**Dean Ship of Graduate Studies**

**Al-Quds University**

# The Demand Management of Improved Environmentally Friendly Household Organic Food in West Bank: Choice Experiment Method

**Hasan Omar Ahmad Abu Latifa**

**MBA Thesis**

**Jerusalem – Palestine**

**1434 / 2013**

# The Demand Management of Improved Environmentally Friendly Household Organic Food in West Bank: Choice Experiment Method

**Prepared by:**

**Hasan Omar Ahmad Abu Latifa**

**B.Sc.: Managent Information System, 2007**

**Al-Quds University, Palestine**

**Supervisor: Dr. Ibrahim M. Awad**

**A Thesis submitted in partial fulfillment of the requirements for the Degree of Master in Business Administration / Faculty of Admin. & Economic Science Institute of Business and Economics / Al-Quds University.**

**Jerusalem – Palestine**

**1434 / 2013**

Al-Quds University

Deanship of Graduate Studies

Master of Business Administration

Thesis Approval

**The Demand Management of Improved Environmentally Friendly Household Organic Food in West Bank: Choice Experiment Method**

Prepared by: Hasan Omar Abu Latifa

Registration No.: 20913061

Supervisor: Dr. Ibrahim M. Awad, PhD.

Master thesis sub and accepted, Date: Aug 26, 2013.

| | | | |
|---|---|---|---|
| 1. | Head of committee | Dr. Ibrahim M. Awad | Signature …… |
| 2. | Internal examiner | Prof. Mahmoud Eljafari | Signature …… |
| 3. | External examiner | Prof. Arne Hallam | Signature …… |

**Jerusalem – Palestine**

**1434 - 2013**

# DEDICATION

This Research thesis is lovingly dedicated to our respective parents who have been our constant source of inspiration. They have given us the drive and discipline to tackle any task with enthusiasm and determination. Without their love and support this project would not have been made possible.

## DECLERATION

The work contained in this thesis has not been previously submitted for any academic degree or diploma at any higher education institution. To the best of my knowledge and belief, the thesis contains no materials previously published or written by another person except where reference is made.

Hasan Omar Ahmad Abu Latifa

_____.

Date: _____.

# PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a Master's degree in business administration at Al-Quds University, I agree that the library shall make it available to borrowers under rules of the Library. Brief quotations from this thesis are allowable without special permission, provided that accurate acknowledgement of the source is made. Permission for extensive quotation from or reproduction of this thesis may be granted by my main supervisor, or in his absence, by the Dean of Graduate Studies, Deanship of Scientific Research and the Institute of Business and Economics, in the opinion of either, the proposed use of the material is for scholarly purposes. Any copying or use of the material in this thesis for financial gain shall not be allowed without my written permission.

Hasan Omar Ahmad Abu Latifa

Signed: _____ Date: _____

# ACKNOWLEDGMENT

I would like to deeply express my gratitude and appreciation to Dr. Ibrahim Awad, who is a supportive and respectable supervisor. Throughout my whole master thesis, he was always patient, guided me to the right directions, encouraged me to pursue my own research ideas and provided a great amount of valuable suggestions and guidance. I appreciate all his contributions of time and practical advice to make me successfully complete the master program in business administration.

I would like to extend my appreciation to my advisory committee members, Prof. Mahmoud Eljafari; I appreciate his expert advice, generous time spending and valuable comments in different aspects of my research areas. I am also grateful to Prof. Arne Hallam to be my external examiner and provide insightful suggestions during the defense.

I would also like to thank all the faculty, staff and graduate students in our department for their friendships and collaboration. I would like to be grateful to Dr. Afif Hamad, Dr. Mohamad Amro, Dr. Samir Hazboun and Mr. Salah Odeh for their good advice and encouragement not only like teachers but also like good friends.

I owe my gratitude and thanks to my friend, Mr. Nizar Alayasa and other colleagues from IBDAA Cultural Center whom gathered the data of the survey of my thesis.

I am also thankful to Eng. Dalal Hussien, works in the Company for Organic Agriculture in Palestine (COAP) for giving me a lot of information about the organic agriculture in Palestine.

I am also sincerely grateful to my mother and my father and also to my sisters and brothers for their love and encouragement.

Most importantly, none of the above would have been possible without the love and patience of my family, my wife Shatha, and my children Omar and Lyan. I would like to express my heartfelt gratitude for their love, patience, support, encouragement, and profound understanding throughout this endeavor.

Finally, anyone who keeps patience in life verily, he/she will be graced by the Almighty Allah. However, the one who has patience will achieve success in his/her life.

# ABSTRACT

Considering the high risk level of using synthetic pesticides and chemical fertilizer in fruit and vegetable production in the West Bank, this research investigates the Willingness to pay (WTP) of organic fruits and vegetables in both Ramllah and Bethlehem Governorates. The impact of organic fruits and vegetables on human health is considered to be a main contributor to the increased demand for this kind of product.

The overall objective of the thesis is to create new effective policies that provide decision-makers and Palestinian investors with the policy of recommendation that can encourage the use of environmentally green foods. They also stimulate Palestinian households to buy these goods in terms of benefits of organic fruits and vegetables for the consumers' health, taste, animal welfare, and the environment.

A stratified random sampling strategy was applied to study the households' preferences of this kind of food where the sample size (n = 384); However, choice preferences and willingness-to-pay (WTP) for organic fruits and vegetables were specifically analyzed. The results showed that households are more likely willing to pay 0.54 (NIS), 1.23 (NIS) and 0.81 premium for organic tomatoes, potatoes and grapes respectively over the conventional ones when knowing the ultimate benefits of the organic products in the West Bank. Also, households generally preferred organic products to be labeled and sold in specialized markets. However, the shape of organic products reduces the consumer's interest when making the purchasing decision but still increases their interest due to the better taste and nutritional benefits of organic fruits and vegetables and thus trying to produce these products with better shape and appearance can increase consumers' preference and in turn the demand. We therefore conclude that governmental, non-governmental organizations and other stakeholders should work together to promote the consumption benefits of organic products; The scientific community, in collaboration with the media, therefore has a very important role in educating the public, so that consumers can distinguish between real and unsubstantiated diseases associated with conventional fruits and vegetables, and make a better informed decision.

**إدارة الطلب على المنتجات الزراعية العضوية الفلسطيني**

**اعداد الطالب: حسن عمر أحمد أبو لطيفة.**

**إشراف: د. إبراهيم عوض.**

## الملخص

استنادا الى مستويات الضرر العالية الناجمة عن استخدام المبيدات الحشرية والأسمدة الكيميائية في زراعة وانتاج الخضروات والفواكه التقليدية على صحة الانسان الفلسطيني وعلى البيئة بشكل عام. تحرى البحث رغبة المستهلك الفلسطيني في الضفة الغربية في "محافظتي رام الله والبيرة وبيت لحم" لدفع مبلغ اعلى من المال مقابل شراء الخضروات والفواكه العضوية التي تعتمد في زراعتها على مواد صديقة للبيئة بعيدا عن استخدام الكيماويات والمبيدات الحشرية، حيث أن هذه المنتجات هي منتجات صحية وتساهم في الحفاظ على صحة المستهلك من جهة وعلى البيئة من جهة أخرى.

إن الهدف العام من البحث هو إيجاد سياسات فعالة توفر لمتخذي القرار والمستثمرين الفلسطينيين اتخاذ قرارات تشجع الزراعة العضوية. كما أنه يهدف ال تحفيز الأسر الفلسطينية لزيادة الطلب على الفواكه و الخضروات الصديقة للبيئة.

وقام الباحث بأخذ عينة عشوائية طبقية مكونة من (384) شخص من أرباب الأسر الفلسطينية، حيث القام الباحث بسؤالهم عن رغبتهم في شراء هذا النوع من المنتجات مستخدما أسلوب الاختيار التجريبي.

وأظهرت نتائج البحث أن أرباب الأسر أبدوا استعدادهم لدفع زيادة مقدارها 0.54 مقابل الحصول على الطماطم العضوية، و1.23 شيكلا مقابل الحصول على البطاطا العضوية، و0.83 شيكلا

مقابل الحصول على العنب العضوي وذلك لما لهذه المنتجات من منافع تعود على صحة المستهلك والبيئة. كما أظهرت النتائج أن المستهلكين يفضلون بيع هذه المنتجات في مراكز تسوق خاصة بالمنتجات العضوية، وبالرغم من أن مظهر المنتجات العضوية اقل جذبا للمستهلك الفلسطيني الا انه قام بتفضيلها ويعود ذلك لمنافعها المتعددة ومذاقها اللذيذ.

وعليه يجب على الحكومة والمنظمات غير الحكومية ان تعمل سويا من أجل الترويج لمنافع استهلاك المنتجات العضوية. ويجب على العلماء وبالتعاون مع الاعلام الفلسطيني ان يقوموا بتوعية المستهلكين إزاء المنافع المتعلقة بهذه المنتجات.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| **ASC** | Alternative Specific Constant |
| **CA** | Conjoint Analysis |
| **CE** | Choice experiments |
| **CEM** | Choice Experiment Method |
| **CL** | Conditional Logit Model |
| **CLA** | Conjugated Linoleic Acid |
| **CRM** | Contingent ranking method |
| **CVM** | Contingent valuation method |
| **GHG** | Greenhouse Gas |
| **GTZ** | German Development Agency |
| **HPM** | Hedonic Pricing Method |
| **IFOAM** | International federation of organic agriculture movements |
| **LCM** | Latent Class Model |
| **ML** | Mixed Logit Model |
| **MWTP** | Median Willingness To Pay |
| **NGO's** | Non-Governmental Sectors |
| **NIS** | New Israeli Shekel |
| **OTA** | Organic Trade Association |
| **PEPS** | Palestinian Central Bureau of Statistics |
| **TCM** | Travel cost method |

| | |
|---|---|
| **WB** | West Bank |
| **WTA** | Willingness to Accept |
| **WTP** | Willingness to Pay |

# TABLE OF CONTENTS

DEDICATION ..... 1

DECLERATION ..... I

PERMISSION TO USE ..... II

ACKNOWLEDGMENT ..... III

ABSTRACT ..... IV

الملخص .. ..... V

LIST OF ABBREVIATIONS ..... VII

LIST OF TABLES ..... XII

LIST OF FIGURES ..... XVI

**CAPTER ONE: NATURE AND BACKGROUND OF THE STUDY** ..... 1

1.1 BACKGROUND OF THE STUDY ..... 1

1.2 STATEMENT OF THE PROBLEM ..... 8

1.3 JUSTIFICATIONS ..... 8

1.4 STUDY QUESTIONS ..... 9

1.5 PURPOSES OF THE STUDY ..... 10

1.5.1 Main Purpose ..... 10

1.5.2 Specific Purposes ..... 10

1.6 HYPOTHESES ..... 11

**CHAPTER 2: LITERATURE REVIEWS AND THEORY** ..... 12

2.1 PRELUDE ..... 12

2.2 DEFINITION OF ORGANIC FOODS ..... 12

2.3 CONSUMER REVIEWS & THEORIES ..... 13

2.3.1 Stated Preference Methods versus Revealed Preference Methods ..... 13

2.3.2 Non -Market Valuation Methods ..... 15

2.3.3 Contingent Valuation Method and Conjoint Analysis Method ..... 18

2.3.3.1 Contingent Valuation Method (CVM) ..... 18

2.3.3.2 Conjoint Analysis Method (CAM) ..... 18

2.3.4 Choice Experiments: Literatures on food sector. ..... 19

**CHAPTER THREE: METHODOLOGY OF RESEARCH** ..... 23
3.1 PRELUDE ..... 23
3.2 THE SELECTION OF ATTRIBURES & LEVELS IN THE (CEM) ..... 24
3.3 THE DESIGN OF CHOICE EXPERIMENT ..... 27
3.3.1 Full Factorial Design ..... 28
3.3.2 Fractional Factorial Design ..... 28
3.3.2.1 Orthogonal design ..... 28
3.3.2.2 Balanced design ..... 30
3.4 NO-PURCHASE OPTION TREATMENT ..... 32
3.5 SURVEY AND DATA COLLECTION ..... 33
3.5.1 The Study Site ..... 34
3.5.2 The Households Sample ..... 34
3.5.3 Justification of using the stratified random sample ..... 37
**CHAPTER FOUR: ECONOMETRIC MODELS** ..... 39
4.1 INTRODUCTION ..... 39
4.2 ECONOMETRIC MODELS ..... 40
**CHAPTER FIVE: EMPIRICAL RESULTS & FINDINGS** ..... 48
5.1 DESCRIPTIVE ANALYSIS ..... 48
5.1.1 Prelude ..... 48
5.1.2 Sample Characteristics ..... 48
5.1.2.1 Respondent Socioeconomic and demographic Characteristics ..... 50
5.1.2.2 Health and Environmental Problems facing households in the West Bank ..... 57
5.1.2.3 Eating Habits and Buying Behavior in the West Bank ..... 61
5.1.2.4 Household Attitudes towards Conventional and Organic agriculture of fruits and vegetables ..... 70
5.2 THE BASE & INTERACTION EFFECTS ON ORGANIC FRUITS AND VEGETABLES. ..... 75
5.2.1 Prelude: ..... 75
5.2.2 Basic Models: Mixed Logit Estimations & Willingness to Pay: ..... 76
5.2.2.1 Tomato Model (ML) Estimates and (WTP) ..... 76
5.2.2.2 Tomato Model (ML) Estimates and (WTP) Interaction Effects ..... 77

5.2.2.3 Potato Model (ML) Estimates and (WTP) ..... 78
5.2.2.4 Potato Model (ML) Estimates and (WTP) with Interaction Effects ..... 79
5.2.2.5 Grapes Model (ML) Estimates and (WTP) ..... 80
5.2.2.6 Grapes Model (ML) Estimates and (WTP) with Interaction Effects ..... 81
5.3 DISCUSSION OF EMPIRICAL RESULTS. ..... 82
5.3.1 Palestinians household aware of ensuring and securing the environment ..... 82
5.3.2 Palestinians household WTP and pay a premium for environmentally green fruits and vegetables. ..... 83
5.3.3 Palestinians household's socioeconomics variables have a significant effect on WTP of environmentally-green products of fruits and vegetables. ..... 84
5.3.3.1 Educations effects on WTP of environmentally green goods ..... 84
5.3.3.2 Income level effects on WTP of environmentally green goods ..... 84
5.3.3.3 Household size effects on WTP of environmentally green goods ..... 85
5.4 CONCLUSION ..... 86
**CHAPTER SIX: CONCLUSIONS, POLICY IMPLICATIONS AND FUTURE RESEARCH** ..... 87
6.1 CONCLUSIONS & POLICY IMPLICATIONS ..... 87
6.2 LIMITATIONS & FUTURE RESEARCH ..... 90
REFERENCES ..... 91
APPENDICE ..... 96
Appendix 1: Questionnaire for Household heads – Choice Experiment Survey ..... 96

# LIST OF TABLES

Table1.1: The names of the farms committed to the renewal of certificates of organic farming with the Palestinian Company……..... 3

Table 2.1: Pros and cons of the main non-market economic valuation methods…..... 16

Table 3.1: Attributes and Levels in Choice Experiment…… 26

Table 3.2: Orthogonal design with three attributes having two level…….……... 29

Table 3.3: Non-orthogonal design with three attributes having two levels……..... 29

Table 3.4: Two step samples - Ramallah and Al-Bira governorates stratified random sample……..... 36

Table 3.5: Two step samples - Ramallah and Al-Bira villages stratified random sample…… 36

Table 3.6: Two step samples - Bethlehem governorate stratified random sample…… 37

Table 3.7: Two step samples - Bethlehem villages stratified random sample……... 37

Table 5.1: Cross-tabulation between the WTP for non-use values of organic potatoes and Place of live……. 49

Table 5.2: Cross-tabulation between the WTP for non-use values of organic grapes and Place of live……..... 49

Table 5.3: Cross-tabulation between the WTP for non-use values of organic tomatoes and Place of live……. 49

Table 5.4: Description of age…… 50

Table 5.5: Description of the family status…… 51

Table 5.6: Distribution of gender……... 51

Table 5.7: Distribution of household place of live…… 52

Table 5.8: Description of number of years that the respondents lived in this region… 52

Table 5.9: Distribution of education…….. 52

Table 5.10: Description of employment status…….. 53

Table 5.11: Kind of household's occupation……. 53

Table 5.12: Members of family under direct household responsibility……... 53

Table 5.13: Description of number of family workers…….. 54

Table 5.14: Distribution of households whom using the land phone……..... 54

Table 5.15: Distribution of households whom using the internet…….. 54

Table 5.16: Distribution of households who owned a car……..... 54

Table 5.17: Household consumption of electricity and water……... 55

Table 5.18: Description to the households land area, house area and estimated price of each other and the cost of rented houses……... 55

Table 5.19: Household smoker or nonsmoker……... 55

Table 5.20: Household expenditures……..... 56

Table 5.21: Description of income……..... 56

Table 5.22: Description of income in both Ramallah & Bethlehem governorates…… 57

Table 5.23: Describes the degree of important of health problems……... 59

Table 5.24: Describes the degree of important of environmental problem……... 61

Table 5.25: Describes how households in West Bank prefer products produced in Palestine……. 62

Table 5.26: Describes the ability of purchasing food products at the cheapest prices…….. 62

Table 5.27: Describes whom willingness to purchase environmentally fruits…….. 63

Table 5.28: Describes those willing to purchase environmentally friendly vegetables. 63

Table 5.29: Describes whom willingness to purchase new products available at the supermarket…… 64

Table 5.30: Describes who preferred to purchase products which are socially consumed……... 64

Table 5.31: Describes households who read the information on the packages of products just out of curiosity…….. 65

Table 5.32: Describes the time taken by the households to buy the products……... 65

Table 5.33: Describes household whom prefer organic products…….. 66

Table 5.34: Describes household whom willingness to pay extra for organic fruits and vegetables…… 66

Table 5.35: Describes that eating is always a question of taste for households…… 67

Table 5.36: Describes that eating has to be fast for household…….. 67

Table 5.37: Shows that a household pays attention to healthy food…….. 67

Table 5.38: Describes that a household looks for food with low calorie content…….. 68

Table 5.39: Describes that the household do not think about his weight when eats….. 68

Table 5.40: Describes that eating for households is pure pleasure…… 69

Table 5.41: Describes that the eating makes household happy……..…….. 69

Table 5.42: Describes that the household prefer to eats fruits after the lunch……... 70

Table 5.43: Household expenditure on fruits and vegetables per month……... 70

Table 5.44: Reasons for the non-widespread of organic fruits and vegetables in the West Bank…….. 71

Table 5.45: Negative impacts of eating conventional fruits and vegetables from households' point of view…….. 71

Table 5.46: Organic fruits and vegetables characteristics from households' point of view…… 72

Table 5.47: Reasons for the households in WB interest to consume organic fruits and vegetables……... 73

Table 5.48: Reasons behind the households in WB doesn't interest to consume organic fruits and vegetables……...…….. 74

Table 5.49: Summary of the Variables for the Estimation Models……... 75

Table 5.50: Basic tomato model: ML Estimations and WTP…… 77

Table 5.51: Tomato ML Estimations and WTP with interaction effects……... 78

Table 5.52: Basic potato model: ML Estimations and WTP……. 79

Table 5.53: Potato ML Estimations and WTP with interaction effects……. 80

Table 5.54: Basic Grapes model: ML Estimations and WTP…… 81

Table 5.55: Grapes ML Estimations and WTP with interaction effects…… 82

Table 5.56: Cross-tabulation between the WTP for non-use values of organic grapes and family size……... 85

Table 5.57: Cross-tabulation between the WTP for non-use values of organic tomatoes and family size…… 85

Table 5.58: Cross-tabulation between the WTP for non-use values of organic potatoes and family size……. 85

# LIST OF FIGURES

Figure 2.1: Valuation methods and their relation to economic value……..…… 14

Figure 3.1: Designs clarify how the sample selected…….. 36

Figure 4.1: Marshallian demand curve, consumer surplus and WTP…….. 46

# CAPTER ONE: NATURE AND BACKGROUND OF THE STUDY

## 1.1 BACKGROUND OF THE STUDY

Organic agriculture, a worldwide growth industry, can be a profitable, sustainable business for agricultural producers interested in going through the certification process necessary to enter this market. Organics have continued to expand during the last few years, and industry experts are forecasting steady growth of 9 percent or higher (OTA 2012). However, adoption and development of certified organic farming are not an easy option for farmers and they carry with them several barriers such as technical, economic, social, cultural or legal. (OTA 2012)

In Jordan, a series of projects were implemented to gradually eliminate the usage of chemical fertilizers and pesticides in agricultural production. With the GTZ technical and financial support, these projects were implemented in Jordan and Tunisia. However, According to IFOAM in Jordan there are diverse organic farms with a total area of 25,669,000 square meters; the shares of these farms plus the total agricultural land are equal to 0.25% and there are 98 producers of these kinds of agriculture.

