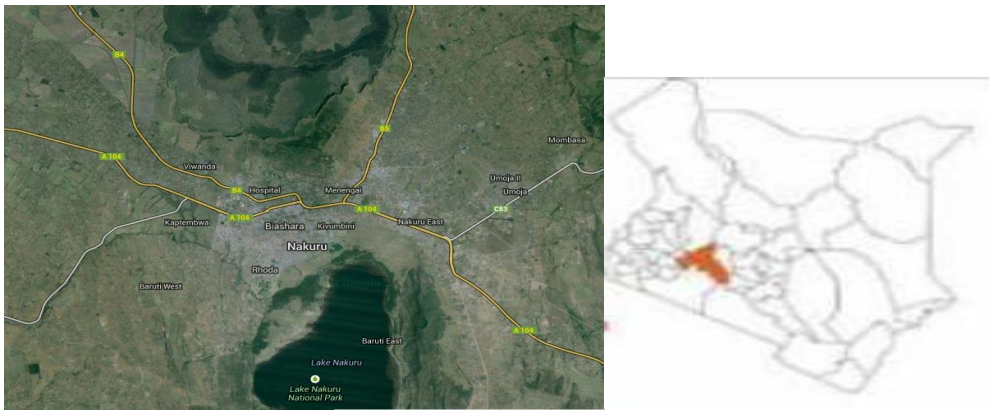
The study contributes to existing literature on stated preference methods for measuring demand and preferences for consumers of GI labelled honey in general and in particular for a developing country. In addition, consumer preference for different labelling emblems for various attributes is tackled. Moreover, the study provides emerging farmers, consumers, marketers and policy makers with information on the domestic supply chain for GI products. Furthermore the study also reveals policy implications towards sustainable GI implementation in Kenya and Worldwide. It therefore, reveals potential to develop specific marketing strategies based on demographics. First, it helps other actors along the honey value chain to know if honey currently being marketed possesses the attributes most valued by consumers. Second, it benefits policy makers, implementers and marketers to apply appropriate techniques to enhance honey quality characteristics most appealing to consumers. Third, it is valuable for marketing managers to base their strategies on research-based information on consumers' preferences for the attributes covered by this study.

This study was hypothetical. Future research could compare WTP values after GI has fully been implemented in Kenya by use of revealed preference methods. In addition, there are other forms GI certification in the world, like the PGI and PDO; future studies could compare consumers' WTP for the two levels of GI, because they provide various levels of product quality.

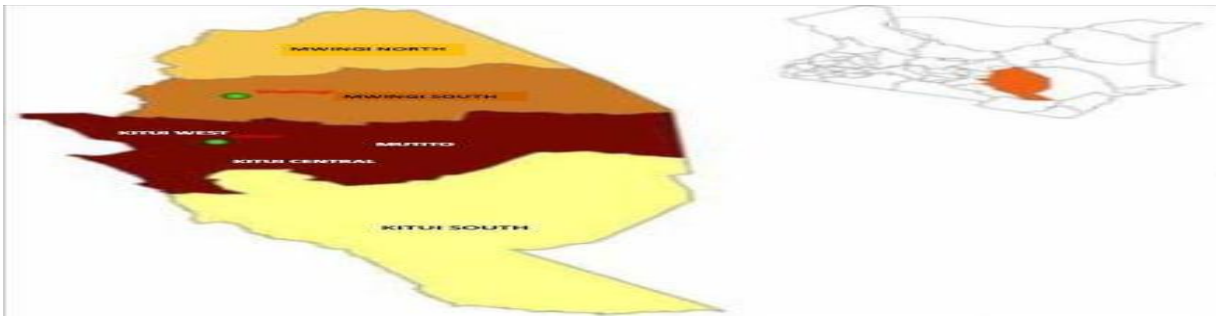
Appendices

Appendix 1: Maps of the Study Areas in Kenya

Map of Nairobi, Kenya



Map of Nakuru, Kenya



Map of Kitui, Kenya.