Also, Israel's agricultural sector is characterized by an intensive productive system, which stems from the need to overcome the scarcity of natural resources, particularly water. The agricultural sectors high-level of development is due to the close cooperation and interaction between scientists, extension advisers, farmers, and agriculture-related industries. These four elements have joined together to promote advanced technologies in all agricultural branches. The results according to IFOAM Israel have diverse organic farms with a total area of 70,950,000 square meters; the shares of these farms plus the total

agricultural land are equal to 1.36% and there are 500 producers of these kinds of agriculture.

However, agriculture is one of the most important sectors of the Palestinian economy as it employs about 31.9% of the population (PEPS 2013). There are about 500 organic farms in Palestine with a total area of 10,000 square meters mainly planted in fruit, almond, olives and dates. According to the Palestinian Agricultural Relief Committee, Organic plant farms are not widespread due to the dominance of the occupation of the Palestinian territories Green lands (German Development Agency GTZ). According to the Ministry of Agriculture in Palestine there are 24 organic olive farms with a total area of 8964.8 square meters (Palestinian Ministry of Agriculture). Table 1.1 demonstrates the names of the farms committed to the renewal of certificates of organic farming with the Palestinian Company for organic farming for the season of 2012.

| No. | The names of the farms | Region | Area | Expected production of fruit / kg | Expected production of oil / kg |
|---|---|---|---|---|---|
| 1 | Al-Zawia Agricultural Farm | Salfit | 324 | 32400 | 6480 |
| 2 | Masha Farm for Animal Development | Salfit | 579.5 | 57950 | 11590 |
| 3 | Azoon New Farm | Qalqilya | 534 | 53400 | 534 |
| 4 | Western Bani Zeid Farm | Ramallah | 574 | 57400 | 11480 |
| 5 | Kafr Theleth Farm for Producing and Marketing Organic Olive Oil | Qalqilya | 998.5 | 99850 | 19970 |
| 6 | Farkha Farm for Producing Organic Olive oil | Salfit | 444 | 44400 | 8880 |
| 7 | Kafr Elrae' Farm | Jenin | 500 | 50000 | 10000 |
| 8 | Yamoun Altaawina Farm ofAgricultural | Jenin | 320 | 32000 | 6400 |
| 9 | Dair Elghosoon Farm | Tulkarem | 337 | 33700 | 6740 |
| 10 | Al-Nama' Farm | Kafr a-Dik | 300 | 30000 | 6000 |
| 11 | Bani Zeid Farm for Organic Olive Oil Farm | Ramallah | 977.5 | 97750 | 19550 |
| 12 | Bedia Farm | Salfit | 407 | 40700 | 8140 |
| 13 | Sanniriya Farm | Qalqilya | 807 | 80700 | 16140 |
| 14 | Al-Daier Farm | Sourif | 228.3 | 22830 | 4566 |
| 15 | Kafr Kadoom Farm | Qalqilya | 853 | 85300 | 17060 |
| 16 | Derestea Farm | Salfit | 781 | 78100 | 15620 |

Table1.1: The names of the farms committed to the renewal of certificates of organic farming with the Palestinian Company

The impact of organic fruits and vegetables on human health is considered to be a main contributor to the increased demand of this kind of product. Also, consumers are increasingly interested in health benefits of foods and have begun to look beyond the basic nutritional benefits to the potential disease prevention and health enhancing compounds contained in many foods. This interest combined with better understanding of how diet affects diseases, rising health-care costs and lifelong expectancy are driving a growing and robust market for organic foods and natural health products. (Agriculture and Agri-Food Canada, 2009)

***However, according to Organic Trade Association there are ten reasons to go organic:***

- Organic products meet stringent standards: Organic certification is the public's assurance that products have been grown and handled according to strict procedures without persistent toxic chemical inputs.
- Organic food tastes great!: It's common sense – well-balanced soils produce strong, healthy plants that become nourishing food for people and animals.
- Organic production reduces health risks: Many EPA-approved pesticides were registered long before extensive research linked these chemicals to cancer and other diseases. Organic agriculture is one way to prevent any more of these chemicals from getting into the air, earth and water that sustain us.
- Organic farms respect our water resources: The elimination of polluting chemicals and nitrogen leaching, done in combination with soil building, protects and conserves water resources.
- Organic farmers build healthy soil: Soil is the foundation of the food chain. The primary focus of organic farming is to use practices that build up healthy soils.
- Organic farmers work in harmony with nature: Organic agriculture respects the balance demanded of a healthy ecosystem: wildlife is encouraged by including forage crops in rotation and by retaining fence rows, wetlands, and other natural areas.
- Organic producers are leaders in innovative research: Organic farmers have led the way, largely at their own expense, with innovative on-farm research aimed at reducing pesticide use and minimizing agriculture's impact on the environment.

- Organic producers strive to preserve diversity: The loss of a large variety of species (biodiversity) is one of the most pressing environmental concerns. The good news is that many organic farmers and gardeners have been collecting and preserving seeds, and growing unusual varieties for decades.
- Organic farming helps keep rural communities healthy: USDA reported that in 1997, half of U.S. farm production came from only 2% of farms. Organic agriculture can be a lifeline for small farms because it offers an alternative market where sellers can control fair prices for crops.
- Organic abundance – Foods and non-foods alike! Now every food category has an organic alternative. And non-food agricultural products are being grown organically – even cotton, which most experts felt could not be grown this way.

However, Consumers' interest in organic food has exhibited continued growth for the past two decades, which has attracted entrepreneurs and corporations seeing a big potential for this industry. This has led to the creation of standards and regulations for organic food industry. There are clear challenges on both demand and supply.

Palestinian consumers are becoming more sophisticated in their purchasing decisions of organic foods; and companies are focusing on supply chain management in order to ensure high quality, traceability, and supply continuity. However, the main obstacle that may face the production of organic foods in Palestine is the transition requirements forms conventional to organic agriculture. During transition, production must meet all of the many standard requirements, including the following (Canadian Organic Standards):

- The land must be managed as organic for 36 months prior to the first organic harvest and during the last 12 months of this period, it must have been under the supervision of an organic certification body (i.e. that the farm has been reviewed and approved as a transitional organic farm).
- The goal of the enterprise must be for a complete transition of its production. During the transition phase, split production is allowed if organic and non-organic products are distinguishable. Parallel production of the same product is not allowed. Parallel production is where the same crop is produced both organically and non-organically.

- Production units must have distinctly-defined boundaries. Boundaries must be readily visible and defined on a map.
- Buffer zones between organic and non-organic production must be at least eight meters wide and this production may not be used or sold as organic. This can include permanent hedgerows, windbreaks, permanent roads or physical barriers.
- Production units cannot alternate between being organic and non-organic production. If you have a problem with a field, it cannot be rotated between organic and non-organic.

Also, people who hold strong health or environmental concerns are likely to be organic consumers. Organic-producing consumers are represented at income and educational levels. Purchasing of organic produce is closely related to health and environmental concerns, leading to the idea that values and personal interests play a role in making one an organic consumer. Major obstacles to the organic market appear to be:

- Availability: most people shop in only one market, a supermarket. Supermarkets may carry some organic produce, but usually not a wide variety of organic produce.
- Higher grower prices than conventional produce: higher grower prices for organic produce decrease consumers' demand and stores' interest in stocking organic produce.
- Lack of uniform labeling and certification: this problem is now being addressed at the federal level.

Finally, the organic food industry may also face some other challenges: (1) maintaining and increasing consumers' trust in the organic food products and this kind of industry in general, and (2) facing competition from other sustainability labels and initiatives. The organic food industry and all its stakeholders will have to elaborate strategic responses to these opportunities and challenges. The results provide an insight into the structure of the organic food industry based on studies conducted with suppliers and consumers of organic food products. The increasing number of consumers willing to pay organic fruits and vegetables in the West Bank still leads to an important imbalance between supply and demand, high operating costs as well as poor supply reliability.

The main purposes of this study are to describe how organic fruits and vegetables play a role in improving the health of people and the environment in the West Bank, and to suggest solutions for increasing the awareness of the benefits of organic products on human health. Specifically, it highlights the benefits of organic fruits and vegetables to consumers' health, taste, animal welfare, and environment, as well as their attitudes (i.e. beliefs about health, taste, and environmental consequences of organic food), and the importance of social and personal norms, are important impetus for organic fruits and vegetable consumption. However, a few studies have compared the consumers' willingness-to-pay for organic fruits and vegetables with their socio economics variables such as age, education, income, gender, household size and the marital status.

Despite the price premium of the organic fruits and vegetables over the conventional one, various reports and studies have shown an increased demand of organic products due to the benefits described above.

Although, prices of conventional fruits and vegetables compared with organic fruits and vegetables are lower. However, promotion of organic food agriculture can lead to increasing the production of this kind of product, which in term decreases the prices and increases the demand in future. In the West Bank, it is anticipated that the development of internal and external markets of organic fruits and vegetables will increase farming income, reduce pollution from agricultural inputs, and provide a healthier alternative to traditional foods.

Given this, this study has an important value for both, policy makers and households to make estimation of consumers' willingness to pay (WTP) for health risk reduction of eating conventional fruits and vegetables.

The study used choice experiment (CE) to estimate the demand of organic fruits and vegetables by measuring consumers' willingness to pay (WTP) for this kind of foods (Hanley et al., 1998). Also, choice experiments (CE) were chosen to measure stated preferences since the method is consistent with Random Utility Theory RUT and allows for obtaining WTP of organic fruits and vegetables by measuring consumers' data indirectly (Adamowicz et al., 1998).

## 1.2 STATEMENT OF THE PROBLEM

In Palestine, the study is likely to be the first one that focuses on staple products of fruits and vegetables, specifically (Grapes, Potatoes and Tomatoes). The environmental and health factors are reported to be important to consumers when purchasing organic fruits and vegetables. In fact, households in the West Bank may not appreciate the long term effect of many health and environmental factors even after consumption. For example, it would take a long time after consumption to realize the effect of pesticides used on the body or on the environment. However, it seems that consumers create their own perceptions or expectations as concerns products and their qualities, and make purchasing decisions accordingly. Thus, it is important to understand how consumers perceive the quality of the product. Environmentally friendly food must have some perceived benefits to those households who are willing to pay higher prices (i.e. beliefs about health, taste, and environmental consequences of these kinds of foods).

## 1.3 JUSTIFICATIONS

The study problem is, however, important and necessary for several reasons listed below:

1. Empirical studies of choice experiment are applied to organic food (i.e.Ara (2003) and Hearne and Volcan (2006)) used choice experiments to value attributes of organic rice in the Philippines, and vegetables in Costa Rica, respectively). The study undertakes the appropriateness of chosen experiments as a method to elicit individuals' WTP for an environmental good by performing tests of internal and external validity. Chosen experiments are now being used more frequently in valuation of environmental goods and so far the results are promising (Adamowicz 1998).
2. However, investigating the household WTP that encourages household to use environmentally friendly foods of fruits and vegetables rather than conventional foods play an important role in improving public health for both present and future generations. The environmental impact assessment includes the production process, use, and disposal of the product (Van Ravenswaay and Blend).
3. Increasing the level of environmentally friendly food consumption in the households is an important element that can be utilized in safeguarding the

environment and reducing the GHG emission. Even in such a small timeframe the characteristics of the population who are willing to pay more for environmentally friendly goods could have changed (Roberts 1996, Kilbourne and Beckmann 1998, Diamantopoulos 2003).

4. This study may give basic information for making other studies of other kinds of foods rather than those described in this study.
5. In the West Bank, willingness to pay for organic fruits and vegetables is an interesting subject and is becoming more and more relevant to business.

## 1.4 STUDY QUESTIONS

In this study, the researcher concentrates on investigating five main questions. It mainly focuses on how to investigate the WTP for environmentally green foods in the West Bank; this kind of food is special in term of its yields and positive benefits to people that are excludable, i.e. its owners can exercise private property rights, preventing those who have not paid for it from using the goods or consuming its benefits and rivalries, i.e. consumption by one necessarily prevents that of another. A specific good, as an economic resource is scarce, which can cause competition for it. The study questions comprise:

1. Are West Bank Households aware of the importance of ensuring / securing environment through purchasing green products of food?
2. How many Households in the West Bank pay for environmentally green goods of fruits and vegetables?
3. What are the reasons why Households may be willing to pay more for environmentally friendly fruits and vegetables?
4. What are the reasons why Households may not be willing to pay more for environmentally friendly fruits and vegetables?
5. What are the main socio economic variables that affect Households willing to pay for environmentally friendly fruits and vegetables?

## 1.5 PURPOSES OF THE STUDY

### 1.5.1 Main Purpose

The overall objective of the thesis is to create new effective policies that provide decision-makers and Palestinian investors with the policy of recommendation that can encourage the use of environmentally green foods. They also stimulate Palestinian households to buy these goods in terms of benefits of organic fruits and vegetables for the consumers' health, taste, animal welfare, and the environment.

### 1.5.2 Specific Purposes

The researcher seeks to achieve specific objectives that can achieve the overall objective of the study, undertaking an empirical work dealing with organic fruits and vegetables in the West Bank. The specific objectives of the main purpose are:

1. Saving the environment through purchasing organic fruits and vegetables;
2. Estimating how many Households in the West Bank pay for organic fruits and vegetables;
3. Identifying whether or not households are WTP for organic fruits and vegetables;
4. Stimulating business to invest in this important sector, especially if households are WTP for organic fruits and vegetables.

The researcher will seek to accomplish the study objectives, which is an important key to policy planners and decision makers toward more efficient and proper management of environmentally green goods in the short run and long run, and how consumers make choices of organic fruits and vegetables with health claims. Reference dependent effects reflect the fact that individuals with different reference points could make heterogeneous choice decisions. Thus, a utility function needs to be constructed relative to the reference condition and it will be discussed later in chapter 4.

## 1.6 HYPOTHESES

According to the economic theory and previous studies, this study seeks to undertake an empirical investigation of household willingness to pay for environmentally organic fruits and vegetables. More precisely, it examines the allocation mechanisms of willingness to pay for organic fruits and vegetables in terms of: (1) Households aware of ensuring and securing environment; (2) Prices of environmentally green products of food; (3) Reasons for which Households in the West Bank may be willing to pay more for environmentally green goods of food (4) Reasons for which Households in the West Bank may not be willing to pay more for environmentally green goods of food; (5) socio economic variables that affect the Households willing to pay for environmentally green food. Toward that end, the hypotheses to be tested in this study are listed below:

i. Palestinian households aware of ensuring and securing the environment;
ii. Palestinian households pay a premium for environmentally green fruits and vegetables;
iii. Palestinian households willing to pay for environmentally green fruits and vegetables;
iv. Palestinian households socioeconomics variables have a significant effect on WTP of environmentally green products of fruits and vegetables;

This study aims to ensure and secure the environment through purchasing organic fruits and vegetables; however the theoretical framework of this thesis is based on a random utility theory. A stated preference choice experiment is used to examining consumers WTP to organic fruits and vegetables. Chapter 2 provides the Literature reviews and theory related to organic foods. Chapter 3 describes the methodology of the research. Chapter 4 presents the econometric models and descriptive analysis. Chapter 5 presents the results of the econometric model. Chapter 6 indicates the conclusion and discusses the limitations of the study, policy implications and future research.

# CHAPTER 2: LITERATURE REVIEWS AND THEORY

## 2.1 PRELUDE

Organic food is deemed one of the important issues worldwide. Therefore, this chapter is to provide a broad vision of green goods from a literatures view, even though this study concentrates on the Palestinian households' willingness to pay for environmentally green products of food especially organic fruits and vegetables. Environmentally green products of food are one of the important things that save the environment and reduce the emission of GHG worldwide and maintain the health of Individuals in the community. Also the section is to develop a theoretical prospectus and theory that can explore the economic feasibility of organic fruits and vegetables. In addition, it illustrates economic concepts of consumers WTP for environmentally green products of food.

## 2.2 DEFINITION OF ORGANIC FOODS

When Palestinian households are asked, ―have you ever heard about organic foods? We can expect a range of responses due to confusion, to unclear familiarity and to knowledgeable interest. While relatively few consumers are likely to have a clear idea about the term organic foods', a substantial number of them have probably consumed organic fruits and vegetables at some point in the recent past, whether knowingly or not. However, a few products of organic foods are available in Palestinian markets, such as organic eggs, organic tomatoes, organic olives and organic milk and dairy products, etc.

***What are Organic foods?*** Organic foods are foods that are produced using methods that do not involve modern synthetic inputs such as synthetic pesticides and chemical fertilizers.

Organic foods are also not processed using irradiation, industrial solvents, or chemical food additives (Allen, Gary J. & Albala, Ken, ed. (2007)).

## 2.3 CONSUMER REVIEWS & THEORIES

### 2.3.1 Stated Preference Methods versus Revealed Preference Methods

The research methodology adopted in this study is one of the Stated Preference Methods: a choice experiment (CE). However, there are two main evaluation methods to examine individual‘s preferences for market and non-market goods: Revealed and Stated Preference Methods. Revealed Preference Methods, one of the earliest consumer demand theories, pioneered by (Paul Samuelson 1938), states that consumer’ preferences can be revealed by their purchasing habits. This method is usually applied to the demand for existing products where data is available for consumers’ actual choice behavior in the real market.

Econometric techniques are used for examining the stated preference methods utilized in this study. Stated Preference Methods are usefully empirical research techniques to understand and predict the decision makers’ choice behavior among discrete products, and were originally developed in marketing research in the 1970s. The methods focus on assessing consumer responses to potential product characteristics (Quagrainie, Unterschultz and Veeman, 1998). Kroes and Sheldon (1988) state that the term stated preference method refers to a family of techniques which use individual respondents’ statements about their preferences in a set of options to estimate a utility function.

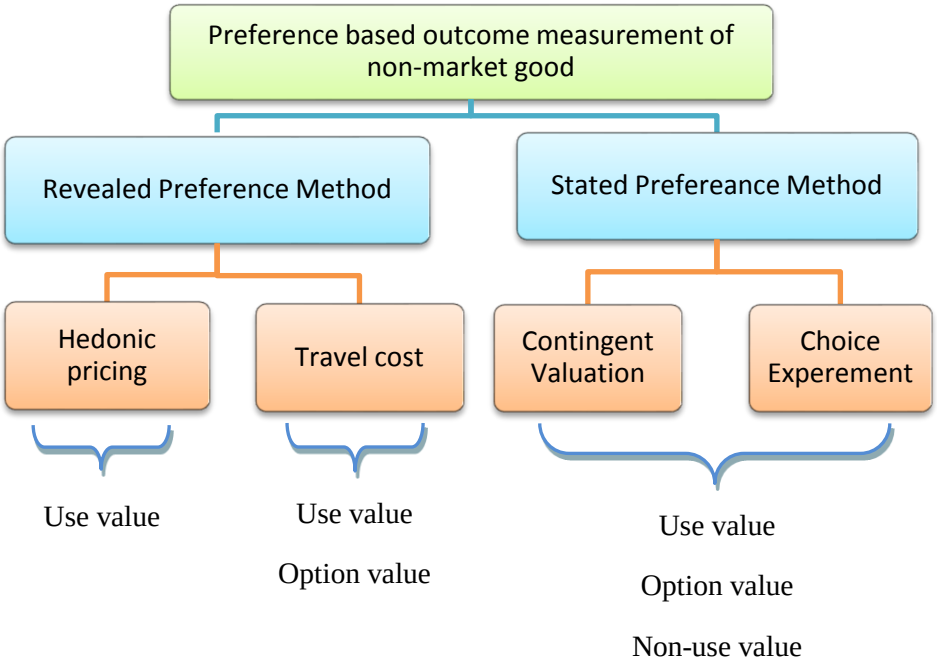



Figure 2.1: Valuation methods and their relation to economic value

Where;

***Use value:*** is the utility of consuming a piece of good; the want-satisfying power of a piece of goods or service in classical political economy.(Adam Smith Theory of Value)"Economic: Adam Smith Theory of Value". Economictheories.org. Retrieved 2012-03-13.

***Option value:*** the value placed on individual willingness to pay for maintaining an asset or resource even if there is little or no likelihood of the individual actually ever using it, occurring because of uncertainty of future supply (the continued existence of the asset) and potential future demand (the possibility that it may someday be used) (Brookshire, D.S., L.S. Eubanks and R.A. Randall)

***Non-use Value:*** The concept of non-use value refers to the value that people assign to economic goods (including public goods, public assets or public resources) even if they have never and will never use it. It is distinguished from use value, which people derive from direct use of the good. The concept is most commonly applied to the value of natural and built resources.

However, many literatures discuss and compare Stated and Revealed Preference Methods (see for example, Kroes and Sheldon, 1988; Adamowicz, Louviere and Williams, 1994 and Morikawa, Ben-Akiva and McFadden, 2002). There are two major advantages of Stated Preference Methods over Revealed Preference Methods. First, Stated Preference Methods allow researchers to estimate and predict the demand for new products with non-existing attributes in a situation where the revealed preference data is not yet available. Second, the data collected by Revealed Preference Methods, the attributes and attribute levels of non-market goods (for example a lake for recreational fishing) usually do not have variability over time in a single cross-section, and it is difficult to estimate the value changes provided by the non-market good without panel data (Louviere, Hensher and Swait, 2000). For example, the observation of choosing a location for lake fishing is fixed in a single time period, while the change effects of respondents 'choices can be observed over multiple periods of time. It is also common to have collinearity among multiple attributes (e.g. the relationship of sales and price) in revealed preference data, which makes it difficult to isolate the effect of one variable from another. A well designed Stated Preference study should avoid these problems.

The challenge of the Stated Preference Method is its hypothetical nature. Consumers may provide unrealistic statements if there is no cost to over (or under-) stating their willingness to pay (WTP). Also, if consumers are unfamiliar with the product (which could be the case for a new functional food attribute), their stated WTP may be inaccurate, because this method asks respondents to state their WTP values but does not record an actual choice action as is the case with revealed preference studies. The fact that Stated Preference Methods are based on what people say rather than on what people do is the source of its greatest strengths and its greatest weaknesses compared with Revealed Preference.

### 2.3.2 Non -Market Valuation Methods

A number of methods have been developed to value non-market goods and services in monetary terms. A wide body of literature and empirical studies is available now, which documents these methods and shows how these studies are regarded as a particular problem. Since, Birol et al. (2006), and National Academy of Sciences (2008) showed the main techniques utilized to measure the value of non-market goods and services

(environmental and/or public goods). The pros and cons of each method are listed in table 2.1 below.

Table 2.1: Pros and cons of the main non-market economic valuation methods.

| Method | Pros | Cons |
|---|---|---|
| **Contingent valuation method (CVM)** | • It can be utilized to evaluate the value of anything without need for observable behavior (data).<br>• It is the best to measure non-use values (existence and bequest values).<br>• Technique is not generally difficult to understand.<br>• Enables pre-and post-valuation. | • Subject to different biases (e.g., interviewing bias, starting point bias, non-response bias, strategic bias, yea-saying bias, insensitivity to scope or embedding bias, payment vehicle bias, information bias, hypothetical bias).<br>• Expensive because there is a need to apply survey development and pre-testing (Pilot site).<br>• Controversial for non-use value applications. |
| **Contingent ranking method (CRM)** | • It can be used to measure the value of environmental goods.<br>• CR respondents are asked to rank or rate a series of product profiles which describe products having specific attribute levels. | • There will be a need to rescale the ranking utility index in monetary terms since price would be used to estimate the marginal utility of each attribute.<br>• Impose a significant cognitive burden on respondents that may make data are not reliable.<br>• The level of coherence for respondents based on CR is not quite adequate |
| **Choice experiment method (CEM)** | • It can be used to measure the value of any environmental resource without need for observable behavior (data), as well as the values of their multiple attributes.<br>• It can measure non-use values (existence and bequest values).<br>• Eliminates several biases of CVM.<br>• Enables pre-and post-valuation | • It is not easy to understand.<br>• Expensive due to the need for thorough survey development and pre-testing.<br>• Controversial for non-use value applications. |
| **Hedonic pricing method (HPM)** | • Based on observable and readily available data from actual behavior and choices. | • Difficulty in detecting small effects of environmental quality factors on property prices.<br>• Connection between implicit prices and value measures is technically complex and sometimes empirically unobtainable.<br>• Ex post valuation. (i.e. conducted after the change in environmental quality or quantity has occurred).<br>• Does not measure non-use values. |

| | | |
|---|---|---|
| **Travel cost method (TCM)** | • Based on observable data from actual behavior and alternatives.<br>• Relatively inexpensive. | • Need for easily observable behavior.<br>• Limited to in situ resource use situations including travel.<br>• Limited to evaluate of the current situation.<br>• Possible sample selection problems.<br>• Ex post valuation.<br>• Does not measure non-use values. |
| **Replacement cost method** | • Based on observable data from actual behavior and choices.<br>• Relatively inexpensive.<br>• Provides a lower bound WTP if certain assumptions are met. | • Need for easily observable behavior on averting behaviors or expenditures.<br>• Estimates do not capture full losses from environmental degradation.<br>• Several key assumptions must be met to obtain reliable estimates.<br>• Limited to assessment of current situation.<br>• Ex post valuation.<br>• Does not measure non-use values. |
| **Production function method** | • Based on observable data from firms using water as an input.<br>• Firmly grounded in microeconomic theory.<br>• Relatively inexpensive. | • Understates WTP.<br>• Ex post valuation.<br>• Does not measure non-use values. |
| **Cost-of-illness method** | • Relatively inexpensive. | • Ignores the disutility associated with illness.<br>• Understates WTP because it overlooks averting costs. Limited to assessment of the current situation.<br>• Ex post valuation. |
| **Market prices** | • Based on observable data from actual choices in markets or other negotiated exchanges. | • Does not provide total values (including non-use values).<br>• Limited to assessment of current situation.<br>• Potential for market distortions to bias values. |

Source: Birol et al. (2006), National Academy of Sciences (2008)

Also, the tables above shows different non-market valuation methods have been developed to estimate public or environmental goods in monetary terms. Accordingly, in the absence of efficient pricing and ownership, economists have sought to find special techniques that can place consumer preferences for the demands for environmental goods and/or services on a common ground.

The study, however, will undertake a CEM technique as the only approach that can investigate the non-use values, as well as the first four hypotheses of the study. Also, CEM is a feasible technique for discovering the use and nonuse values.

### 2.3.3 Contingent Valuation Method and Conjoint Analysis Method

Generally speaking, Contingent Valuation and Conjoint Analysis are two major Stated Preference Methods. The major difference between CVM and CA is that CVM focuses on a single scenario to collect the precise information from each respondent‘s choice, while CA tends to examine a respondent‘s preference by providing a richer description of the attributes trade-offs in the overall scenarios and results in a smaller variance for welfare values than CVM (Adamowicz et al., 1998). The data collection approaches that can be used to conduct conjoint analysis include judgment data (e.g. rating and ranking conjoint) and choice data (e.g. choice experiment) (Louviere, 1988). Both CVM and CA are survey-based stated preference approaches for data collection.

#### 2.3.3.1 Contingent Valuation Method (CVM)

The Contingent Valuation Method (CVM) is a survey based economic technique and has often been applied to non-market goods, such as environmental resources and wildlife (Hanemann, 1994). CVM uses a survey instrument to ask respondents questions directly about their WTP or willingness-to-accept (WTA) as a compensation for the non-market goods in a hypothetical scenario.

#### 2.3.3.2 Conjoint Analysis Method (CAM)

Conjoint Analysis (CA) estimates the structure of a consumer‘s preference given his/her overall evaluation of a set of alternatives that are pre-specified in terms of levels of different attributes (Green and Srinivasan, 1978). A choice experiment is a type of choice based on conjoint analysis, a sub-family of conjoint analysis techniques, also called a Discrete Choice Conjoint Experiment (Louviere, 1988). It is consistent with Random Utility Theory and Lancaster‘s (1966) Consumer Demand Theory. The choice experiment was developed from Conjoint Analysis and Discrete Choice Theory by Louviere and Woodworth in 1983, allowing the researcher to study the choice process and attribute

trade-offs process simultaneously. The choice experiment method evaluates the values of attributes of a product by asking people to choose the most preferred product out of a few available products. In each scenario of a stated choice experiment, the alternative options are described as combinations of different levels of the attributes, and the descriptions of the alternatives vary among scenarios. The respondents make their choices in a series of hypothetical choice sets. The preference effects of attributes can be derived by observing the changes of respondents 'choices due to the variation in the choice alternatives.

### 2.3.4 Choice Experiments: Literatures on food sector.

A number of previous researches had used choice experiments to examine consumers 'attitudes towards organic foods (Lorenz Probst, Elysee Houedjofonon, Hayford Mensah Ayerakwa and Rainer Haas (2012), West et al., 2002, Cranfield, Deaton and Shellikeri, 2009; Steiner, Gao and Unterschultz, 2010; Quagrainie, UnterschultzandVeeman, 1998; Larue et al., 2004; Lusk and Parker 2009; Hu, Woods and Bastin, 2009; Hovde et al., 2007).

Lorenz Probst, Elysee Houedjofonon, Hayford Mensah Ayerakwa and Rainer Haas (2012) use a choice experiment to identify marketing potential of organic vegetables in the food vending sector of Cotonou (Benin), Accra (Ghana) and Ouagadougou (Burkina Faso). Certified organic production and marketing was examined as a potential strategy to improve chemical food safety. Data was obtained to study the preferences of food vendors (n = 180) and consumers (n = 360); vegetable use, risk perception, choice preferences and willingness-to-pay (WTP) for organic certification were specifically analyzed. The results showed that awareness of chemical contamination risks was generally low. Appearance of a product was central to vendor choice; consumers attributed similar utility to taste and organic certification. Consumer WTP was calculated to be a premium of 1.04 USD (per plate) if the food served contained only certified organic vegetables.

West et al. (2002) used stated choice experiments to estimate WTP to different types of for functional foods (e.g., anti-cancer tomato sauce), produced by conventional, organic, and GM technology. This is one of the earliest studies of the functional food sector. A representative sample of 1,008 Canadian household food shoppers responded to the stated

preference experiment administered through a telephone survey in 2001. Each choice set in the questionnaire asked consumers to choose between the same foods produced by three different food production processes. As it was a phone survey, the number of other characteristics describing the foods had to be small, and the three alternatives differed in terms of price and the presence or absence of a functional health property. A Mixed Logit (ML) model was used to analyze the responses. The authors found that the majority of respondents were willing to pay a price premium for functional foods, particularly if the functional ingredients were derived from plants. Consumers were less receptive to a functional property if the functional food was a meat product. The results also indicated that many Canadian consumers would avoid GM foods regardless of the presence of functional health properties, and they are likely to accept conventional and organic functional foods if the prices are reasonable.

Another example of the application of this method is the paper by Quagrainie, Unterschultz and Veeman (1998). A stated preference experiment was administered in major cities in western Canada in 1996 via a mail survey; there were 530 respondents. The research question dealt with how product origin, packaging, and selected demographics affect consumers 'choice of red meats. Several attributes were selected for each different fresh meat product, including price, product origin and packaging. A Nested Logit model was used to analyze the stated preference data. The results indicated that the consumers generally preferred Alberta fresh beef rather than a more general Canadian origin, but the consumers were indifferent between fresh pork from Alberta and elsewhere in Canada. Consumers' age, household income and family size were found to have an effect on meat choice.

Lusk and Parker (2009) applied a choice-based conjoint experiment to examine consumer preferences for the amount and type of fat in ground beef. This paper linked consumers 'beef choices to their health concerns and fat content. Several attributes and levels were selected, including the levels of Omega-3 fatty acid, conjugated linoleic acid (CLA) and saturated fat. The examined product, ground beef enriched with Omega-3 and lower fat content, is also a type of functional food. The goal was to examine preferences for a heart healthy 'beef product. A survey was mailed to 2,000 randomly selected households throughout the United States in April 2007 with 241 surveys returned, a 12.7% response

rate. This paper aimed to determine households' willingness to pay for beef with a healthier fat content, and to determine the importance of fat content in beef relative to other beef attributes. WTP estimates showed that consumers placed significant value on beef enhanced with Omega-3 fatty acids, ranging from $1.30 to $2.21 per-pound of ground beef depending on total fat content. The authors suggested that it might be profitable for the beef industry to market and sell products that are healthier for the consumer (e.g. heart healthy beef). This paper confirmed the importance of Omega-3 functional products. The method used to calculate the total WTP is also helpful to develop the WTP estimates in this study.

Woods and Bastin (2009) used the choice experiment method to study consumers 'acceptance and willingness to pay for blueberry products with nonconventional attributes: organic, Kentucky-grown and sugar-free. An in-store intercept survey was conducted in Kentucky with a sample of 557 respondents in 2007. The results found strong evidence that demographic variables had a significant impact on consumers 'preferences. For example, consumers with different ages, household income and years of education have different preferences. Depending on their personal characteristics, consumers' preferences and willingness to pay differ for various attributes. For example, younger and mid-aged consumers with low to moderate income valued the attribute Kentucky-grown much higher than the organic feature for a pure blueberry jam product. The analysis in this study used the WTP method to obtain the marginal values when the selected attributes also contained demographic interaction variables in a Mixed Logit model. The calculation of marginal WTP when there is significant demographic interaction effects involved in the estimation model provides insights that are valuable for the estimation methods used in this study.

Hovde et al. (2007) use a choice experiment to identify market preferences for high selenium beef in the United States. The survey design included three attributes: price premium, health claims and origin. Health claims levels included the FDA level A and FDA level C claims. Data was obtained from a nationwide internet survey with a sample of 1,304 respondents in 2006. A Multinomial Logit Model was estimated. Unexpected results showed that respondents did not prefer the high-selenium beef products with the FDA level A and C health claims. The authors explained that because the words cancer and selenium were included in the claims; both words might have elicited negative perceptions about the product. Also, consumers were unfamiliar with the function of the new functional

ingredient, selenium, which might reduce the risk of certain cancers. One interesting finding was that those with less health-oriented lifestyles, including those who did not exercise and who use tobacco, preferred high-selenium beef with health claims. Those findings provide some insights for this study, such as the importance of careful wording in the examined health claims.

However, the choice experiment studies summarized here represent only a fraction of the literature in the area of consumers 'attitudes towards and beliefs about organic foods or healthy food choices. The next chapter (Chapter 3) focuses on how a choice experiment was applied in this study so as to examine the willingness to pay for organic fruits and vegetables. It also discusses the selection of organic fruits and vegetables attributes and attributes levels, the choice experiment design and the survey and data collection.

# CHAPTER THREE: METHODOLOGY OF RESEARCH

## 3.1 PRELUDE

The main purpose of this section is to outline a theoretical background of research methodology, where the theoretical definitions of willingness to pay concepts will be discussed. Also, the choice experiment approach widely used empirical methodology in the economics literature (Lorenz Probst, Elysee Houedjofonon, Hayford Mensah Ayerakwa and Rainer Haas, 2012, West et al., 2002, Cranfield, Deaton and Shellikeri, 2009; Steiner, Gao and Unterschultz, 2010; Quagrainie, Unterschultz and Veeman, 1998; Larue et al., 2004; Lusk and Parker 2009; Hu, Woods and Bastin, 2009; Hovde et al., 2007, Hensher, Rose and Green, 2005; Adamowicz et al., 1998 and Veeman and Adamowicz, 2004). For a consumer's choice preference, the classic random utility approach of consumer theory is appropriate (Manski, 1977). The choice experiment method is consistent with Random Utility Theory (RUT). It is a data generation approach which depends on the design of choice tasks to show factors influencing choices and to understand how respondents make choice decisions (Louviere, Hensher and Swait, 2000). A choice experiment is used to observe the effects upon one variable, a response variable, given the manipulation of the levels of one or more other variables in the choice sets (Hensher, Rose and Green, 2005). The choice set is a subset of all alternatives in a universal set that are available at the time of the choice and have a non-zero probability of being chosen (Adamowicz et al., 1998).

However, to conduct the choice experiment first step is to define the study problem by asking the question: what does the study hope to achieve? After understanding the problem, the researcher must identify a list of alternatives, attributes and attribute levels which are appropriate for the choice experiment. This step is called stimulation refinements, which means brainstorming and then narrowing the range of alternatives to consider in the experiment (Hensher, Rose and Green, 2005). The key issues in designing a choice experiment method include selecting the attributes and level of attributes, the experimental design and the treatment of the no-choice option. These aspects of choice experiment design are discussed under sections 3.2, 3.3, and 3.4.

## 3.2 THE SELECTION OF ATTRIBURES & LEVELS IN THE (CEM)

The choice experiment explores how consumers value and make trade-offs among the selected attributes. The selected attributes need to properly reflect the competitive environment of the available alternatives and/or be closely relevant to consumers 'decision making (Blamey, Louviere, and Bennett, 2001). As mentioned in Chapter 1, the research questions of this study focus on awareness of the importance of ensuring / securing environment, how many households in the West Bank pay for organic fruits and vegetables, reasons for which households may be willing or not willing to pay more for organic fruits and vegetables and the main socio economic variables that affect the households willing to pay for environmentally friendly fruits and vegetables when making organic fruits and vegetables choices. And thus, price per kg, Levels of minerals and vitamins, Tasty, Nutritious, shape, Texture and How and where fruits and vegetables where grown were selected as the main attributes for inclusion in the choice experiment.

While selecting attributes, the following aspects need to be considered by analysts. First, many products might have the potential to become tested product(s), only the most representative product or service should be selected. The selected product or service will be used as the alternatives in the choice sets. For example, this study focuses on the households health and taste related to the choice of organically grown fruits and vegetables, so the tested product should contain the main attributes such as taste and nutritious of organic products. Second, not all attributes and levels that are relevant to

consumers' choice decisions for the tested product are included in the choice experiment design.

However, tomatoes, potatoes and grapes have been selected as the products to be tested in this study. The reasons for choosing these fruits and vegetables are: First, these products are widely consumed in the food sector. Second, these products play an important role in improving public health for both present and future generations. Third, increasing the level of these products consumption is an important element that can be utilized in the safeguarding of environment and reduces the GHG emission. Fourth, in the West Bank, the willingness to pay for environmentally green food is a very interesting subject and is becoming more and more relevant to the business in the West bank. For example, explicit health claims for products enhanced with organic fruits and vegetables may increase farmers' profit.

Table 3.1 summarizes the selected attributes and levels in this choice experiment. Also, price per kg, levels of minerals and vitamins, tasty, nutritious, shape, texture and how and where fruits and vegetables were grown are the selected attributes.

Table 3.1: Attributes and Levels in Choice Experiment.

| **Attributes** | **Level of Attributes** | | **Non purchase option** |
|---|---|---|---|
| | **Organic** | **Conventional** | |
| Price per Kg | 100% | 50% | I Don't Know |
| Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | |
| Levels of minerals and vitamins | Contain higher level | Contain low level | I Don't Know |
| Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | |
| Tasty | Very Tasty | Tasteless | I Don't Know |
| Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | |
| Nutritious | Nutritious | Less nutritious | I Don't Know |
| Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | |
| Shape | Less perfect looking | Perfect looking | I Don't Know |
| Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | |
| Texture | Matt | Smooth | I Don't Know |
| Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | |
| How tomatoes were grown | Certified Organic | Not Organic | I Don't Know |
| Please choose one of these choices. | ☐ | ☐ | ☐ |

In this study, the organic fruits and vegetables (tomatoes, potatoes and grapes) have two levels for each attribute. Also, the attribute level of each attribute as the following price of organic fruits and vegetables are double compared with the price of conventional fruits and vegetables, contain a higher level of minerals and vitamins, very tasty, more nutritious, less perfect-looking, texture is matt and certifies organic. Conventional fruits and vegetables (tomatoes, potatoes and grapes) have seven attributes as organic fruits and vegetables with two levels of attributes: the price of conventional fruits and vegetables compared with the price of organic fruits and vegetables, contain a lower level of minerals and vitamins, tasteless, less nutritious, perfect-looking, texture is smooth and not organically certified. However, there are two alternatives available to the Palestinian consumers in each choice set: the first is organic fruits and vegetables (tomatoes, potatoes and grapes) and the second is conventional one.

Organic fruits and vegetables (tomatoes, potatoes and grapes) already exist in the Palestinian fruits and vegetables market. Also, the design of the choice experiment is discussed in the next section.

## 3.3 THE DESIGN OF CHOICE EXPERIMENT

A functional experimental design is used to maximize the information collected from the stated preference choice experiment. The objective of using fractional factorial design is to create efficient choice sets, including how to combine attribute levels into product profiles and how to put profiles into choice sets (Carson, Louviere, Arabie, Bunch, Hensher and Hensher 1994).

Two concepts need to be defined before identifying the formal design used in this study. The first one concerns main effects and interaction effects, and the other deals with labeled experiments and unlabeled experiments. The main effect is the independent effect of a particular treatment upon the dependent variable, the choice. The measurement of the main effect is by the estimated parameter of that treatment variable. An interaction effect is the combined effect of two or more treatments upon the dependent variable. The interaction effect could be measured by the estimated parameter of the combined variables. The main effects and interaction effects determine the degrees of freedom of the experiment, which is directly related to the design of the minimum number of profiles. The number of the profiles needs to be sufficient to estimate both the main effects and interaction effects.