Appendix 2: Checklist Questions Used in the Focused Group Discussions

Focused Group discussion questionnaire

The purpose of this FGD and key informant interviews was to obtain preliminary insights on issues in honey sold, knowledge of quality honey attributes and labelling with product origin that were relevant to choice experiment design procedure. The main goal was to validate the attribute before pre-test and actual survey. Checklist for discussion

1. How long and how often do you consume honey?
2. Where do you get the honey that you consume?
3. What major doubts have you encountered in the honey that you consume?
   Crystallisation, pesticide residues fake or adulterated, unavailability, too expensive,
4. What are some of the possible solutions to the above challenges?
5. How conversant are you with geographical indications? Which one?
6. What do you see as the strengths and weaknesses of the current honey labelling?
7. Suppose honey was improved in Kenya, what features would you like to be included in\on it?
8. Which of the mentioned honey attributes should be compulsory and which ones should be optional
9. Suppose an improved honey product was developed and has the following features:

a). Geographic origin label b). Method of production c). Honey viscosity

d). Certification organization e). Price f).Floral source

10. Do you think they are relevant in quality honey design? Suggest the possible levels for each attribute.

11). Now I will show you various types of honey made by combining the above features. Pleas compare them and indicate the one you prefer.

Honey quality Attribute	Definition of attributes	Attribute levels
Geographic origin label	GI attribute(whether honey origin was indicated or not)areas	Yes No
Floral source	(indication of floral source that bees visit or not)	Yes No
Method of production	Food Safety attribute (if organic honey or not)	Organic Non-organic
Honey viscosity	Intrinsic quality cue (Honey resistance to flow)	loose thick
Certification organization	Quality standardization attribute (level of standardization of honey product)	Public/private/ public and private
Price increase per 500 grams of honey in Kshs.	Monetary attribute (price of 500grams of honey in Kenya shillings within 50% of the current price/status quo)	Sh.300, 375, 450

Each member of the group was given six choice situations to consider and make choices individually.

12).What was the experiences with the choice tasks? Were the choices easy or difficult to make?

13). While you were making choices, were you comparing all the features or were there specific features that you were looking for? Are there any features that you ignored?

14) Finally, assuming that this honey product was ready for sale in the market;

Would you buy it?

Thank you for participating.

Appendix 3: Household Survey Questionnaire

AN ANALYSIS OF COMSUMERS' WILLINGNESS TO PAY FOR GEOGRAPHICAL INDICATORS AND QUALITY ATTRIBUTES OF BEE HONEY IN KENYA.

SURVEY QUESTIONNAIRE, 2014 Profile 2

INTRODUCTION

This research survey is being conducted under the collaboration of the University of Nairobi, Department of Agricultural Economics and World Agroforestry Centre (ICRAF) for academic and research purposes. The findings will provide insights on consumers' expectations of local bee honey: labelling, traceability, food safety and attribute preferences. Also consumer awareness, preferences and willingness to pay for Geographical Indication is important for policy makers and researchers in the government and private sectors for the implementation of the same.

You have been randomly selected for this interview from households found in Nakuru, Kitui and Nairobi. The survey will cover 400 respondents. The information provided will be treated with a high sense of confidentiality and anonymity. Your name will not appear in any data or report that is made publicly available and the information you provide will be used solely for academic and research purposes. The interview may take about 30 minutes and your participation is voluntary and highly appreciated.

If you have any questions about the survey, you can ask interviewer or the field supervisor in charge of the survey team.

Contacts for further clarity; Miss Charity Juma (0710850891, chrtjuma@gmail.com)

Screening questions

1. Do you or your household consume honey

   YES ☐ NO ☐
2. Are you one of the primary food (honey) shoppers?

   YES ☐ NO ☐

Respondents that answer YES to both questions should proceed with the survey. Those answering NO should not proceed.

NOTE; all answers were correct as they express consumers opinion from his/her use of honey.

General information

Questionnaire number…… Date of interview……..

Name of Respondent…….....

Are you a household head? Yes.....No.....

If, NO. How are you related to the Household Head……..

County…… Location……

Sub-Location…….

Village/estate……

Name of interviewer…….