A labeled experiment refers to an experiment using a label or a brand title for each alternative of the choice task. For example, brand names for organic fruits and vegetables products, such as Door to Door or Urban Organic could be used as a label for an alternative. An unlabeled experiment refers to an experiment using a generic title for each alternative and the generic title does not carry any information to the household decision. A label or a brand title in a labeled experiment has a brand effect in the design. The design processes are different for labeled and unlabeled experiments (Esther W. de Bekker-Grob 2009). However, to make an efficient design, the unlabeled experiment requires a smaller number of profiles than the labeled experiment. The design of this study uses an unlabeled experiment since a brand effect is not directly relevant to the research questions being examined.

### 3.3.1 Full Factorial Design

A full factorial design is a design in which each level of each attribute is combined with every level of all other attributes (Louviere, Hensher and Swait, 2000). It allows all possible combinations of the attribute levels and alternatives to be used, and allows all the main effects and interaction effects to be estimated. The number of possible profiles in a full factorial design is equal to LA for an unlabeled experiment and LMA for a labeled experiment, where L is the number of levels, A is the number of attributes and M is the number of alternatives (Hensher, Rose and Greene, 2005). Usually it is too costly and tedious to expose respondents to all possible choice sets. There are some strategies available to reduce the number of choice sets given to respondents, including reducing the number of levels, using a fractional factorial design, blocking the design or using a fractional factorial design combined with a blocking strategy (Hensher, Rose and Greene, 2005).

In general, if there are J alternatives, each with Kj attributes, where attribute k Kj has ljklevels, then the total number of choice situations in the full factorial design is (Ngene Software manual):

$$S^{ff} = \prod_{j=1}^{j} \prod_{k=1}^{k} \ell\, jk^{*}$$

### 3.3.2 Fractional Factorial Design

A fractional factorial design is a design in which only a fraction of all treatment combinations is used in the choice sets. How are the combinations chosen? Two principles should be considered which are orthogonality and balance (Hensher, Rose and Greene, 2005).

#### 3.3.2.1 Orthogonal design

An orthogonal design requires all attributes to be statistically independent of each other, which means zero correlations between attributes. Also, orthogonal design is said to be

orthogonal if it satisfies attribute level balance and all parameters are independently estimable. This translates into the definition that the attribute levels for each attribute column in the design need to be uncorrelated. In case of using orthogonal coding, an orthogonal design satisfies the property that the sum of the inner product of any two columns is zero (Ngene Software manual):

$$\sum_{s=1}^{S} X_{j1k1s} X_{j2k2s} = 0, \forall (j_1, k_1) \neq (j_2, k_2)$$

This is illustrated by the orthogonal design in Table 3.2. The design in Table 3.3 is not orthogonal, as the sum of the inner product of columns B and C is not equal to zero. As can be observed from the correlation matrix, columns B and C are perfectly (negatively) correlated.

| **S** | **A** | **B** | **C** | **AB** | **AC** | **BC** | **Correlation Matrix** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | -1 | -1 | -1 | 1 | 1 | 1 | | **A** | **B** | **C** |
| **2** | -1 | 1 | 1 | -1 | -1 | 1 | **A** | 1 | 0 | 0 |
| **3** | 1 | -1 | 1 | -1 | 1 | -1 | **B** | 0 | 1 | 0 |
| **4** | 1 | 1 | -1 | 1 | -1 | -1 | **C** | 0 | 0 | 1 |
| | | | | ∑ = 0 | ∑ = 0 | ∑ = 0 | | | | |

Table 3.2: Orthogonal design with three attributes having two levels

| **S** | **A** | **B** | **C** | **AB** | **AC** | **BC** | **Correlation Matrix** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | -1 | 1 | -1 | -1 | 1 | -1 | | **A** | **B** | **C** |
| **2** | -1 | -1 | 1 | 1 | -1 | -1 | **A** | 1 | 0 | 0 |
| **3** | 1 | -1 | 1 | -1 | 1 | -1 | **B** | 0 | 1 | 0 |
| **4** | 1 | 1 | -1 | 1 | -1 | -1 | **C** | 0 | 0 | 1 |
| | | | | ∑ = 0 | ∑ = 0 | ∑ = -4 | | | | |

Table 3.3: Non-orthogonal design with three attributes having two levels

Orthogonality is preserved if columns are left out, however not when rows are left out. Therefore, if an orthogonal array exists with more columns than is needed, one can randomly select columns to enter the design, and re-arrange them in any preferred order.

Also, multiplying one or more columns by -1 preserves orthogonality. Therefore, from the orthogonal design in Table 6.2, in total eight different orthogonal designs can be generated using all possible combinations of column multipliers: (1,1,1), (-1,1,1), (1,-1,1), (1,1,-1), (-1,-1,1), (-1,1,-1), (1,-1,-1), and (-1,-1,-1). Furthermore, when replacing the orthogonal codes with the actual attribute levels when constructing the questionnaire, one is not restricted to assigning the attribute levels in the same order as the orthogonal coded levels.

#### 3.3.2.2 Balanced design

A balanced design requires the probability of each attribute level occurring equally often for each attribute of each alternative in all choice sets. One way to express a fractional factorial design could be LA-P, where L and A have the same meaning as above, and P represents the size of the reduced fraction of the full factorial design determined by researchers (Holmes and Adamowicz, 2003). There is a minimum design requirement that the number of the profiles in a fractional factorial design must satisfy the estimation of the main effects and the two-way interaction effects. The limitation of the fractional factorial design is that it cannot guarantee to impart the maximum amount of information about the parameters of the attributes relevant to each specific choice task (Hensher, Rose and Greene, 2005).

Related to the orthogonal fractional factorial design, the optimal or statistically efficient design is another design method in the choice experiment literature and was the method adopted in this study. The development or application of the optimal efficient design method is discussed in Kuhfeld, Tobias and Garratt (1994); Huber and Zwerina (1996); and Kanninen (2002). The optimal efficient design needs to have balance, orthogonality and minimal level overlap (Huber and Zwerina, 1996). The goal of the optimal efficient design is to minimize the variance and covariance of parameter estimates and maintain those optimal design properties as much as possible (Kuhfeld, Tobias and Garratt, 1994). The criterion of the optimal efficient design is to have the design be as efficient as possible, which means to search for a minimum-variance design. Such a design is known as a ***D-optimal design***, which aims to maximize the determinant of the variance-covariance matrix of the model to be estimated. There are some differences between the orthogonal fractional factorial design and the optimal efficient design. The orthogonal fractional

factorial design aims to make the attributes of the design statistically independent and uncorrelated. In contrast, the optimal efficient design optimizes the amount of information in the design and aims to be statistically efficient, but is likely to have correlation among attributes (Hensher, Rose and Greene, 2005).

Applying the Ngenee econometric comprehensive software for designing choice experiments; the syntax below was used to create initial candidate choice sets. This study contains 7 attributes 2 levels, and there would be 128 choice sets for a full factorial design. Therefore, the optimal design needs to include an appropriate amount of choice tasks to satisfy a complex model which can handle the possible main effects and interaction effects, the possible alternative specific effects and demographic effects. However, the number of choice set accord maintained at this study are equal to 28 choice set. So, the choice scenario was reducing the variance and covariance of parameter estimates and maintaining those optimal design properties as much as possible and will be minimized the criterion of the optimal efficient design is to make the design as efficient as possible, which means searching for a minimum-variance design.

*Design*

```
;alts = alt1, alt2
;rows = 9
;orth = ood
;model:
U(alt1) = b1 * A[0,1,2] + b2 * B[0,1,2] /
U(alt2) = b1 * A + b2 * C[0,1,2] $
```

The design of the choice experiment in this study is based on STAT software and it is a general-purpose statistical software package created in 1985 by StataCorp. It is used by many businesses and academic institutions around the world. Most of its users work in research, especially in the fields of economics, sociology, political science, biomedicine and epidemiology. This is an unlabeled generic design because there are no brands in the alternatives for the examined products.

## 3.4 NO-PURCHASE OPTION TREATMENT

The no-purchase option is a constant alternative in each choice set and does not vary among choice sets. The purpose of the no-purchase option is to simulate the real purchase environment where consumers always have the option to choose not to buy a product. The inclusion of the no-purchase option in the choice set avoids forced choices. If the no-purchase option is not provided in the choice experiment, consumers are forced to make choices among the hypothetical alternatives which might change the values of attributes relative to a real market situation. Forced choices could also bias the product demand estimation and WTP results (Carson et al., 1994).

There are several ways of formats by which the consumer presents a no-choice option in the choice experiment: no-purchase and the current purchased product, etc. A no-purchase option is often applied when the research objective is to simulate realism or measure market demand. Another alternative is to allow consumers to choose their current purchased product. This enables a researcher to examine which attribute or level of the new product is so attractive as to encourage consumers to switch from their current purchased product (Batsell and Louviere, 1991). There is no clear guideline to which format should be applied, and is primarily a matter of choice for the researcher. For this study, the no-purchase option has been applied as a constant alternative in each choice set to simulate the real shopping environment.

One popular approach in the literature to deal with the inclusion of the no-purchase option in the choice set is by the measurement of an alternative specific constant (ASC) variable to normalize the alternative utilities (Train, 2009). The ASC approach is used in this study. This method treats the no-purchase option similarly to other alternatives and assumes the marginal utilities of the attributes in the no-purchase option to be zero since there are no attributes associated with this option. The ASC approach measures the relative value of the utility associated with one alternative compared with another alternative. The difference in the utility associated with the no-purchase option and other purchase options is captured by the ASC variable. The coefficient of the ASC variable for the no-purchase option is a relative utility associated with that option relative to the other purchase options.

## 3.5 SURVEY AND DATA COLLECTION

The choice experiment was administrated in in-person survey. The survey contained seven sections. The first section asked about respondent's general questions to introduce him. This section was used to insure that the respondents are the households that buy the fruits and vegetables from Ramallah or Bethlehem bounds. The second section gives the respondents an idea about organic fruits and vegetables health benefits. The third section asked about health and environmental problems facing households in the West Bank. The fourth section gathered information about consumers: eating habits and buying behavior. The fifth section asked about household attitudes to conventional agriculture and organic fruits and vegetables. The sixth asked respondents to complete a series of choice tasks, which was the primary source of choice data for the estimation models in this thesis. The final section of the survey contained some Socioeconomic and demographic questions.

Before conducting the in-person survey a pilot study was completed in December 2011. This pilot survey was carried out by different respondents from different locations in the West Bank -at Al-Quds University, fruit and vegetable market in Bethlehem, fruit and vegetable market in Ramallah. 20 respondents completed a pilot survey. This pilot study provided very useful feedback in finalizing the survey instrument. For example, the main attributes were used for organic and conventional choice experiments. Also, interviews which give a good background about the organic agriculture in the West Bank and how these products can give the farmers opportunities to achieve a higher profit. However, after careful consideration the attribute and attribute level were put at the choice experiment design.

The formal survey was conducted from November to December 2012; respondents recruited from the West Bank, (Ramallah & Al-Bireh governorate and Bethlehem governorate). A random sample was taken from the two governorates and in-person interviews were held to apply the household choice. A total of 345 households completed the survey from the whole sample.

### 3.5.1 The Study Site

The study will be applied in two of the West Bank governorates; Ramallah & Al-Bireh governorate and Bethlehem governorate; this is because the WTP questions are unlikely to be measured by other Palestinian governorates due to political, social and economic drawbacks. However, studying more than one population increases the variance of social and economic background factors, such as nutritional habits, and governmental policies and regulations.

Ramallah & Al-Bireh governorate is located in the middle of the West Bank with an estimated population of 279730 and with a 52,834 households. This governorate contains two main cities Ramallah and Al-Bira, with a further 71 villages and 5 refugee camps (Palestinian Central Bureau of Statistics 2012). In regard to Bethlehem governorate, it is located in the south of the West Bank with an estimated population of 199,463 and with 32,667 households. This governorate contains three main cities: Bethlehem, BeitJala and BeitSahur, with a further 38 villages and 3 refugee camps (Palestinian Central Bureau of Statistics 2012).

Accordingly, a two-step stratified random sample was adopted in this study with a population that includes urban, rural, and refugee camps.

### 3.5.2 The Households Sample

To accomplish a higher degree of precision in sample statistics such as the mean WTP amount, Choice Experiment studies require large sample sizes due to the large variance in the WTP responses (Green and Tunstall, 1991; Phuong and Gopalakrishnan, 2003).

A sample size selection procedure plays an important role in ensuring the reliability of choice experiment studies; especially major criteria for survey design are a sufficient sample size that can obtain a representative sample (Mitchell and Carson, 1989; and Kimenju et al., 2005). Lorenz Probstand Elysee Houedjofonon (2012) noted that stratified random sampling is used intensively in economic research, by applying the technique of stratified random sampling in their research *(Will they buy it? The potential for marketing*

*organic vegetables in the food vending sector to strengthen vegetable safety: A choice experiment study in three West African cities).*

The aim of stratified random sampling is to produce a sample that reflects the population in terms of each member of the population having an equal chance of being included in the sample and has relative proportions of people in different categories, such as gender, ethnicity, age groups, demographic groups, and region of residence.

- Each respondent in the sample gets a chance of selection.
- Better comparison and hence representation across strata.
- Differential response rates may necessitate re-weighting
- However, often only practical approach when sampling a large complicated population

With a 5% margin of error, the households sample size in Ramallah and Bethlehem governorates equal 384 persons. A stratified random sample utilized to ensure a representative and reliable sample of households in the West Bank, was chosen by the governorate of Ramallah & Al-Bira and Bethlehem governorates to identify and divide the households into two main zones with three main sub-groups. Specifically, the two governorates were broken down into three divisions and a representative sample of each stratum was selected: Division (A) household heads who live in cities (urban respondents); Division (B) targets household heads of rural areas (rural respondents); and Division (C) directed to household heads who live in the refugee camps of the selected governorates.

After dividing the study population into the appropriate regions, a stratified random sample was taken through each region. In the application of the survey the interviewers were made the best to take into consideration the criteria of a stratified random sample for each region that can generalize the study results on the population of the study.
The design below clarifies how we select the sample in term of two step samples with a stratified random technique:

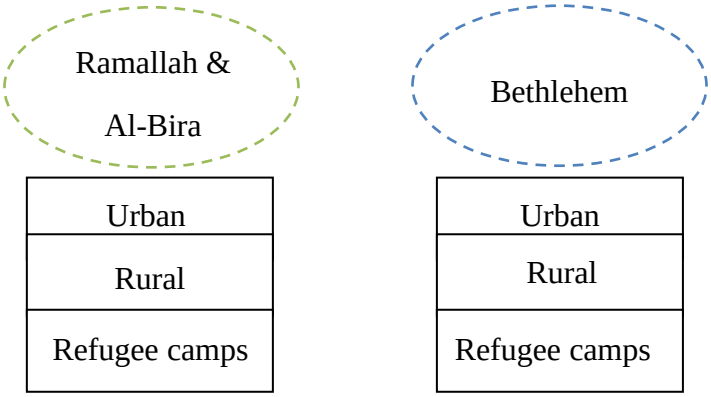



Figure 3.1: Designs clarify how the sample selected.

The tables below clarify how we select the sample in term of two step samples with a stratified random technique:

| City | Division | Zone | # of zones | Population | # of households | Sample size | |
|---|---|---|---|---|---|---|---|
| Ramallah and Al-Bira | Division A | Ramallah | 1 | 27,460 | 6,083(12%) | 28 | 64 |
| | | Al Bira | 1 | 38,202 | 7,917 (15%) | 36 | |
| | Division B | Villages | 73 | 197817 | 35915(68%) | 161 | |
| | Division C | Refugee camps | 5 | 16251 | 2919 (5%) | 12 | |

Table 3.4: Two step samples - Ramallah and Al-Bira governorates stratified random sample.

| City | Division | Zone | Selected villages | Population | # of households | Sample size |
|---|---|---|---|---|---|---|
| Ramallah and Al-Bira | Division B | Villages | Beituniya | 19,761 | 3,901 (29%) | 47 |
| | | | BeitLiqya | 7,710 | 1,302 (10%) | 16 |
| | | | Silwad | 6,123 | 1,237 (9%) | 15 |
| | | | BaniZeid | 5,515 | 1,094 (8%) | 13 |
| | | | AL-Itihad | 6,803 | 1,055 (8%) | 13 |
| | | | AL-Zaytouneh | 6,190 | 1,027 (8%) | 13 |
| | | | BirZeit | 4,529 | 1,005 (7%) | 11 |
| | | | Sinjil | 5,236 | 965 (7%) | 11 |
| | | | BaniZeid ash Sharqiya | 5,083 | 888 (7%) | 11 |
| | | | Ni'lin | 4,573 | 869 (7%) | 11 |
| **Total** | | | | 71,523 | 13,343 | 161 |

Table 3.5: Two step samples - Ramallah and Al-Bira villages stratified random sample.

The tables below clarify how we select the sample in term of two step sample with stratified random technique:

| City | Division | Zone | # of zones | Population | # of households | Sample size | |
|---|---|---|---|---|---|---|---|
| Bethlehem | Division A | Bethlehem | 1 | 25,266 | 5,211 (16%) | 23 | 47 |
| | | BeitSahur | 1 | 12,367 | 2,775 (8%) | 12 | |
| | | BeitJala | 1 | 11,758 | 2,664 (8%) | 12 | |
| | Division B | Villages | 38 | 113948 | 19518 (60%) | 88 | |
| | Division C | Refugee camps | 3 | 12,896 | 2499 (8%) | 12 | |
| **Total** | | | 44 | 176,235 | 32,667 (38%) | 147 | |

Table 3.6: Two step samples - Bethlehem governorate stratified random sample.

Villages divided in term of population size and we select the largest ten villages in Bethlehem city that shown below:

| City | Division | Zone | Selected villages | Population | # of households | Sample size |
|---|---|---|---|---|---|---|
| Bethlehem | Division B | Villages | BeitFajjar | 11,004 | 1,808 (14%) | 12 |
| | | | Al 'Ubeidiya | 10,753 | 1,703 (13%) | 12 |
| | | | Al Khadr | 9,774 | 1,722 (13%) | 11 |
| | | | Ad Doha | 9,753 | 1,849 (14%) | 12 |
| | | | Tuqu' | 8,881 | 1,368 (10%) | 9 |
| | | | Nahhalin | 6,827 | 1,204 (9%) | 8 |
| | | | Za'tara | 6,289 | 1,046 (8%) | 7 |
| | | | Husan | 5,551 | 1,028 (7%) | 6 |
| | | | Jannatah | 5,416 | 860 (6%) | 6 |
| | | | Hindaza | 4,799 | 794 (6%) | 5 |
| **Total** | | | | 79,047 | 13,382 | 88 |

Table 3.7: Two step samples - Bethlehem villages stratified random sample.

### 3.5.3 Justification of using the stratified random sample

Many reasons for choosing the stratified random sample in order to increase sample statistical efficiency, provide adequate data for analyzing the various subpopulations or strata and to enable different research methods and procedures to be used in different

strata. However the aims of using the stratified random sample in this research are to (Donald R. Cooper, Pamela S. Schindler, 2008):

- Reducing the potential of bias in the selection of cases to be included in the sample. As a result, the stratified random sample provides a sample that is highly representative of the population being studied, assuming that there is limited missing data;
- Allowing us to make statistical conclusions from the collected data that will be considered to be valid;
- Improving the potential for the strata to be more evenly spread over the population. Furthermore, where the samples are the same size, a stratified random sample can provide greater precision than a simple random sample. Because of the greater precision of a stratified random sample compared with a simple random sample, it may be possible to use a smaller sample, which saves time and money;
- The stratified random sample also improves the representation of particular strata (groups) within the population, as well as ensuring that these strata are not over-represented.

This chapter has described the design of the choice experiment and administration of the survey in this study. However, a well-developed choice experiment survey is used. Therefore, stated guidelines are designed basically to ensure reliability and usefulness of the information obtained in the questions of the survey, especially the choice experiment questionnaires. In order to ensure an acceptable level of reliability face-to-face (in-person) interviews were adopted for the stratified random sample of this study, which is likely to be the best approach for such studies to be used in the WB. The next chapter (Chapter 4) presents the econometric models and the descriptive analysis of the survey data.

# CHAPTER FOUR: ECONOMETRIC MODELS

## 4.1 INTRODUCTION

This chapter focuses on developing the econometric models to examine consumers WTP for organic fruits and vegetables in the West Bank. As described in the previous chapters, this study examines Palestinian consumer's response to different types of prices, health claims and the shape of organic fruits and vegetables over the conventional ones and the effects of other attitudinal factors on purchasing choice for organic fruits and vegetables choices over conventional one. Also, described in this chapter, a discussion of the econometric models and estimation methods that could be used to obtain the households preference and identifies the utility function with the main and the interactional effects in the choice experiment.

## 4.2 ECONOMETRIC MODELS

According to Train (2009), an individual i receive utility U when choosing an alternative j with a group of attributes Xij from a choice set. The utility has been modeled with two components: an observed deterministic component Vij and an unobserved stochastic component εij of the utility function. The utility received from alternative j is represented by:

$$\mathbf{Uij = Vij + \varepsilon ij} \qquad \mathbf{(4.1)}$$

Where Vij = f(Xij), the deterministic component, is a function of the attributes of the alternatives. In the choice model, individual i face a choice of one alternative from a finite choice set C. The probability Pij that alternative j will be chosen equals the probability that the utility gained from this choice is no less than the utility of choosing another alternative in the finite choice set. The probability of individual i choosing alternative j is expressed as:

$$\mathbf{Pij = Prob\ \{Vij + \varepsilon ij \geq Vik + \varepsilon ij;\ for\ j \neq k,\ and\ k \in\ C\}} \qquad \mathbf{(4.2)}$$

However, at this research, consumer i faces the choice of one alternative among organic fruits and vegetables, conventional fruits and vegetables and doesn't know purchase option, given various attribute level combinations in each choice set. The probability of consumer i choosing alternative j equal the probability that the utility received from alternative j is greater or equal to the utility when choosing conventional fruits and vegetables or doesn't know purchase option.

McFadden (1974) developed the Conditional Logit model to estimate these probabilities assuming the stochastic error term is independent and follows a Type-I extreme value distribution. Assume the observed deterministic component Vij is a linear function of perceived product attributes Xj, so Vij = β'Xj. The choice probability of consumer i choosing alternative j in the Conditional Logit Model is formed as:

$$\mathbf{Pij} = \frac{\mathbf{exp}(\boldsymbol{\mu\beta' Xj})}{\sum_{\boldsymbol{k=1}}^{\boldsymbol{k}} \mathbf{exp}(\boldsymbol{\mu\beta' Xk})} \qquad (\mathbf{4.3})$$

Where:

- $\mu$is a scale parameter which is usually assumed to be 1.
- β is a vector of parameters.
- k is an index representing the chosen product by consumers from the choice set (k =1,…,K, where K = 3 in this study). Parameters in this model can be estimated by the maximum likelihood estimation method.

However, this research uses the Random Utility Theory as the underlying theoretical framework. The indirect utility of consumer i choosing alternative j can be expressed as the following function:

$$\mathbf{Uij = Xijß + ej} \qquad \mathbf{(4.4)}$$

Where:

- ß is a vector of estimated parameters
- Xij represents a vector of the selected attribute levels in the choice set
- ej is the error term associated with the utility brought by alternative j, which cannot be captured by the attributes.

Given the specified attributes and levels of organic fruits and vegetables in this study, a linear indirect utility function of consumer i choosing alternative j in one choice set is specified as:

**Uij = ß1 (No-Purchase Option) + ej  where j= (no purchase)** **(4.5)**

**Uij = (1-NoPurchase) * (ß1Pricej + ß4Nutritiousj + ß5Shapej +)** **(4.6)**
**+ ej (j ≠ no purchase)**

Also, the base model above identifies the utility function with the main effect variables in the choice experiment. As specified in Table 3.1 in Chapter 3, seven attributes are included in this choice experiment, which are price, level of minerals and vitamins, tasty, nutritious, shape, texture and how fruits and vegetables were grown. Those attributes include different levels which are all dummy-coded, and they become the main variables to test the effects of each attribute in the random utility function. However, the seven attributes are separated

into two dummy variables equal to 0 if household select conventional fruits or vegetables and 1 if the household select organic fruits or vegetables otherwise equal to 0 (Non-purchase option).

Through the design of choice experiment as presented in Chapter 3, the possible interaction effects between the main variables were also considered. The indirect utility function of consumer i choosing alternative j with both the main effects and the interaction effects could be expressed as follows:

**Uij = (1-NoPurchase) * (ß1 EducationalLevelj + ß2 MonthlyIncomej + ß3 FamilySizej + ß4 EmploymentStatusj)+ ej** **(4.7)**

Where; EducationalLevelj, MonthlyIncomej, FamilySizej and EmploymentStatusj of the respondents are the interaction variables.

Also, Equation 4.7 includes the interaction effects. A main effect represents the effect of one level of the selected attribute on the dependent variable measured independently from other variables. A two-way interaction effect is the first order interaction between two main variables. An interaction effect between two variables exists if consumers' preferences for the levels of one attribute depend on the levels of the other (Louviere, Hensher and Swait, 2000). In this study, the potentially relevant interaction effects are between organic fruits and vegetables (Tomato, Potato and Grapes) and conventional fruits and vegetables (Tomatoes, Potatoes and Grapes). However, households' preferences for seven main attributes for fruits and vegetables (Price, Levels of minerals and vitamins, Tasty, Nutritious, Shape, Texture and How fruits and vegetables were grown). For example, household might be less sensitive to the presence of organic fruits and vegetables taste, compared with higher prices of these kinds of fruits and vegetables.

A number of discrete choice models are available and differ in the assumptions made about the distribution of the error term (Train, 2009). For example, the Conditional Logit model's error term is assumed to have a type-I extreme value distribution. The Probit Logit model's error term is assumed to have a normal distribution. The discrete choice models typically used to estimate consumers 'choice behaviors, are the Conditional Logit, the

Mixed/Random Parameter Logit model, the Latent Class model, the Nested Logit, and the Ordered Probit model. This study focuses on estimation results from the Conditional Logit model.

The Conditional Logit (CL) model is a standard and fundamental starting point from which to derive other advanced models in the family of discrete choice models. However, the limitations of the CL model are obvious as well. The major limitation listed below:

- The estimated coefficients of the attributes are fixed to be the mean values of all respondents' responses. They ignore the variation of the estimated coefficients and cannot handle preference heterogeneity among consumers. Consumer heterogeneity is an important issue in food markets, especially when dealing with differentiated products, such as organic fruits and vegetables, where target consumer preferences might be quite different from other consumers.
- The second major limitation of the CL model is the independence of irrelevant alternatives (IIA), also known as binary independence is an axiom of decision theory and various social sciences. The IIA property assumes that the ratio of the probability for any two alternatives is completely independent of the existence and attributes of any other alternatives (see Ben-Akiva and Lerman, 1985). It assumes that the errors are independently distributed across alternatives even for repeated choices, which is unrealistic. The CL model cannot avoid the restrictive substitution pattern of the IIA property (Louviere, Hensher and Swait, 2000). It is often necessary to relax the IIA assumption in practice. However, it is common in the literature to estimate the CL model and the estimated result serves as a benchmark for other discrete choice models.

However, many approaches were developed to address the limitations of the CL model in the economics literature, such as the Mixed/Random Parameter Logit model, the Latent Class Model (LCM), Probit model and the Nested Logit model. The Mixed Logit (ML) model is a popular method to explore the unobserved heterogeneity in choices, as is the LCM. In this study, significant improvements in model fits were found from the estimation results from the Mixed Logit model. (see Chapter 5 for details).

The Mixed Logit model is very flexible and can approximate any random utility model (McFadden and Train, 2000). The Mixed Logit model was developed by Boyd and Mellman (1980), Jain, Vilcassim and Chintagunta (1994), Bhat (1998) and Train (1998), to identify a broad range of consumers 'preference heterogeneity. According to Train (2009), the Mixed Logit probabilities are the integrals of standard logit probabilities over a density of parameters. The ML model assumes that rather than being fixed, the parameters of attributes follow certain specific distributions across the respondents in the sample. Specifically, the choice probability of the Mixed Logit model of individual i choosing alternative j can be expressed as:

$$\breve{\boldsymbol{P}}\boldsymbol{ij} = \int \boldsymbol{Pij}\, \boldsymbol{f}\,(\boldsymbol{\beta} \mid \boldsymbol{\theta})\boldsymbol{d\beta} \qquad \textbf{(4.8)}$$

Were:

$\theta$ = the distribution parameters of coefficient β (such as the mean and covarianceof $\beta$.

Pij = the standard logit probability function.

Therefore, its likelihood function cannot be efficiently estimated with Maximum Likelihood estimation (Hu, Veeman and Adamowicz, 2005).

However, the probability function ij P in equation (4.10) can be estimated by a simulation method over the density function f (β | θ).

According to Train (2009), the procedure for the simulation method includes three steps. The probabilities for any given value of $\theta$: (1) draw a value of β from the density function f (β |$\theta$), and name it βr with the superscript r = 1 to represent the first draw; (2) calculate the with the logit formula for the first draw; (3) repeat steps 1 and 2 many times (usually more than 100 times), and average the results. The average simulated probability can be expressed as:

$$\breve{\boldsymbol{P}}\boldsymbol{ij} = \frac{\boldsymbol{1}}{\boldsymbol{R}}\sum_{\boldsymbol{R=1}}^{\boldsymbol{R}} \boldsymbol{Pij}\,(\boldsymbol{\beta}^{\boldsymbol{r}}) \qquad \textbf{(4.9)}$$

Where:

R = the number of draws;

P̆ij= unbiased estimator P̆ij and its variance decreases as R increases.The summation of P̆ijis equal to 1 over alternatives, which is a useful property for forecasting.

The simulated log likelihood function is given by inserting the simulated probabilities into the log likelihood function as the following equation:

$$\mathbf{SLL} = \sum_{i=1}^{I} \sum_{j=1}^{J} \boldsymbol{dij} \ln \breve{\boldsymbol{P}}\boldsymbol{ij} \qquad \mathbf{(4.10)}$$

Where: dij is an indicator that dij =1 if individual i chose alternative j and zero otherwise and the maximum simulated likelihood estimation (MSLE) is derived by maximizing SLL over the value of θ (Train, 2009).

***Willingness-to-pay*** is the amount of money a person would be willing to pay to get or avoid something other than the status quo. The aggregation of all stakeholders' willingness-to-pay is what is sought in identifying the net benefits of the policy. If someone were made worse off as a result of the change, we can introduce the notion of compensation to bring them back to at least the same level of well-being even if others' well-being was improved as a result of the policy. If, after performing the analysis, there are any estimated net benefits, this would imply that the proposed change would be a Pareto improvement over the status quo.

Also, the marginal utility of income is independent of income and prices, and that income effect is negligible (i.e. the compensated (Hicksian) demand curve and the Marshallian demand curve approximate each other, (Small & Rosen 1981). The price coefficient can be specified to depend upon socio demographics such as household size, but cannot be specified to depend upon income.

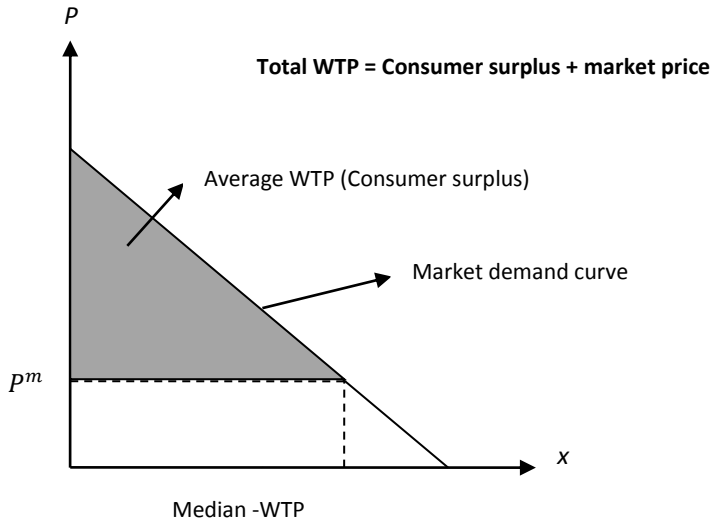



Figure 4.1: Marshallian demand curve, consumer surplus

The parameters estimated by the Discrete Choice models should not be interpreted by their absolute values which are not comparable, but must be jointly explained with other linked estimated parameters (Hensher, Rose and Greene, 2005). Willingness-To-Pay (WTP) is often adopted by researchers to jointly interpret the estimated parameters and identify the money values associated with changes in each attribute. The marginal WTP indicates the maximum amount that the respondent would be willing to pay in order to receive/avoid a particular attribute of the product (Burton et al., 2001). The marginal WTP can be derived as follows:

$$\boldsymbol{WTP_{x_k} = \frac{\beta_k}{\beta_{price}}} \qquad (\mathbf{4.13})$$

Where $\beta_k$the estimated parameter of attribute $x_k$and βprice is the parameter for price,$WTP_{x_k}$represents the money value that respondents are willing to pay for the attribute of $x_k$of the product characteristics.

A number of studies (Ryan and Huges, 1997; Ryan, 1999; Peracchi F,2001; Lee MJ,2002 and Johnson FR, Mathews KE, Bingham MF, 2000) have also calculated the WTP arising from a change in all levels of a product as follows:

$$\boldsymbol{WTPmedian} = \sum \frac{\boldsymbol{\beta_k}}{\boldsymbol{\beta_{price}}} \qquad (\mathbf{4.14})$$

This method simply involves the unweighted summation of the product of MWTP multiplied by the change in levels across all attributes. Also, and because of its simplicity, median willingness to pay is a very attractive measure of central tendency for the bound probit/logit model. In addition, median willingness to pay appears to be less sensitive to distributional misspecification in a referendum framework.

# CHAPTER FIVE: EMPIRICAL RESULTS & FINDINGS

This chapter describes the descriptive analysis of the in person questionnaires, which were distributed in Ramallah and Bethlehem governorates, that includes a sample of 345 respondents. Also, it presents the estimation results for the utility models developed in Chapter 4 to answer the research questions and hypotheses.

## 5.1 DESCRIPTIVE ANALYSIS

### 5.1.1 Prelude

This chapter is to present the empirical results of the data obtained from the CE questionnaire. In this questionnaire, data and information collection were carried out in in-person interviews (face-to-face). The data was entered in Microsoft Excel for ease of data screening. SPSS statistical software was run to find descriptive statistics, including frequencies. STATA econometric software was run to estimate the WTP econometric models. Also, the data obtained from the CE questionnaire was to estimate the individuals' WTP of organic fruits and vegetables.

### 5.1.2 Sample Characteristics

In this analysis, data and information collection were carried out in in-person interviews for household heads in Ramallah and Bethlehem governorates. In Ramallah governorate 220 respondents were interviewed from 237 respondents (93% of the sample) and in

Bethlehem governorate 125 respondents were interviewed from 147 respondents (85 % of the sample). However, 345 respondents were interviewed (89% of the sample) at their residence and interviews were undertaken over the period of October 2012 to November 2012.

Table 5.1 shows the number of respondents who are willing to pay for improved non-use values of organic potato in accordance with location of respondents, including urban areas, rural areas and refugee camps.

Table 5.1: Cross-tabulation between the WTP for non-use values of organic potatoes and Place of live.

| **Did you prefer organic potato?** | **Place of live** | | | **Sample Size (N)** |
|---|---|---|---|---|
| | **Urban areas** | **Rural areas** | **Refugee camps** | |
| No | 33 | 99 | 15 | 147 |
| Yes | 74 | 115 | 9 | 198 |
| Sample Size (N) | **107** | **214** | **24** | 345 |

Table 5.2 shows the number of respondents who are willing to pay for improved non-use values of organic grapes in accordance with location of respondents, including urban areas, rural areas and refugee camps.

Table 5.2: Cross-tabulation between the WTP for non-use values of organic grapes and Place of live.

| **Did you prefer organic potato?** | **Place of live** | | | **Sample Size (N)** |
|---|---|---|---|---|
| | **Urban areas** | **Rural areas** | **Refugee camps** | |
| No | 31 | 53 | 12 | 96 |
| Yes | 76 | 161 | 12 | 249 |
| Sample Size (N) | 107 | 214 | 24 | 345 |

Table 5.3 shows the number of respondents who are willing to pay for improved non-use values of organic tomato in accordance with location of respondents, including urban areas, rural areas and refugee camps.

Table 5.3: Cross-tabulation between the WTP for non-use values of organic tomatoes and Place of live.

| **Did you prefer organic tomato?** | **Place of live** | | | **Sample Size (N)** |
|---|---|---|---|---|
| | **Urban areas** | **Rural areas** | **Refugee camps** | |
| No | 28 | 59 | 12 | 99 |
| Yes | 79 | 155 | 12 | 246 |
| Sample Size (N) | 107 | 214 | 24 | 345 |

### 5.1.2.1 Respondent Socioeconomic and demographic Characteristics

The socioeconomic details of respondents were measured. The results suggest that the data are a good presentation for the characteristics of the population under study. In particular, frequencies, mean, standard deviation, minimum value, and maximum value of: age, family status, gender, family size, place of living, number of years lived at this region, educational level, employment status, occupation, members of family are under direct responsibility, number of family workers using the land phone, cost of using the land phone, using the internet, cost of using the internet, owned car, car type , car production year, cost of getting electricity, cost of getting water, owned land area, owned house area, owned house and land estimated price, rent house price per month, numbers of owned colored TV, numbers of owned satellite dish, numbers of owned refrigerator, numbers of owned mobile, numbers of owned land telephone, numbers of owned washer, numbers of owned Gas oven, numbers of owned Microwave, kitchen expenses, smoker or nonsmoker, smoking spending, monthly clothing expenses, monthly shoes expenses, monthly transportation expenses, monthly gasoline or diesel expenses, monthly cooking gas expenses, monthly medical services expenses and monthly medicine expenses.

Table 5.4 shows all age classes of the respondents. 13.6 percent of the respondents are less than 25 years. 38.3 percent of respondents are classified under the second class (26-36). 23.5 percent of respondents are classified under the third class (37-44). 11.9 percent of respondents are classified under the fourth class (45-52).9 percent of respondents are classified under the fifth class (53-60).The data also revealed that only 3.8 percent of respondents are above 61 years.

Table 5.4: Description of age.

| Governorates | Classes | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | ≤ 25 years | 47 | 13.6 |
| | 26-36 | 132 | 38.3 |
| | 37-44 | 81 | 23.5 |
| | 45-52 | 41 | 11.9 |
| | 53-60 | 31 | 9.0 |
| | > 61 | 13 | 3.8 |
| | Total | 345 | 100.0 |

Table 5.5 shows all family status of the respondents. 53.3 percent of the respondents are the husband. 32.5 percent of the respondents are the wife. 12.2percent of the respondents

are the eldest son. 1.7 percent of the respondents are the eldest daughter and only one interviewer was the grandfather of the family who made the interview.

Table 5.5: Description of the family status.

| Governorates | Family Status | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | Husband | 184 | 53.3 |
| | Wife | 112 | 32.5 |
| | Eldest son | 42 | 12.2 |
| | Eldest daughter | 6 | 1.7 |
| | And others | 1 | .3 |
| | Sample Size (N) | 345 | 100.0 |

The data revealed that 63.8 percent of the respondents were males and 36.2 percent were females as presented in Table 5.6 below:

Table 5.6: Distribution of gender.

| Governorates | Gender | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | Female | 125 | 36.2 |
| | Male | 220 | 63.8 |
| | Sample Size (N) | 345 | 100.0 |

Also, there are 0.6 percent of the families consisting of only one individual. 6.7 percent of the families consisting of 2 members. 10.4 percent of the families consisting of 3 members. 13.6 percent of the families consisting of 4 members. 18.3 percent of the families consisting of 5 members. 16.2 percent of the families consisting of 6 members. 13.3 percent of the families consisting of 7 members. 10.7 percent of the families consisting of 8 members. 6.1 percent of the families consisting of 9 members. 2.6 percent of the families consisting of 10 members. 0.6 percent of the families consisting of 12 members. The data also revealed that 0.9percent of the families consist of 13 members.

However, the data revealed that the number of rural respondents “households who live in the villages” was 62 percent of the respondents. Households who live in the main cities (urban respondents) were 31 percent of the respondents. Households from the refugee camps were 7 percent of the respondents, as described in Table 5.7 below.

Table 5.7: Distribution of household place of live.

| Governorates | Place of live | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | Urban areas | 107 | 31.0 |
| | Rural areas | 214 | 62.0 |
| | Refugee camps | 24 | 7.0 |
| | Sample Size (N) | 345 | 100.0 |

How long that the respondents lived at these areas was asked by an open-ended question on the CE questionnaire. As shown in Table 5.8, the data revealed that the main household living in these areas was 25.45 years.

Table 5.8: Description of number of years that the respondents lived in this region.

| Governorates | Sample size | Mean | Median | Std. Deviation | Max | Min |
|---|---|---|---|---|---|---|
| Ramallah & Bethlehem | 345 | 25.45 | 25.00 | 15.140 | 65 | 1 |

Table 5.9 shows the level of education. However, it was broken-down into four main categories. 25.9 percent of the respondents completed primary school education or lower than that. 20.9 percent of the respondents completed a diploma degree (two years at the university). 41.7 percent of the respondents were bachelor degree holders. Also, only 11.6 percent of the respondents have completed higher than a bachelor degree or have completed postgraduate studies.