Point of interview……

SECTION 1: GEOGRAPHICAL INDICATORS AWARENESS

1. Do you know about geographical indicators? 1=YES 0= NO (*If NO go to question 4*)
2. How did you know about it?1) Friend 2) advertisement 3) internet 4) radio 5) newspaper 6) Others (specify)……
3. How best can you define geographical indicators?

i. They show where a product has been produced.
ii. They show product origin that is protected by law
iii. They show unique product origin that is protected by law
iv. They show quality and unique product that is protected by law

4. Do you know of any geographical labelled products 1=YES 0=NO
5. If YES, please list the products_____
6. Do you trust that the products are from the indicated region? 1=YES 0=NO
7. Are you aware of any geographical indicated honey? 1=YES 0=NO
8. If YES, have you and your household consumed it? 1=YES 0=NO
9. If NO what was the reason? .....
10. If YES how was it better from others? .....
11. What do you think were the important reasons of labelling honey with geographical origin?(tick all that you think applies)

i. Quality assurance ☐ ii. Help spread information ☐
iii. Protection of honey reputation ☐ iv. Boost rural development ☐

SECTION II: PREFERENCES

12. Does your household consume honey regularly? ……..1=YES 0=NO
13. If NO what is the reason? (1=Not Available, 2=Not aware of it, 3=expensive, 4=don't trust them 5=other, specify……..)
14. What could be your motivation to consume honey? (Tick all that apply)
    (i) To keep a healthy lifestyle(ii)For medicinal value(iii)Religious and customary reasons(iv)I don't Know
15. What is the main use of honey you normally buy?1=Spread, 2=sweetener, 3=Baking, 4=Medical, 5=preservative, 6=baby use 7=other (specify) …….
16. How many times a day do you use honey? 1=once 2=twice 3=thrice 4=other specify……
17. What are the major doubts/issues you have encountered in the honey that you consume?

1=Crystallisation 2=pesticide residues 3=fake or adulterated 4= Packaging 5=other (specify)

18. How much honey has your household consumed per month over the last one year?.....(kilograms)
19. Where do you buy your honey 1=Supermarket, 2= farmer, 3= Hawker, 4=kiosk 5= roadside 6=market 7=other (specify)
20. Please indicate your preferred features of honey below.

Honey source	1=local	2=imported
Imported and Local brand used	List	
Origin label preferred	1=Country of origin	2= specific region of origin
Climate of production	1= semi-arid areas	2=Highlands
Production type	1=organic	2=non-organic
Honey form	1=processed	2=unprocessed
Region of production in Kenya	List	

21. How important were the following factors as indicators of honey quality during purchase (i)Country/area of origin (ii) Price (iii) Colour (iv) Labelling (v) Taste (vi)Texture (vii) Honey Viscosity (viii) Organic honey (ix) Packaging
22. How often do you read labels when purchasing honey? (tick where applicable)(1=Never, 2=Rarely, 3=Occasionally,4=Often,5=Nearly always)
23. How important were these aspects to you on a honey package label?(on a scale of 1 =not important, 2 =neutral,3=important,4=fairly important, 5=Very important i)Local area of origin (ii) Mark of quality (iii) Brand name (iv) Size (vi) Storage instruction (vii)Floral source label (viii) Expiry date (ix) Nutritional information
24. Do you normally seek prior information regarding any of the aspects on the above question before making honey purchase decisions? _____ 1=YES 0=NO

III. CHOICE EXPERIMENT

25. Using a scale of 1 to 5, where 1 = strongly disagree and 5 = strongly agree, could you please indicate your thinking in the following statements (about local honey)

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I consider the current quality standards (KEBS) of honey to be adequate.					
I am satisfied by the current quality of local farmers honey					
Improving labelling of local honey is critical to ensure food safety					
Organic honey is more superior with less contaminant.					
Honey should be labelled with area of origin and the floral sources					
The current honey prices are too high					
Honey should be thick in viscosity for it to be quality.					

Suppose that the honey industry in Kenya were to be reformed (redesigned). The final improved honey product would include *compulsory* and *voluntary (optional) features.* The compulsory features are those that must be adhered to by all stakeholders involved in the

honey sector. In the honey sector the compulsory attributes will ensure that the program operates within a regulatory framework within Kenya. This will enhance public confidence. In the current study, the compulsory features are as follows.