Table 5.9: Distribution of education.

| Governorates | Educational level | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | Completed primary school or less than | 89 | 25.8 |
| | Completed diploma degree | 72 | 20.9 |
| | Completed bachelor degree | 144 | 41.7 |
| | Completed master degree or higher than | 40 | 11.6 |
| | Sample Size (N) | 345 | 100.0 |

The data revealed that the number of respondents who don't work was 15.9 percent of the respondents. 13 percent of the respondents work as part time employees. 61.54percentof the respondents work in full time jobs. And only 9.6 percent of the respondents do more than one formal work, as described in Table 5.10 below.

Table 5.10: Description of employment status.

| Governorates | Employment status | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | Doesn't work | 55 | 15.9 |
| | Part time employee | 45 | 13.0 |
| | Full time employee | 212 | 61.4 |
| | Work at more than one work | 33 | 9.6 |
| | Sample Size (N) | 345 | 100.0 |

The data revealed that the occupation of respondents was broken-down into four main categories. 26.7 percent of the respondents work at the governmental sector.16.8 percent of the respondents work at the NGO's sector.14.5 percent of the respondents work at the private sector. 23.2 percent of the respondents work at the freelance works and only 3 percent of the respondents work at other sectors. Also there are 15.5 percent of the respondents who don't work yet as described in Table 5.11 below.

Table 5.11: Kind of household's occupation.

| Governorates | Occupation | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | Government sector | 92 | 26.7 |
| | NGO's sector | 58 | 16.8 |
| | Private sector | 50 | 14.5 |
| | Freelance work | 80 | 23.2 |
| | Other sectors | 4 | 1.2 |
| | Doesn't work | 55 | 15.9 |
| | More than 1 work | 4 | 1.2 |
| | Other sectors | 2 | .6 |
| | Total | 345 | 100.0 |

Table 5.12 describes members of family under direct household responsibility. Also, this question asked by an open-ended question on the CE questionnaire. The mean of family under direct household responsibility was 4.17.

Table 5.12: Members of family under direct household responsibility.

| Governorates | Sample size | Mean | Median | Std. Deviation | Max | Min |
|---|---|---|---|---|---|---|
| Ramallah & Bethlehem | 345 | 4.17 | 4.00 | 2.180 | 11 | 0 |

The data revealed that the number of member worker ate at each family 1.83 at the mean. Also, this question asked by an open-ended question on the CE questionnaire. As shown in Table 5.13.

Table 5.13: Description of number of family workers.

| Governorates | Sample size | Mean | Median | Std. Deviation | Max | Min |
|---|---|---|---|---|---|---|
| Ramallah & Bethlehem | 345 | 1.83 | 2.00 | .990 | 9 | 0 |

As shown in Table 5.14, 123 respondents don't use the land phone at their homes and 222 of respondent use the land phone. Also, the mean cost of using the land phone was141.48 (NIS).

Table 5.14: Distribution of households whom using the land phone.

| Governorates | Using the land phone | Number of Interviews | Relative Frequencies (%) | Mean Cost of using the land phone (NIS) |
|---|---|---|---|---|
| Ramallah & Bethlehem | No | 123 | 35.7 | 141.48 |
| | Yes | 222 | 64.3 | |
| | Sample Size (N) | 345 | 100.0 | |

As shown in Table 5.15, 110 respondents don't use the internet at their homes and 335 of respondent use the internet. Also, the mean cost of using the internet was 87.07 (NIS).

Table 5.15: Distribution of households whom using the internet.

| Governorates | Using the internet | Number of Interviews | Relative Frequencies (%) | Mean Cost of using the land phone (NIS) |
|---|---|---|---|---|
| Ramallah & Bethlehem | No | 110 | 31.9 | 87.07 |
| | Yes | 235 | 68.1 | |
| | Sample Size (N) | 345 | 100 | |

As shown in Table 5.16, 196 respondents don't own cars and 149 of respondent owned cars.

Table 5.16: Distribution of households who owned a car.

| Governorates | Owned a car | Number of Interviews | Relative Frequencies (%) |
|---|---|---|---|
| Ramallah & Bethlehem | No | 196 | 56.8 |
| | Yes | 149 | 43.2 |
| | Sample Size (N) | 345 | 100.0 |

Table 5.17 describes the household's consumption of electricity and water. Also, this question asked by an open-ended question on the CE questionnaire. The mean consumption of electricity was 213.43 (NIS) and of water was 121.77.

Table 5.17: Household consumption of electricity and water.

| Governorates | Consumption type | Sample size | Mean | Median | Std. Deviation | Max | Min |
|---|---|---|---|---|---|---|---|
| Ramallah & Bethlehem | Electricity | 345 | 213.43 | 200.00 | 130.391 | 1000 | 0 |
| | Water | 345 | 121.77 | 100.00 | 98.210 | 1000 | 0 |

Table 5.18 describes the households land area, house area in square meters and the estimated price of these houses and land, on the other hand show the cost of renting a house. Also, these questions asked by an open-ended question on the CE questionnaire 191respondents have owned a land from the 345and the mean land area was 1133.64square meter, 263respondents have owned a house from the 345and the mean house area was 171.80square meter, the mean lands and houses estimated price was 445631.78 (NIS) and the data revealed that the cost rented houses equals 943.90 (NIS) at the mean.

Table 5.18: Description to the households land area, house area and estimated price of each other and the cost of rented houses.

| Governorates | Lands and Houses | Sample size | Mean | Median | Std. Deviation | Max | Min |
|---|---|---|---|---|---|---|---|
| Ramallah & Bethlehem | Land area (square meters) | 345 | 1133.64 | 670.00 | 3023.607 | 40000 | 110 |
| | House area (square meters) | 345 | 171.80 | 160.00 | 55.503 | 520 | 70 |
| | Lands and houses estimated price (NIS) | 345 | 445631.78 | 300000 | 413187.985 | 3400000 | 30000 |
| | Rented houses cost(NIS) | 345 | 943.90 | 835.00 | 431.974 | 2700 | 400 |

Table 5.19 describes the number of household whom are smoking or not. 44.1% of households are smokers and 55.9 of respondents are nonsmokers.

Table 5.19: Household smoker or nonsmoker.

| Governorates | Smoking | Frequency | Percent |
|---|---|---|---|
| Ramallah & Bethlehem | Nonsmoker | 193 | 55.9 |
| | Smoker | 152 | 44.1 |
| | Sample Size (N) | 345 | 100.0 |

Also, Table 5.20 describes all household expenditures in both Ramallah and Bethlehem governorates. The mean monthly household kitchen expenditure was 1568.55 New Israeli Shekel (NIS), the mean monthly household fruits and vegetables expenditure was 471.61,

the mean monthly smoking expenditurewas494.44(NIS), the mean monthly clothing expenditure was 206.92 (NIS), the mean monthly shoes expenditure was 153.34(NIS), the mean monthly transportation expenditure was 574.07 (NIS) ,the mean monthly gasoline or diesel expenditure was 789.73 (NIS), the mean monthly coking gas expenditure was 117.32 (NIS), the mean monthly medical services expenditure was 84.12 (NIS) and the mean monthly medicine expenditure was 100.30(NIS).

Table 5.20: Household expenditures.

| Governorates | Expenditures | Sample size | Mean | Median | Max | Min |
|---|---|---|---|---|---|---|
| Ramallah & Bethlehem | Kitchen | 345 | 1568.55 | 1500.00 | 6000 | 100 |
| | Fruits & Vegetables | 345 | 471.61 | 450.00 | 2000 | 80 |
| | Smoking | 345 | 494.44 | 450.00 | 1500 | 200 |
| | Clothing | 345 | 206.92 | 200.00 | 800 | 40 |
| | Shoes | 345 | 153.34 | 150.00 | 550 | 30 |
| | Transportation | 345 | 574.07 | 500.00 | 3000 | 20 |
| | Gasoline | 345 | 789.73 | 700.00 | 2500 | 120 |
| | Cooking gas | 345 | 117.32 | 100.00 | 500 | 0 |
| | Medical services | 345 | 84.12 | 80.00 | 1500 | 0 |
| | Medicine | 345 | 100.30 | 100.00 | 500 | 0 |

As shown in Table 5.21, the data revealed that the mean monthly household income was 4709.84 New Israeli Shekel (NIS), and the standard deviation of 1809.132 was relatively very high compared with the mean income. Further, the gap between the maximum and minimum value of income level was too high. On the other hand, the distribution table of income shows that 65.9 percent of the households receive income, which is less than (5000 NIS) per month. 25.5 percent of households receive monthly income in between (5000 – 7000 NIS). The relatively small number: 8.6 percent of households receive a high level of income, which is more than (7000 NIS).

Table 5.21: Description of income.

| Governorates | Income | Sample size | Mean | Median | Std. Deviation | Max | Min |
|---|---|---|---|---|---|---|---|
| Ramallah & Bethlehem | New Israeli Shekel | 345 | 4709.84 | 4378.00 | 1809.132 | 13393 | 1015 |

As shown in Table 5.22, the data revealed that the mean monthly household income in Ramallah governorate was 4969.14New Israeli Shekel (NIS), and the standard deviation of 1978.366was relatively very high compared with the mean income. Further, the gap between the maximum and minimum value of income level was too high. On the other hand, the distribution table of income shows that 61 percent of the households receive

income, which is less than (5000 NIS) per month. 26.2 percent of households receive monthly income in between (5000 – 7000 NIS). 12.8 percent of households receive a high level of income which is more that (7000 NIS). In Bethlehem governorate the mean monthly household income was 4257.59New Israeli Shekel (NIS), and the standard deviation of 1361.355 was relatively low compared with the mean income. Further, the gap between the maximum and minimum values of income level was too high. On the other hand, the distribution table of income shows that 74.4 percent of the households receive income which is less than (5000 NIS) per month. 22.4 percent of households receive monthly income between (5000 – 7000 NIS). The relatively small number: 3.2 percent of households receive a high level of income which is more that (7000 NIS).

Table 5.22: Description of income in both Ramallah & Bethlehem governorates.

| Governorates | Income | Sample size | Mean | Median | Std. Deviation | Max | Min |
|---|---|---|---|---|---|---|---|
| Ramallah | New Israeli Shekel | 220 | 4969.14 | 4534.15 | 1978.366 | 13393 | 1245 |
| Bethlehem | New Israeli Shekel | 125 | 4257.59 | 4218.50 | 1361.355 | 8803 | 1015 |

### 5.1.2.2 Health and Environmental Problems facing households in the West Bank

The health and environmental problems facing households in the West Bank were measured by asking the Palestinian households about the main health and environmental problems in the survey. The results suggest that the data are a well presentation for the characteristics of the population under study. In particular, frequencies, mean, standard deviation, minimum value, and maximum value not only for the health problems contains: cancer, heart, diabetes, learning and emotional problems and stomach, Intestines and liver diseases but also for the environmental problems contains: air pollution, soil erosion, water pollution and enhanced greenhouse effect

Also, Table 5.23 describes the degree of importance of health problems may face people in both Ramallah and Bethlehem governorates. 13.9 percent of the respondents say cancer in the West Bank diffuse in a very few degrees. 9.6 percent of the respondents say cancer in the West Bank diffuses in a few degrees. 15.7 percent of the respondents say Cancer in the West Bank is moderately diffused. 29 percent of the respondents say cancer in the West Bank diffuses in a high degree. 31.9 percent of the respondents say cancer in the West

Bank diffuses in a very high degree. However the other disease that may face people in the West Bank is the heart disease, 9.3 percent of the respondents say heart disease in the West Bank diffuses in a very few degree.6.4 percent of the respondents say heart disease in the West Bank diffuses in a few degrees. 13.3 percent of the respondents say heart disease in the West Bank moderately diffuses. 42.9 percent of the respondents say heart disease in the West Bank diffuses in a high degree. 28.1 percent of the respondents say heart disease in the West Bank diffuses in a very high degree. However the other disease that may face people in West Bank is diabetes, 4.6 percent of the respondents say diabetes in the West Bank diffuses in a very few degrees. 4.1 percent of the respondents say diabetes in the West Bank diffuses in a few degrees. 4.6 percent of the respondents say diabetes in the West Bank moderately diffuses. 46.1 percent of the respondents say diabetes in the West Bank diffuses in a high degree. 40.6 percent of the respondents say diabetes in the West Bank diffuses in a very high degree. However the other problem that may face people in West Bank is learning & emotional problems, 13.9 percent of the respondents say learning &emotional problems in the West Bank diffuse in a very few degree. 13.9 percent of the respondents say learning &emotional problems in the West Bank diffuse in a few degrees. 22.6 percent of the respondents say learning &emotional problems in the West Bank are moderately diffused. 30.1 percent of the respondents say learning &emotional problems in the West Bank diffuse in a high degree. 19.4 percent of the respondents say learning &emotional problems in the West Bank diffuse in a very high degree. However the last problem we asked the respondents about it and may face people in the West Bank is the stomach, intestines & liver diseases, 15.9 percent of the respondents say stomach, intestines & liver diseases in the West Bank diffuse in a very few degrees. 11.6 percent of the respondents say stomach, intestines & liver diseases in the West Bank diffuse in a few degrees. 24.3 percent of the respondents say stomach, intestines & liver diseases in the West Bank moderately diffuse. 31.9 percent of the respondents say stomach, intestines & liver diseases in the West Bank diffuse in a high degree. 16.12 percent of the respondents say stomach, intestines & liver diseases in the West Bank diffuse in a very high degree.

Table 5.23: Describes the degree of important of health problems.

| Diseases degree | Governorate and kind of diseases | Frequency | Percent |
|---|---|---|---|
| Very few degrees | Ramallah & Bethlehem - Cancer | 48 | 13.9 |
| A few degrees | | 33 | 9.6 |
| Average | | 54 | 15.7 |
| High degree | | 100 | 29.0 |
| A very high degree | | 110 | 31.9 |
| **Total** | | **345** | **100.0** |
| Very few degrees | Ramallah & Bethlehem - Heart | 32 | 9.3 |
| A few degrees | | 22 | 6.4 |
| Average | | 46 | 13.3 |
| High degree | | 148 | 42.9 |
| A very high degree | | 97 | 28.1 |
| **Total** | | **345** | **100.0** |
| Very few degrees | Ramallah & Bethlehem - Diabetes | 16 | 4.6 |
| A few degrees | | 14 | 4.1 |
| Average | | 16 | 4.6 |
| High degree | | 159 | 46.1 |
| A very high degree | | 140 | 40.6 |
| **Total** | | **345** | **100.0** |
| Very few degrees | Ramallah & Bethlehem - Learning & Emotional Problems | 48 | 13.9 |
| A few degrees | | 48 | 13.9 |
| Average | | 78 | 22.6 |
| High degree | | 104 | 30.1 |
| A very high degree | | 67 | 19.4 |
| **Total** | | **345** | **100.0** |
| Very few degrees | Ramallah & Bethlehem - Stomach, Intestines & Liver | 48 | 13.9 |
| A few degrees | | 48 | 13.9 |
| Average | | 78 | 22.6 |
| High degree | | 104 | 30.1 |
| A very high degree | | 67 | 19.4 |
| **Total** | | **345** | **100.0** |

Table 5.24 describes the degree of importance of environmental problems that may face people in both Ramallah and Bethlehem governorates. 4.3 percent of the respondents say that air pollution in the West Bank diffuses in a very few degrees. 6.7 percent of the respondents say that air pollution in the West Bank diffuses in a few degrees. 22.3 percent of the respondents say that air pollution in the West Bank diffuses moderately. 44.1 percent of the respondents say that air pollution in the West Bank diffuses in a high degree. 22.6 percent of the respondents say that air pollution in the West Bank diffuses in a very high degree. However the other environmental problem that may face people in the West Bank is soil erosion; 4.3 percent of the respondents say that soil erosion in the West Bank diffuses in a very few degrees. 13.9 percent of the respondents say that soil erosion in the West Bank diffuses in a few degrees. 29.3 percent of the respondents say that soil erosion in the West Bank diffuses moderately. 38.8 percent of the respondents say that soil erosion

in the West Bank diffuses in a high degree. 13.6 percent of the respondents say that soil erosion in the West Bank diffuses in a very high degree. However the other environmental problem that may face people in the West Bank is water pollution; 4.6 percent of the respondents say that water pollution in the West Bank diffuses in a very few degrees. 9.6 percent of the respondents say that water pollution in the West Bank diffuses in a few degrees. 23.5 percent of the respondents say that water pollution in the West Bank diffuses moderately. 41.2 percent of the respondents say that water pollution in the West Bank diffuses in a high degree. 21.2 percent of the respondents say that water pollution in the West Bank diffuses in a very high degree. However the last environmental problem we asked the respondents about that may face people in West Bank is the enhanced greenhouse effect; 9 percent of the respondents say that the enhanced greenhouse effect in the West Bank diffuses in a very few degree. 19.4 percent of the respondents say that the enhanced greenhouse effect in the West Bank diffuses in a few degrees. 31.3 percent of the respondents say that the enhanced greenhouse effect in the West Bank diffuses moderately. 27.8 percent of the respondents say that the enhanced greenhouse effect in the West Bank diffuses in a high degree and 12.5 percent of the respondents say that the enhanced greenhouse effect in the West Bank diffuses in a very high degree.

Table 5.24: Describes the degree of important of environmental problems.

| Environmental problem degree | Governorate and kind of Environmental problem | Frequency | Percent |
|---|---|---|---|
| Very few degrees | Ramallah & Bethlehem – Air pollution | 15 | 4.3 |
| A few degrees | | 23 | 6.7 |
| Average | | 77 | 22.3 |
| High degree | | 152 | 44.1 |
| A very high degree | | 78 | 22.6 |
| Total | | 345 | 100.0 |
| Very few degrees | Ramallah & Bethlehem – Soil erosion | 15 | 4.3 |
| A few degrees | | 48 | 13.9 |
| Average | | 101 | 29.3 |
| High degree | | 134 | 38.8 |
| A very high degree | | 47 | 13.6 |
| Total | | 345 | 100.0 |
| Very few degrees | Ramallah & Bethlehem – Water pollution | 16 | 4.6 |
| A few degrees | | 33 | 9.6 |
| Average | | 81 | 23.5 |
| High degree | | 142 | 41.2 |
| A very high degree | | 73 | 21.2 |
| Total | | 345 | 100.0 |
| Very few degrees | Ramallah & Bethlehem – Enhanced greenhouse effect | 31 | 9.0 |
| A few degrees | | 67 | 19.4 |
| Average | | 108 | 31.3 |
| High degree | | 96 | 27.8 |
| A very high degree | | 43 | 12.5 |
| **Total** | | **345** | **100.0** |

### 5.1.2.3 Eating Habits and Buying Behavior in the West Bank

In this section we also measured the eating habits and buying behavior in the West Bank. The results suggest that the data are a well presentation for the characteristics of the population under study. In particular, frequencies, mean, standard deviation, minimum value, and maximum value not only for eating habits but also for buying behavior.

Table 5.25 describes how households in Ramallah and Bethlehem governorates prefer products produced in Palestine. 1.2 percent of the respondents strongly disagree to purchase the locally produced products. 8.7 percent of the respondents disagree to purchase the locally produced products. 5.8percent of the respondents neither agree nor disagree to purchase the locally produced products. 42.3 percent of the respondents agree to purchase the locally produced products and 42percent of the respondents strongly agree to purchase the locally produced products.

Table 5.25: Describes how households in West Bank prefer products produced in Palestine.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I prefer products produced in my region. | Strongly disagree | 4 | 1.2 |
| | | Disagree | 30 | 8.7 |
| | | Neutral | 20 | 5.8 |
| | | Agree | 146 | 42.3 |
| | | Strongly agree | 145 | 42.0 |
| | | Total | 345 | 100.0 |

Table 5.26 describes the ability of households in both Ramallah and Bethlehem governorate to purchase food products at the cheapest prices. 11 percent of the respondents strongly disagree to purchase food products at the cheapest prices. 45.2 percent of the respondents disagree to purchase food products at the cheapest prices.14.5 percent of the respondents neither agree nor disagree to purchase food products in term of cheapest prices.18.6 percent of the respondents agree to purchase food products at the cheapest prices and 10.7 percent of the respondents strongly agree to purchase food products at the cheapest prices.

Table 5.26: Describes the ability of purchasing food products at the cheapest prices.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | When buying food products for myself, the cheapest price is the most important factor. | Strongly disagree | 38 | 11.0 |
| | | Disagree | 156 | 45.2 |
| | | Neutral | 50 | 14.5 |
| | | Agree | 64 | 18.6 |
| | | Strongly agree | 37 | 10.7 |
| | | Total | 345 | 100.0 |

Table 5.27 describes how many households are willing to buy environmentally friendly fruits in both Ramallah and Bethlehem governorates. 0.9 percent of the respondents strongly disagree to purchase environmentally-friendly fruits. 26.1 percent of the respondents disagree to purchase environmentally-friendly fruits.11.9 percent of the respondents neither agree nor disagree to purchase environmentally-friendly fruits. 44.6 percent of the respondents agree to purchase environmentally-friendly fruits and 16.5 percent of the respondents strongly agree to purchase environmentally-friendly fruits.