Bee honey will have essential compositions, hygienically produced with no contaminants.
The final honey product shall meet the standards set locally by the KEBS.
The Public Health Act Cap 242, for sanitation, protection and storage of honey.
Food, Drug and Chemical Substances Act Cap 254provides for the control of the quality and safety of food. Honey should be labelled, packaged, sold, treated and processed in a manner to meet a prescribed standard.
The Kenyan constitution article 46 on consumers right to information ; reasonable quality of goods and services, benefits from food, protection of health, safety and economic interests and compensation in case of defects from food.
Farmers will make known the quality, reputation or other characteristic of honey for which the geographical indication was used. And they have to pay a regulatory fee to prevent people from other regions from using a given GI name.
In addition, to the compulsory features, the improved honey shall have other voluntary features, which offer the honey consumer an opportunity to choose among different levels. The optional or voluntary attributes are those that allow consumers to make choices and are the ones incorporated in the CE design. Suppose your opinion is consulted on how the product needs to be developed. You are required to choose the best combination of voluntary features/attributes that should be considered in the new honey.

Honey quality Attribute	Definition of attributes	Attribute levels
Geographic origin label	GI attribute(whether honey origin was indicated or not)areas	Yes, No
Floral source	(indication of floral source that bees visit or not)	Yes, No
Method of production	Food Safety attribute (if organic honey or not)	Organic, Non-organic
Honey viscosity	Intrinsic quality cue (Honey resistance to flow)	Loose, thick
Certification organization	Quality standardization attribute (level of standardization of honey product)	Public/private/ public and private
Price increase per 500 grams of honey in Kshs.	Monetary attribute (price of 500grams of honey in Kenya shillings within 50% of the current price/status quo)	Sh.300, 375, 450

I would like to show different honey type scenarios and their options that can be made by combining the above attributes and their levels. You are requested to compare them carefully and indicate which one you prefer.

Scenario 1	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	No	yes	
Production Method	Non-organic	organic	
Viscosity	Thick	loose	
Certification Organization	Private	private	
Price	450	300	
Which one would you prefer?			

Scenario 2	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	public	Public and private	
Price	450	300	
Which one would you prefer?			

Scenario 3	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	Public and private	public	
Price	300	450	
Which one would you prefer?			

Scenario 4	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	Organic	Non-organic	
Viscosity	thick	loose	
Certification Organization	public	Public and private	
Price	375	375	
Which one would you prefer?			

Scenario 5	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	Public and private	public	
Price	450	300	
Which one would you prefer?			

Scenario 6	Honey Option A	Honey Option B	None
Origin Label	no	no	
Floral Source Label	yes	no	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	public	Public and private	
Price	300	450	
Which one would you prefer?			

Validation questions on choice experiment responses

26. How sure are you about the choices you made in the honey types?

[1=Very sure, 0=Not sure]

27. Were you considering and comparing all attributes before you made a choice? [1=YES, 0=NO]
28. Were there specific attributes you were looking for in each choice option before you made each decision? [1=YES, 0=NO] If yes please list the selected attributes…… ……
29. Were there specific attributes that you ignored in each choice option before you made your choices? [1=YES, 0=NO], If yes please list the selected attributes…… ……
30. Is there any other factor that influenced your responses to the choice experiment questions besides the information given? [1=YES, 0=NO] if YES please specify……

SECTION IV: CONSUMER SOCIO DEMOGRAPHICS

Indicate how the statements best describe you and your households (on a scale of 1=Never, 2=rarely, 3=not sure,4=often, 5=always) (i)Read newspaper on food safety
(ii) Listen to radio discussion programs about food safety
(iii) Watch television programs on food safety

31. Marital status of the respondent [0=never married, 1=married,2=divorced, 3= Widowed]
32. Please indicate your year of birth……..
33. Please indicate your occupation…….
34. Please indicate your religion [1=Christian, 2=Islam, 3=Hinduism, 4=other, specify]_____
35. Gender of the respondent [1=male, 0=female]_____
36. Excluding you, how many members of your household in the following age groups?