Table 5.27: Describes whom willingness to purchase environmentally friendly fruits.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I specifically willingness to buy fruits which are environmentally friendly | Strongly disagree | 3 | .9 |
| | | Disagree | 90 | 26.1 |
| | | Neutral | 41 | 11.9 |
| | | Agree | 154 | 44.6 |
| | | Strongly agree | 57 | 16.5 |
| | | Total | 345 | 100.0 |

Table 5.28 describes how many households are willing to buy environmentally friendly vegetables in both Ramallah and Bethlehem governorates. 0.3 percent of the respondents strongly disagree to purchase environmentally-friendly vegetables. 26.7 percent of the respondents disagree to purchase environmentally-friendlyvegetables.11.9 percent of the respondents neither agree nor disagree to purchase environmentally-friendly vegetables. 44.6 percent of the respondents agree to purchase environmentally-friendly vegetables and 16.5 percent of the respondents strongly agree to purchase environmentally-friendly vegetables.

Table 5.28: Describes whom willingness to purchase environmentally friendly vegetables.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I specifically willingness to buy vegetables which are environmentally friendly | Strongly disagree | 1 | .3 |
| | | Disagree | 92 | 26.7 |
| | | Neutral | 41 | 11.9 |
| | | Agree | 154 | 44.6 |
| | | Strongly agree | 57 | 16.5 |
| | | Total | 345 | 100.0 |

Table 5.29 describes how many households are willing to buy new products available at the supermarket in both Ramallah and Bethlehem governorates. 4.1 percent of the respondents strongly disagree to purchase new products from the supermarket. 32.9 percent of the respondents disagree to purchase new products from the supermarket.19.7 percent of the respondents neither agree nor disagree to purchase new products from the supermarket.35.7 percent of the respondents agree to purchase new products from the supermarket.6.7 percent of the respondents strongly agree to purchase new products from the supermarket.

Table 5.29: Describes whom willingness to purchase new products available at the supermarket.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | At the supermarket I like to look at new products. | Strongly disagree | 14 | 4.1 |
| | | Disagree | 117 | 33.9 |
| | | Neutral | 68 | 19.7 |
| | | Agree | 123 | 35.7 |
| | | Strongly agree | 23 | 6.7 |
| | | Total | 345 | 100.0 |

Table 5.30 describes how many households preferred to purchase products which are socially consumed in both Ramallah and Bethlehem governorates. 4.3 percent of the respondents strongly disagree to purchase products that the society preferred. 28.1 percent of the respondents disagree to purchase products that the society preferred. 12.8 percent of the respondents neither agree nor disagree to purchase products that the society preferred. 41.7 percent of the respondents agree to purchase products that the society preferred. 13 percent of the respondents strongly agree to purchase products that the society preferred.

Table 5.30: Describes who preferred to purchase products which are socially consumed.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | At the supermarket I like to look at new products. | Strongly disagree | 15 | 4.3 |
| | | Disagree | 97 | 28.1 |
| | | Neutral | 44 | 12.8 |
| | | Agree | 144 | 41.7 |
| | | Strongly agree | 45 | 13.0 |
| | | Total | 345 | 100.0 |

Table 5.31 describes households who read the information on the packages of product just out of curiosity in both Ramallah and Bethlehem governorates. 9 percent of the respondents strongly disagree to read information on the packages of products just out of curiosity. 38 percent of the respondents disagree to read information on the packages of products just out of curiosity. 16.2 percent of the respondents neither agree nor disagree to read information on the packages of product just out of curiosity. 24.9 percent of the respondents disagree to read information on the packages of product just out of curiosity and 11.9 percent of the respondents strongly agree to read information on the packages of products just out of curiosity.

Table 5.31: Describes households who read the information on the packages of products just out of curiosity.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I often read the information on the packages of products just out of curiosity | Strongly disagree | 31 | 9.0 |
| | | Disagree | 131 | 38.0 |
| | | Neutral | 56 | 16.2 |
| | | Agree | 86 | 24.9 |
| | | Strongly agree | 41 | 11.9 |
| | | Total | 345 | 100.0 |

Table 5.32 describes the time taken by the households to buy the products in both Ramallah and Bethlehem governorates. 6.7 percent of the respondents strongly disagree to buy the products fast. 35.9 percent of the respondents disagree to buy the products fast. 11 percent of the respondents neither agree nor disagree to buy the products fast. 31.6 percent of the respondents agree to buy the products fast and 14.8 percent of the respondents strongly agree to buy the products fast.

Table 5.32: Describes the time taken by the households to buy the products.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | Shopping for food has to be fast for me | Strongly disagree | 23 | 6.7 |
| | | Disagree | 124 | 35.9 |
| | | Neutral | 38 | 11.0 |
| | | Agree | 109 | 31.6 |
| | | Strongly agree | 51 | 14.8 |
| | | Total | 345 | 100.0 |

Table 5.33 describes how many households prefer organic products in both Ramallah and Bethlehem governorates. 1.2 percent of the respondents strongly disagree and do not prefer buying organic products. 10.7 percent of the respondents disagree and do not prefer buying organic products.20.3 percent of the respondents neither agree nor disagree and refuse buying organic products.47.8 percent of the respondents agree and prefer buying organic products and 20 percent of the respondents strongly agree and prefer buying organic products.

Table 5.33: Describes household whom prefer organic products.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | Shopping for food has to be fast for me | Strongly disagree | 4 | 1.2 |
| | | Disagree | 37 | 10.7 |
| | | Neutral | 70 | 20.3 |
| | | Agree | 165 | 47.8 |
| | | Strongly agree | 69 | 20.0 |
| | | Total | 345 | 100.0 |

Table 5.34 describes how many households willing to pay extra organic fruits and vegetables in both Ramallah and Bethlehem governorates. 3.2 percent of the respondents strongly disagree to pay extra organic fruits and vegetables. 27 percent of the respondents disagree to pay extra organic fruits and vegetables. 19.1 percent of the respondents neither agree nor disagree to pay extra organic fruits and vegetables. 36.2 percent of the respondents agree to pay extra organic fruits and vegetables and 14.5 percent of the respondents strongly agree to pay extra organic fruits and vegetables.

Table 5.34: Describes household whom willingness to pay extra for organic fruits and vegetables.

| Governorate | Buying behavior | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I am willing to pay extra organic fruits and vegetables which are produced in environmentally friendly way. | Strongly disagree | 11 | 3.2 |
| | | Disagree | 93 | 27.0 |
| | | Neutral | 66 | 19.1 |
| | | Agree | 125 | 36.2 |
| | | Strongly agree | 50 | 14.5 |
| | | Total | 345 | 100.0 |

Table 5.35 describes that eating for a household is a question of taste in both Ramallah and Bethlehem governorates 2.3 percent of the respondents strongly disagree that eating for a household is a question of taste. 7.8 percent of the respondents disagree that eating for a household is a question of taste. 9.3 percent of the respondents neither agree nor disagree that eating for a household is a question of taste. 53.9 percent of the respondents agree that eating for a household is a question of taste and 26.7 percent of the respondents strongly agree that eating for a household is a question of taste.

Table 5.35: Describes that eating is always a question of taste for households.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | Eating for me is always a question of taste | Strongly disagree | 8 | 2.3 |
| | | Disagree | 27 | 7.8 |
| | | Neutral | 32 | 9.3 |
| | | Agree | 186 | 53.9 |
| | | Strongly agree | 92 | 26.7 |
| | | Total | 345 | 100.0 |

Table 5.36 describes that eating has to be fast for a household in both Ramallah and Bethlehem governorates. 6.7 percent of the respondents strongly disagree that eating has to be fast for a household.36.5 percent of the respondents disagree that eating has to be fast for a household. 14.5 percent of the respondents neither agree nor disagree that eating has to be fast for the household.32.2 percent of the respondents agree that eating has to be fast for a household and 10.1 percent of the respondents strongly agree that eating has to be fast for a household.

Table 5.36: Describes that eating has to be fast for a household.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | To me eating has to be fast. | Strongly disagree | 23 | 6.7 |
| | | Disagree | 126 | 36.5 |
| | | Neutral | 50 | 14.5 |
| | | Agree | 111 | 32.2 |
| | | Strongly agree | 35 | 10.1 |
| | | Total | 345 | 100.0 |

Table 5.37 shows that households pay attention to healthy food in both Ramallah and Bethlehem governorates. In Ramallah governorate 12.5 percent of the respondents disagree that households pay attention to healthy food.11.9 percent of the respondents neither agree nor disagree that households pay attention to healthy food.48.4 percent of the respondents agree that households pay attention to healthy food and 27.2 percent of the respondents agree that households pay attention to healthy food.

Table 5.37: Shows that a household pays attention to healthy food.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I pay attention to healthy food | Disagree | 43 | 12.5 |
| | | Neutral | 41 | 11.9 |
| | | Agree | 167 | 48.4 |
| | | Strongly agree | 94 | 27.2 |
| | | Total | 345 | 100.0 |

Table 5.38 describes that households look for food with low calorie content in both Ramallah and Bethlehem governorates. 2.9 percent of the respondents strongly disagree that a household looks for food with low calorie content. 28.7 percent of the respondents disagree that a household looks for food with low calorie content. 18 percent of the respondents neither agree nor disagree that a household looks for food with low calorie content. 33.3 percent of the respondents agree that a household looks for food with low calorie content and 17.1 percent of the respondents strongly agree that a household looks for food with low calorie content.

Table 5.38: Describes that a household looks for food with low calorie content.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I look for food with low calorie content. | Strongly disagree | 10 | 2.9 |
| | | Disagree | 99 | 28.7 |
| | | Neutral | 62 | 18.0 |
| | | Agree | 115 | 33.3 |
| | | Strongly agree | 59 | 17.1 |
| | | Total | 345 | 100.0 |

Table 5.39 describes that a household in both Ramallah and Bethlehem governorates do not think about weight when eating. 5.2 percent of the respondents strongly disagree that a household does not think about weight when eating. 37.1 percent of the respondents disagree that a household does not think about weight when eating. 10.4 percent of the respondents neither agree nor disagree that a household does not think about weight when eating. 31 percent of the respondents agree that a household does not think about weight when eating and 16.2 percent of the respondents agree that a household does not think about weight when eating.

Table 5.39: Describes that the household do not think about his weight when eats.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | When I eat, I do not think about my weight. | Strongly disagree | 18 | 5.2 |
| | | Disagree | 128 | 37.1 |
| | | Neutral | 36 | 10.4 |
| | | Agree | 107 | 31.0 |
| | | Strongly agree | 56 | 16.2 |
| | | Total | 345 | 100.0 |

Table 5.40 describes that eating for households is pure pleasure in both Ramallah and Bethlehem governorates. 4.1 percent of the respondents strongly disagree that eating for

households is pure pleasure. 24.3 percent of the respondents disagree that eating for households is pure pleasure. 18.6 percent of the respondents neither agree nor disagree that eating for households is pure pleasure. 35.9 percent of the respondents agree that eating for households is pure pleasure and 17.1 percent of the respondents strongly agree that eating for households is pure pleasure.

Table 5.40: Describes that eating for households is pure pleasure.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | Eating for me is pure pleasure | Strongly disagree | 14 | 4.1 |
| | | Disagree | 84 | 24.3 |
| | | Neutral | 64 | 18.6 |
| | | Agree | 124 | 35.9 |
| | | Strongly agree | 59 | 17.1 |
| | | Total | 345 | 100.0 |

Table 5.41 describes that the eating makes household happy in both Ramallah and Bethlehem governorates. 1.7 percent of the respondents strongly disagree that eating makes a household happy. 15.9 percent of the respondents disagree that eating makes a household happy. 16.5 percent of the respondents neither agree nor disagree that eating makes a household happy. 49.3 percent of the respondents agree that eating makes a household happy and 16.5 percent of the respondents strongly agree that eating makes a household happy.

Table 5.41: Describes that the eating makes household happy.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | Eating for me is pure pleasure | Strongly disagree | 6 | 1.7 |
| | | Disagree | 55 | 15.9 |
| | | Neutral | 57 | 16.5 |
| | | Agree | 170 | 49.3 |
| | | Strongly agree | 57 | 16.5 |
| | | Total | 345 | 100.0 |

Table 5.42 shows that a household prefers to eat fruits after lunch in both Ramallah and Bethlehem governorates. 3.5 percent of the respondents strongly disagree that a household prefers to eat fruits after lunch. 27.2 percent of the respondents disagree that a household prefers to eat fruits after lunch. 13.9 percent of the respondents neither agree nor disagree that a household prefers to eat fruits after lunch. 34.2 percent of the respondents agree that

a household prefers to eat fruits after lunch and 21.2 percent of the respondents strongly agree that a household prefers to eat fruits after lunch.

Table 5.42: Describes that the household prefer to eats fruits after the lunch.

| Governorate | Eating habits | Degrees | Frequency | Percent |
|---|---|---|---|---|
| Ramallah & Bethlehem | I prefer to eat fruits after lunch. | Strongly disagree | 12 | 3.5 |
| | | Disagree | 94 | 27.2 |
| | | Neutral | 48 | 13.9 |
| | | Agree | 118 | 34.2 |
| | | Strongly agree | 73 | 21.2 |
| | | Total | 345 | 100.0 |

### 5.1.2.4 Household Attitudes towards Conventional and Organic agriculture of fruits and vegetables.

In this section we also measured household attitudes towards conventional agriculture and organic fruits and vegetables in the West Bank. The results suggest that the data are a precise presentation of the characteristics of the population under study. In particular, frequencies, mean, standard deviation, minimum value, and maximum value are not only for both eating habits and buying behavior.

As shown in Table 5.43, the data reveals that the mean monthly household expenditure on fruits and vegetables is 471.61 New Israeli Shekel (NIS).. Further, the gap between the maximum and minimum value of income level is very deep.

Table 5.43: Household expenditure on fruits and vegetables per month.

| Governorates | Sample size | Mean | Median | Max | Min |
|---|---|---|---|---|---|
| Ramallah & Bethlehem | 345 | 471.61 | 450.00 | 2000 | 80 |

The Reasons for the non- widespread of organic fruits and vegetables in the West Bank were measured by asking the Palestinian households a list of questions as shown in table 5.44. However 176 respondents say that the knowledge of organic fruits and vegetables is not available, 241 respondents agreed that there are many limitations affecting farmers and farming in Palestine so the Palestinian farmers can't farms organic fruits and vegetables. Also 232 respondents agreed that the Governments aren't interested in organic agriculture, 193 respondents agreed that the ministry of health doesn't care about distributing bulletins about the side-effects of using pesticides and chemicals in traditional farming, also 154

respondents agreed that the higher prices of organic fruits and vegetables affect the demand for this kind of products and 101 respondent agreed that the scarcity of natural resources can affect the continuity of organic fruits and vegetables availability during the whole season.

Table 5.44: Reasons for the non-widespread of organic fruits and vegetables in the West Bank.

| Governorates | Reasons | Answer | Sample size | Frequency | Percent |
|---|---|---|---|---|---|
| Ramallah & Bethlehem | Knowledge of organic fruits and vegetables is not available | No | 345 | 169 | 49.0 |
| | | Yes | | 176 | 51.0 |
| | The limited possibilities for Palestinian farmers | No | | 104 | 30.1 |
| | | Yes | | 241 | 69.9 |
| | Government's lack of interest in organic agriculture | No | | 113 | 32.8 |
| | | Yes | | 232 | 67.2 |
| | Awareness bulletins by the Ministry of Health is not available | No | | 152 | 44.1 |
| | | Yes | | 193 | 55.9 |
| | Higher prices of organic fruits and vegetables. | No | | 191 | 55.4 |
| | | Yes | | 154 | 44.6 |
| | Scarcity of natural resources | No | | 244 | 70.7 |
| | | Yes | | 101 | 29.3 |

The Negative impacts of eating conventional fruits and vegetables in the West Bank were measured by asking the Palestinian households a list of questions as shown in table 5.45. However 324 respondents agreed that eating conventional fruits and vegetables (contains pesticides and chemicals) may cause health problems, 219 respondents agreed that eating conventional fruits and vegetables may cause environmental problems, 127 respondents agreed that eating conventional fruits and vegetables may cause soil erosion and 142 respondents agreed that eating conventional fruits and vegetables may destroy biodiversity.

Table 5.45: Negative impacts of eating conventional fruits and vegetables from household's point of view.

| Governorates | Reasons | Answer | Sample size | Frequency | Percent |
|---|---|---|---|---|---|
| Ramallah & Bethlehem | Health problems | No | 345 | 21 | 6.1 |
| | | Yes | | 324 | 93.9 |
| | Environment problems | No | | 126 | 36.5 |
| | | Yes | | 219 | 63.5 |
| | Soil erosion | No | | 218 | 63.2 |
| | | Yes | | 127 | 36.8 |
| | Destroy biodiversity | No | | 203 | 58.8 |
| | | Yes | | 142 | 41.2 |

Table 5.46 shows organic fruits and vegetables characteristics from Palestinian households' point of view. Also, 318 respondents agreed that organic food is more nutritious than conventionally produced food, 303 respondents agreed that organic food tastes better than conventionally produced food, 177 respondents agreed that the appearance of organic products is more attractive than products produced in conventional methods, 250 respondents say that labeling is necessary to guarantee organic origin of products, 257 respondents agreed that organic agriculture conserves soil and has less impact on the environment, 133 respondents say that Palestinian farmers may he make tangible profits by producing organic fruits and vegetables and 274 respondents agreed that consumer behavior is an important element for selecting their fruits and vegetables (either organic or conventional).

Table 5.46: Organic fruits and vegetables characteristics from households' point of view

| Governorates | Reasons | Answer | Sample size | Frequency | Percent |
|---|---|---|---|---|---|
| Ramallah & Bethlehem | Organic food is more nutritious than conventionally- produced food | No | 345 | 14 | 4.1 |
| | | Yes | | 318 | 92.2 |
| | | Don't know | | 13 | 3.8 |
| | Organic food tastes better than conventionally produced food | No | | 22 | 6.4 |
| | | Yes | | 303 | 87.8 |
| | | Don't know | | 20 | 5.8 |
| | The appearance of organic products is more attractive than products produced in conventional methods. | No | | 137 | 39.7 |
| | | Yes | | 177 | 51.3 |
| | | Don't know | | 31 | 9.0 |
| | Organic labels are necessary to guarantee the organic origin of products. | No | | 71 | 20.6 |
| | | Yes | | 250 | 72.5 |
| | | Don't know | | 24 | 7.0 |
| | Organic agriculture conserves soil and has less impact on the environment. | No | | 38 | 11.0 |
| | | Yes | | 257 | 74.5 |
| | | Don't know | | 50 | 14.5 |
| | Palestinian farmers making tangible profits by producing organic fruits and vegetables. | No | | 152 | 44.1 |
| | | Yes | | 133 | 38.6 |
| | | Don't know | | 60 | 17.4 |
| | Consumer behavior is an important element for selecting their fruits and vegetables (either organic or conventional). | No | | 34 | 9.9 |
| | | Yes | | 274 | 79.4 |
| | | Don't know | | 37 | 10.7 |

Table 5.47 describes the reasons for households in WB interest to consume organic fruits and vegetables. Also, 325 respondents agreed that organic fruits and vegetables are more

beneficial to health than conventional fruits and vegetables, 298 respondents agreed that organic food is necessary to protect the environment, 243 respondents agreed that organic vegetables and fruits reduce cancer, 235 respondents agreed that organic vegetables and fruits reduce heart disease. 167 respondents agreed that organic vegetables and fruits play a role in maintaining good eyesight, 181 respondents agreed that organic vegetables and fruits play a role in maintaining strong teeth, 228 respondents agreed that organic vegetables and fruits play an effectives role in maintaining bone strength, 196 respondents agreed that organic vegetables and fruits play a major role in maintaining the health of the skin and 249 respondents agreed that organic vegetables and fruits help to control blood pressure.