	Males	females
(i)pre-school children-less than 5 years		
(ii)School children-5-15 years		
(iii)adults 16-50 years		
(iv)Elderly- above 50 years		

37. Please indicate your highest level of education attained

Education category	Tick category	Years of completed schooling
Primary school		
High/secondary school		
College/diploma		
Bachelor degree		
Other, specify		

38. What is your household monthly income?

Income category(Kshs)	Tick category	Gross household income
Less than 10,000		
10,001-20,000		
20,001-40,000		
40,001-75,000		
75,001-100,000		
100,001-200,000		
Above200,000		

Appendix 4: Ngene Choice Experiment Syntax

A) Orthogonal design for preliminary survey

Design

; Alts = Alt1, Alt2; Rows = 36; Block = 6; Orth = Sim; Model:

U(Alt1)=B0+B1*X1[0,1]+B2*X2[0,1]+B3*X3[0,1]+B4*X4[0,1]+B5*X5[0,1,2]+B6*X6[0,1,2]/U(Alt2) = B1*X1 +B2*X2 +B3*X3 +B4*X4 +B5*X5 +B6*X6$

B) Efficient design for final survey

Coding of attributes in the design:

X1 [Origin label]: 0 = no label; 1 = label present

X2 [floral source]: 0 = no floral source; 1 = floral source present

X3 [Organic]: 0 = no, 1 = yes

X4 [viscosity]: 0 = loose, 1 = thick

X5 [certifying institution]: 0 = public, 1 = private, 2 = both

X6 [price]: 0 = low level, 1 = middle level, 2 = high level [use actual values]

Syntax

Design

;alts = alt1, alt2;rows = 36;block = 6;eff = (mnl,d);model:

U(alt1)=b1[1.42]*x1[0,1]+b2[0.93]*x2[0,1]+b3[1.37]*x3[0,1]+b4[1.08]*x4[0,1]+b5[0.66]*x5[0,1,2]+b6[-0.001]*x6[0,1,2]/

U(alt2) = b1 *x1 +b2 *x2 +b3 *x3 +b4 *x4 +b5 *x5 +b6 *x6$

Efficiency measures

D-error = 12.52%

A-error = 26.54%

B-estimate = 81.95%

S-estimate = 185207.19

Appendix 5: List of All Choice Sets Used in the CE Survey

PROFILE ONE

Scenario 1	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	No	yes	
Production Method	Non-organic	organic	
Viscosity	Thick	loose	
Certification Organization	Private	private	
Price	450	300	
Which one would you prefer?			

Scenario 2	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	public	Public and private	
Price	450	300	
Which one would you prefer?			

Scenario 3	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	Public and private	public	
Price	300	450	
Which one would you prefer?			

Scenario 4	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	Organic	Non-organic	
Viscosity	thick	loose	
Certification Organization	public	Public and private	
Price	375	375	
Which one would you prefer?			

Scenario 5	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	Public and private	public	
Price	450	300	
Which one would you prefer?			

Scenario 6	Honey Option A	Honey Option B	None
Origin Label	no	no	
Floral Source Label	yes	no	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	public	Public and private	
Price	300	450	
Which one would you prefer?			

PROFILE TWO

Scenario 1	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	private	private	
Price	375	375	
Which one would you prefer?			

Scenario 2	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	thick	loose	
Certification Organization	public	Public and private	
Price	450	300	
Which one would you prefer?			

Scenario 3	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	private	private	
Price	450	300	
Which one would you prefer?			

Scenario 4	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	organic	Non-organic	
Viscosity	thick	loose	
Certification Organization	public	Public and private	
Price	300	450	
Which one would you prefer?			

Scenario 5	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	private	private	
Price	450	300	
Which one would you prefer?			

Scenario 6	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	Thick	loose	
Certification Organization	Public and private	public	
Price	450	300	
Which one would you prefer?			

PROFILE 3

Scenario 1	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	private	private	
Price	450	300	
Which one would you prefer?			

Scenario 2	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	Public	Public and private	
Price	300	450	
Which one would you prefer?			

Scenario 3	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	private	private	
Price	375	375	
Which one would you prefer?			

Scenario 4	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	thick	loose	
Certification Organization	Public and private	public	
Price	375	375	
Which one would you prefer?			

Scenario 5	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	Public and private	public	
Price	375	375	
Which one would you prefer?			

Scenario 6	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	Public and private	public	
Price	450	300	
Which one would you prefer?			

Profile 4

Scenario 2	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	Thick	loose	
Certification Organization	Public	Public and private	
Price	375	375	
Which one would you prefer?			

Scenario 3	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	private	private	
Price	300	450	
Which one would you prefer?			

Scenario 4	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	Public and private	public	
Price	300	450	
Which one would you prefer?			

Scenario 5	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	Public and private	public	
Price	300	450	
Which one would you prefer?			

Scenario 6	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	thick	loose	
Certification Organization	private	private	
Price	300	450	
Which one would you prefer?			

PROFILE 5

Scenario 1	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	Public	Public and private	
Price	450	300	
Which one would you prefer?			

Scenario 2	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	private	private	
Price	300	450	
Which one would you prefer?			

Scenario 3	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	public	Public and private	
Price	375	375	
Which one would you prefer?			

Scenario 4	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	private	private	
Price	375	375	
Which one would you prefer?			

Scenario 5	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	Public And Private	public	
Price	375	375	
Which one would you prefer?			

Scenario 6	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	Public And Private	public	
Price	375	375	
Which one would you prefer?			

PROFILE 6

Scenario 1	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	yes	no	
Production Method	organic	Non-organic	
Viscosity	loose	thick	
Certification Organization	Public And Private	public	
Price	450	300	
Which one would you prefer?			

Scenario 2	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	yes	no	
Production Method	Non-organic	organic	
Viscosity	loose	thick	
Certification Organization	public	Public And Private	
Price	375	375	
Which one would you prefer?			

Scenario 3	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	private	private	
Price	300	450	
Which one would you prefer?			

Scenario 4	Honey Option A	Honey Option B	None
Origin Label	yes	no	
Floral Source Label	no	yes	
Production Method	Non-organic	organic	
Viscosity	thick	loose	
Certification Organization	public	Public And Private	
Price	450	300	
Which one would you prefer?			

Scenario 5	Honey Option A	Honey Option B	None
Origin Label	no	yes	
Floral Source Label	no	yes	
Production Method	organic	Non-organic	
Viscosity	thick	loose	
Certification Organization	public	Public And Private	
Price	375	375	
Which one would you prefer?			

Scenario 6	Honey Option A	Honey Option B	None
Origin Label	yes	yes	
Floral Source Label	no	yes	
Production Method	Non-organic	organic	
Viscosity	Thick	loose	
Certification Organization	Public And Private	public	
Price	300	450	
Which one would you prefer?			

Appendix 6: Probit Commands

;ProbitknowgiSupermarket Nairobi trust HouseHoldsizehoneyvolume television priorinformationmstat gender quality education, robust

;mfx

;estatgof

;regknowgiSupermarket Nairobi trust HouseHoldsizehoneyvolume television priorinformationmstat gender quality education, robust

;vif

Appendix 7: Random Parameter Logit (RPL) Commands

a) Parameters for geographical and quality attributes of honey

Sample; all$

|-> RPLOGIT; Lhs=CHOICE; CHOICE=A, B, C ; Rhs =ORIG, FLOR, ORGANIC, VISC, PRIVATE, BOTH, PRICE ; FCN=ORIG(N),FLOR(N),ORGANIC(N),VISC(N)PRIVATE(N)BOTH(N),PRICE(C);pds=6 ;halton;pts=100$

b) WTP estimates(WALD Procedure in NLOGIT 5)

|-> WALD; labels=b1, b2,b3,b4,b5,b6,b7,sd_b1, sd_b2, sd_b3, sd_b4, sd_b5, sd_b6

Fix_b7:start=b;var=varb;Fn1=-1*(b1/b7);Fn2=-1*(b2/b7);Fn3=-1*(b3/b7);Fn4=-1*(b4/b7)

;Fn5=-1*(b5/b7);Fn6=-1*(b6/b7)$

Appendix 8: Summary of Honey Consumption Patterns

Variable	Percentage
Consumes honey regularly(weekly)	63.53
Reasons for not consuming regularly: Not available	22
Not aware of reason	6
Expensive	31
Don't trust them	15
Other	25
Motivation: To keep a healthy lifestyle	25.72
For medicinal value	26.1
Religious and customary reasons	0.96
I don't Know	1.54
Medicinal and healthy reasons	40.69
Main honey uses: Spread	48.75
Medicinal	71.59
Sweetener	88.48
Time of honey use: Once	48.18
Twice	27.64
Three	11.32
Issues with honey: Fake/adulterated	67
Crystallisation	14
Other	7
Pesticides	6
Packaging	5
Place of buying honey(%): Supermarket	37
Farmers	35
Hawkers	13
Others(women groups and own production)	13
Honey volume :average Kgs per month (min-max)	1(1-15)

Source: author's survey, 2014