Table 5.47 Reasons for the households in WB interest to consume organic fruits and vegetables.

| Governorates | Reasons | Answer | Sample size | Frequency | Percent |
|---|---|---|---|---|---|
| Ramallah | Organic fruits and vegetables are more beneficial to health than conventional fruits and vegetables. | Disagree | 345 | 1 | .3 |
| | | Neutral | | 19 | 5.5 |
| | | Agree | | 325 | 94.2 |
| | Organic food is necessary to protect the environment. | Disagree | | 1 | .3 |
| | | Neutral | | 46 | 13.3 |
| | | Agree | | 298 | 86.4 |
| | Organic vegetables and fruits reduce cancer disease. | Disagree | | 5 | 1.4 |
| | | Neutral | | 97 | 28.1 |
| | | Agree | | 243 | 70.4 |
| | Organic vegetables and fruits reduce heart disease. | Disagree | | 15 | 4.3 |
| | | Neutral | | 95 | 27.5 |
| | | Agree | | 235 | 68.1 |
| | Organic vegetables and fruits play a role in maintaining good eyesight. | Disagree | | 32 | 9.3 |
| | | Neutral | | 146 | 42.3 |
| | | Agree | | 167 | 48.4 |
| | Organic vegetables and fruits play a role in maintaining strong teeth. | Disagree | | 34 | 9.9 |
| | | Neutral | | 130 | 37.7 |
| | | Agree | | 181 | 52.5 |
| | Organic vegetables and fruits play a role in maintaining bone strength. | Disagree | | 14 | 4.1 |
| | | Neutral | | 103 | 29.9 |
| | | Agree | | 228 | 66.1 |
| | Organic vegetables and fruits play a major role in maintaining the health of the skin. | Disagree | | 27 | 7.8 |
| | | Neutral | | 122 | 35.4 |
| | | Agree | | 196 | 56.8 |
| | Organic vegetables and fruits help to control blood pressure. | Disagree | | 5 | 1.4 |
| | | Neutral | | 91 | 26.4 |
| | | Agree | | 249 | 72.2 |

Table 5.48 describes the reasons for households in the WB disinterest in consuming organic fruits and vegetables. Also, 249 respondents agreed that the prices of organic fruits

and vegetables are too high compared with those of conventional fruits and vegetables, 140 respondents agreed that the income level is not quite enough to buy organic fruits and vegetables, 198 respondents agreed that the government should cover the difference in prices between organic and conventional fruits and vegetables, 137 aren't sure of the level of quality of organic fruits and vegetables, 138 respondents agreed that the shape of organic products is less attractive than that of conventional products, 269 respondents agreed that organic fruits and vegetables aren't available constantly in the Palestinian market, 245 respondents agreed that the culture of consuming this kind of products is not widespread in Palestine and 160 say that we must minimize the main environmental pollutants (i.e. water pollution, air pollution, etc...) before thinking about organic products.

Table 5.48: Reasons behind the households in WB doesn't interest to consume organic fruits and vegetables.

| Governorates | Reasons | Answer | Sample size | Frequency | Percent |
|---|---|---|---|---|---|
| Ramallah& Bethlehem | The price of organic fruits and vegetables is high compared with that of conventional fruits and vegetables. | Disagree | 345 | 64 | 18.6 |
| | | Neutral | | 32 | 9.3 |
| | | Agree | | 249 | 72.2 |
| | Income level is not quite enough to buy organic fruits and vegetables. | Disagree | | 162 | 47.0 |
| | | Neutral | | 43 | 12.5 |
| | | Agree | | 140 | 40.6 |
| | The government should cover the difference in prices between organic and conventional fruits and vegetables, so I can buy them. | Disagree | | 95 | 27.5 |
| | | Neutral | | 52 | 15.1 |
| | | Agree | | 198 | 57.4 |
| | I'm not sure of the level of quality of organic fruits and vegetables. | Disagree | | 129 | 37.4 |
| | | Neutral | | 79 | 22.9 |
| | | Agree | | 137 | 39.7 |
| | The shape of organic products is less attractive than the shape of conventional products | Disagree | | 141 | 40.9 |
| | | Neutral | | 66 | 19.1 |
| | | Agree | | 138 | 40.0 |
| | Organic fruits and vegetables aren't available constantly in the Palestinian market | Disagree | | 23 | 6.7 |
| | | Neutral | | 53 | 15.4 |
| | | Agree | | 269 | 78.0 |
| | The culture of consuming this kind of products is not widespread in Palestine | Disagree | | 32 | 9.3 |
| | | Neutral | | 68 | 19.7 |
| | | Agree | | 245 | 71.0 |
| | We must minimize the main environmental pollutants (i.e. water pollution, air pollution, etc...) before thinking about organic products. | Disagree | | 112 | 32.5 |
| | | Neutral | | 73 | 21.2 |
| | | Agree | | 160 | 46.4 |

## 5.2 THE BASE & INTERACTION EFFECTS ON ORGANIC FRUITS AND VEGETABLES.

### 5.2.1 Prelude:

This section presents estimation results for the utility models developed in Chapter 4 to answer the following research questions and hypotheses: (1) Palestinian households are aware of ensuring and securing the environment; (2) Palestinian households pay a premium for environmentally-green fruits and vegetables; (3) Palestinian households are willing to pay for environmentally-green fruits and vegetables and (4) Palestinians household socio-economic variables have a significant effect on WTP environmentally green products of fruits and vegetables; in accordance with the economic theory and previous studies. The choice models examine the responses of consumers in term of health claim, attitudes and income level. Also, the models used in this study are: (1) the Mixed Logit model and Willingness-To-Pay (WTP) for random parameters; (2) the Mixed Logit model with interaction effects between main variables for fixed parameters.

Table 5.49: Summary of the Variables for the Estimation Models.

| Attributes | Abbreviation | Description |
|---|---|---|
| Are you WTP Organic fruits and vegetables | Y | 1 if the households chose organic, otherwise 0. |
| Price | x1 | The price adopted in the choice experiment for a kg of organic and conventional fruits and vegetables. Also the household must pay double for organic fruits and vegetables. |
| Nutritious | x4 | 1 if the fruits and vegetables are organic, otherwise 0. |
| Shape | x5 | 1 if the fruits and vegetables are organic, otherwise 0. |
| Educational level | x11 | The level of education of Palestinian households in the West bank classified into four main categories:<br>1. Completed primary school or less<br>2. Completed diploma degree<br>3. Completed bachelor degree<br>4. Completed master degree or higher |
| Monthly income | x12 | The level of income for the Palestinian households in the West bank.<br>**Note**: the ―Income‖ variable is measured by the value of New Israeli Shekel (NIS) in all estimation results. |
| Family size | x13 | The household family size of Palestinian households in the West bank. |
| Employment status | x14 | The Employment status of Palestinian households in the West bank. 1 if the household works, otherwise 0. |

### 5.2.2 Basic Models: Mixed Logit Estimations & Willingness to Pay:

In the basic model (equation 4.6 in Chapter 4), the effects of the main attributes in the choice experiment are measured, including price, nutrition and shape of fruits and vegetables. However, some attribute was excluded from this study for the reason of multicollinearity and these variables are level of minerals and vitamins, tasty, texture and how fruits and vegetables were grown. Also, multicollinearity is a statistical phenomenon in which two or more predictable variables in a multiple regression model are highly correlated, which mean that one can be more linearly predicted than the others with a significant degree of accuracy. In this situation the coefficient estimates may change erratically in response to small changes in the model or the data (Farrar Donald E. and Glauber, Robert R. 1967). However, another Mixed Logit model with interaction effects between main variables for fixed parameters are measured, including Palestinian consumers' level of education, household monthly income, family size and Employment status.

#### 5.2.2.1 Tomato Model (ML) Estimates and (WTP)

Tomato model contains the effects of the main attributes in the choice experiment measured on it, including price, nutrition and shape of tomato. However, Table 5.48 presents the CL and WTP results for the tomato model. The value of the Log Likelihood Function is 41.465059 and the Pseudo-R2 is 0.187, indicating that the goodness or fitness of this model is moderately good (Train, 2009). All coefficients are statistically significant at the 5% level, the household's willingness to pay 0.53 (NIS) for organic tomato. However, there is no difference between Bethlehem and Ramallah households in willingness to pay for organic tomatoes,

Table 5.50: Basic tomato model: ML Estimations and WTP.

| Variables | Coefficients | Standard Error | Z-value | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Price | .6764433 | .0299105 | 22.62 | 0.000 | .6178197 | .7350668 |
| Nutritious | .2349293 | .0408706 | 5.75 | 0.000 | .1548245 | .3150341 |
| Shape | .127888 | .0270699 | 4.72 | 0.000 | .0748319 | .1809441 |
| Constant | .0133135 | .0343863 | 0.39 | 0.699 | -.0540824 | .0807093 |

| | |
|---|---|
| Log likelihood | 41.465059 |
| Pseudo-R2 | 0.187478 |
| Median WTP | 0.53636 (NIS) |

According to the estimation results in Tables 5.50, consumers are more likely to prefer organic tomatoes. Palestinian consumers might believe that organic tomatoes are better for health and environment than conventional tomatoes based on table 5.46 discussed at previous section. Also, Palestinian consumers can pay 0.53 for organic tomato more than conventional tomatoes, they believe that the organic tomatoes are more nutritious than conventional tomatoes and the less perfect shape of organic tomatoes doesn't be an obstacle to pay for organic tomatoes. However, there is no difference between Bethlehem and Ramallah households in willingness to pay for organic tomatoes.

#### 5.2.2.2 Tomato Model (ML) Estimates and (WTP) Interaction Effects

As discussed above, the model in Table 5.50 is a basic model for all random affects variables that urge Palestinian consumers to WTP organic tomatoes. The estimation results in Table 5.49 show the interaction effects for the main socioeconomic and demographic variables in the choice experiment.

Table 5.51: Tomato ML Estimations and WTP with interaction effects.

| Variables | Coefficients | Standard Error | Z-value | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Educational level | .0201369 | .0269285 | 0.75 | 0.455 | -.032642 | .0729157 |
| Monthly income | .000031 | .0000145 | 2.14 | 0.032 | 2.65e-06 | .0000594 |
| Family size | -.012092 | .0121056 | -1.00 | 0.318 | -.0358185 | .0116345 |
| Employment status | -.0246058 | .0733299 | -0.34 | 0.737 | -.1683298 | .1191181 |
| Constant | .6066177 | .1139031 | 5.33 | 0.000 | .3833718 | .8298636 |
| Log likelihood | | -212.27546 | | | | |
| Pseudo-R2 | | 0.017356 | | | | |

According to the estimation results in Tables 5.51, All interaction variables are not significant except that the income level was significant at the 5% level, indicating that Palestinian consumers educational level, family size and employment status don't play a role when the purchase option of organic tomato has been made, also, the main important factor affecting the consumer purchasing option is the income level of this consumer.

### 5.2.2.3 Potato Model (ML) Estimates and (WTP)

The Potato model contains the effects of the main attributes in the choice experiment measured on it, including price, nutrition and shape of potatoes. However, Table 5.52 presents the CL and WTP results for the potato model. The value of the Log Likelihood Function is 86.177599 and the Pseudo-R2 is 0.345, indicating that the goodness or fitness of this model is moderately good. All coefficients are statistically significant at the 5% level, and the household's willingness to pay 1.23 (NIS) for organic potato. However, there is a difference between Bethlehem and Ramallah households in willingness to pay for organic potatoes; in Ramallah the WTP = 0.807 and in Bethlehem the WTP = 2.206.

Table 5.52: Basic potato model: ML Estimations and WTP.

| Variables | Coefficients | Standard Error | Z-value | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Price | .4664256 | .0341837 | 13.64 | 0.000 | .3994267 | .5334245 |
| Nutritious | .28337 | .0301708 | 9.39 | 0.000 | .2242364 | .3425036 |
| Shape | .2880742 | .0318415 | 9.05 | 0.000 | .225666 | .3504825 |
| Constant | .0081683 | .0178341 | 0.46 | 0.647 | -.0267859 | .0431225 |

| | |
|---|---|
| Log likelihood | 86.177599 |
| Pseudo-R2 s | 0.345427 |
| Median WTP | 1.22515(NIS) |

According to the estimation results in Tables 5.52, consumers are more likely to prefer organic potatoes. Palestinian consumers might believe that organic potato better for health and the environment than conventional potatoes. Also, Palestinian consumers can pay 1.23 for organic potatoes more than conventional potatoes, they believe that the organic potatoes are more nutritious than conventional potatoes and the less perfect shape of organic potatoes isn't be obstacle to pay organic potatoes.

### 5.2.2.4 Potato Model (ML) Estimates and (WTP) with Interaction Effects

As discussed above, the model in Table 5.52 is a basic model for all random effects variables that urge the Palestinian consumers to WTP organic potatoes. The estimation results in Table 5.53 show the interaction effects of the main socioeconomic and demographic variables in the CE.

Table 5.53: Potato ML Estimations and WTP with interaction effects.

| Variables | Coefficients | Standard Error | Z-value | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Educational level | .0153877 | .0289881 | 0.53 | 0.596 | -.041428 | .0722034 |
| Monthly income | .0000577 | .0000156 | 3.70 | 0.000 | .0000271 | .0000882 |
| Family size | -.029453 | .0130315 | -2.26 | 0.024 | -.0549942 | -.0039117 |
| Employment status | -.076185 | .0789386 | -0.97 | 0.334 | -.2309018 | .0785319 |
| Constant | .4946508 | .1226151 | 4.03 | 0.000 | .2543297 | .734972 |
| Log likelihood | | -237.55532 | | | | |
| Pseudo-R2 | | 0.015044 | | | | |

According to the estimation results in Tables 5.53, there are two interaction variables significant at the 5% level, indicating a Palestinian consumers' income level and family size, also the family size has a negative impact and this mean that if the family sizes increase the demand for organic potatoes decreases. However, employment status and educational level don't play a role when the purchase option of organic potatoes has been made; also, the main important factor affects the consumer's purchasing option is due to the income level, also, if the income increases, the demand for organic potatoes increases too.

### 5.2.2.5 Grapes Model (ML) Estimates and (WTP)

Grapes model contains the effects of the main attributes in the choice experiment measured on it, including price, nutrition and shape of grapes. However, Table 5.54 presents the CL and WTP results for the grapes model. The value of the Log Likelihood Function is 16.740239 and the Pseudo-R2 is 0.074, indicating that the goodness or fitness of this model is moderately good. All coefficients are statistically significant at the 5% level, households willingness to pay 0.81 (NIS) for organic grapes. However, there is a difference between Bethlehem and Ramallah households in willingness to pay for organic grapes; in Ramallah the WTP = 0.6930 and in Bethlehem the WTP = 0.993.

Table 5.54: Basic Grapes model: ML Estimations and WTP.

| Variables | Coefficients | Standard Error | Z-value | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Price | .5821179 | .0313092 | 18.59 | 0.000 | .520753 | .6434828 |
| Nutritious | .300132 | .0428711 | 7.00 | 0.000 | .2161062 | .3841578 |
| Shape | .1689535 | .0285783 | 5.91 | 0.000 | .1129411 | .224966 |
| Constant | .0158764 | .0355951 | 0.45 | 0.656 | -.0538887 | .0856415 |
| Log likelihood | | 16.740239 | | | | |
| Pseudo-R2 s | | 0.074029 | | | | |
| Median WTP | | 0.805826 | | | | |

On behalf of the estimation results in Tables 5.54, consumers are more likely to prefer organic grapes. Palestinian consumers might believe that organic Grapes are better for health and the environment than conventional grapes. Also, Palestinian consumers can pay 0.81 for organic Grapes more than conventional grapes , they believes that the organic Grapes is more nutritious than conventional Grapes and the less perfect shape of organic Grapes isn't be obstacle to pay organic grapes.

#### 5.2.2.6 Grapes Model (ML) Estimates and (WTP) with Interaction Effects

As discussed above, the model in Table 5.54 is a basic model for all random effects variables that urge the Palestinian consumers to WTP organic grapes. The estimation results in Table 5.55 show the interaction effects of the main socioeconomic and demographic variables in the CE.

Table 5.55: Grapes ML Estimations and WTP with interaction effects.

| Variables | Coefficients | Standard Error | Z-value | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Educational level | .0353544 | .0267046 | 1.32 | 0.186 | -.0169856 | .0876944 |
| Monthly income | -.0043948 | .0120049 | -0.37 | 0.714 | -.027924 | .0191344 |
| Family size | .0000219 | .0000143 | 1.53 | 0.127 | -6.20e-06 | .00005 |
| Employment status | .0027816 | .0727201 | 0.04 | 0.969 | -.1397472 | .1453104 |
| Constant | .5548677 | .1129559 | 4.91 | 0.000 | .3334783 | .7762572 |
| Log likelihood | | -209.41126 | | | | |
| Pseudo-R2 | | 0.017655 | | | | |

According to the estimation results in Tables 5.55, all interaction variables are not significant except at the 5% level, indicating that Palestinian consumers educational level, employment status, family size and income level don't play a role when the purchase option of organic grapes has been made. However, this mean that the Palestinian consumer prefer the organic grapes rather than the conventional grapes and there are no socioeconomic variable affect the purchasing of organic grapes.

However, this study employs a choice experimental approach to investigate consumers' preferences and willingness to pay (WTP) for organic food products. We use a mixed logit model to examine preference heterogeneity. The results revealed significant heterogeneity in preferences for organic potatoes, tomatoes and grapes attributes among consumers. In addition, the WTP results obtained from a mixed logit indicate that the income level has a positive and clear effect WTP on organic potatoes, tomatoes and grapes.

## 5.3 DISCUSSION OF EMPIRICAL RESULTS.

### 5.3.1 Palestinians household aware of ensuring and securing the environment.

When considering knowledge of environmental issues and how this influences willingness to pay, previous research has tried to find out whether more knowledge about environmental issues increases the willingness to pay for environmentally friendly products. For an excellent literature review and empirical investigation of which factors influence the knowledge itself, see Diamantopoulos et al (2003). The research considering

knowledge generally finds a positive effect of knowledge on the environment and on the willingness to pay for more environmentally friendly products (Nomura and Akai 2004 on electricity, Mourato et al 2004 on cars Fotopoulos and Krystallis 2002 on food, Tanner and Kast 2003). Vlosky and Ozanne (1999) find a positive relationship between environmental consciousness and willingness to pay for environmentally certified wood products. Gil et al (2000) also finds that people have a stronger willingness to pay when they are more involved in environmental concerns: those variables show consumers' awareness of the negative effect of development on the environment. In my research knowledge or awareness has not been taken into consideration. A previous research has had a clear conclusion, the effect is positive and, bluntly thinking, this is logical; people with more knowledge of environmental damage and those who are more involved in environmental issues are logically willing to pay more to battle this effect.

However, the results show that Palestinian households have a positive impact on ensuring and securing the environment as a result of section 5.1.2.4.

### 5.3.2 Palestinians household WTP and pay a premium for environmentally green fruits and vegetables.

Several authors have researched the subject of willingness to pay for environmentally green foods. Lorenz Probst, Elysee Houedjofonon, Hayford Mensah Ayerakwa and Rainer Haas (2012) use a choice experiment to identify the marketing potential of organic vegetables in the food vending sector. In this research consumer WTP was calculated to be a premium of 1.04 USD (per plate) if the food served contained only certified organic vegetables. A willingness to pay for study of organic foods was conducted in Argentina in 2007 (Rodriquez et al., 2007). The results were significant in determining consumers WTP for organic foods. The five selected food products chosen for this study were regular milk, leafy vegetables, whole wheat flour, fresh chicken and aromatic herbs. According to Rodriquez (Rodriquez et al., 2007) the results of WTP estimates obtained for the selected products indicated that organic products are positively valued in Argentina.

However, in this research the Palestinian household is willing to pay a premium of 0.54 (NIS), 1.23 (NIS) and 0.81 premium for organic tomatoes, potatoes and grapes respectively.

### 5.3.3 Palestinians household's socioeconomics variables have a significant effect on WTP of environmentally-green products of fruits and vegetables.

#### 5.3.3.1 Educations effects on WTP of environmentally green goods

When looking upon how education influences the willingness to pay for environmentally green products of food, the image is more consistent. Most literature finds that more education leads to a stronger willingness to pay (Zarnikau 2003, Roe et al 2001 for electricity, Radman 2005, Fotopoulos and Krystallis 2002 for food and Mourato et al for cars and Jensen et al 2003 for wooden products). Although limited, there are some findings indicating a negative effect of education (Gil et al 2000 for organic food) or a non-significance (Aquilar and Vlosky 2006 on different wood products and Krystallis and Chryssohoidis 2005 on different food products). When concentrating on fair-trade products I see similar results; more education usually finds a stronger willingness to pay (Loureiro and Lotade 2005, De Pelsmacker et al 2005 for coffee) although some mixed results are also found (Auger et al 2003 for soap and sneakers).

However in our research, the educational level had a positive but little effect WTP of organic potatoes, tomatoes and grapes.

#### 5.3.3.2 Income level effects on WTP of environmentally green goods

The effect of income on willingness to pay for environmentally green goods is consistent throughout the literature. Although a few find it to be non-significant (Krystallis and Chryssohoidis 2005, Tanner 2003 on food) the vast majority finds that when income rises, the willingness to pay for green products (Roe et al 2001, Zarnikau 2003 for electricity, Fotopoulos and Krystallis 2002 for food, Saphores et al 2007 for electronics) and fair trade products (Aquilar and Vlosky 2006 on wooden products, Loureiro and Lotade 2005 on coffee) also rises. However in our research the income level had a positive and clear effect WTP of organic potato, tomato and grapes.

### 5.3.3.3 Household size effects on WTP of environmentally green goods

Although this demographic variable has not been widely studied in this context, the studies that do take household size into account find that the more children the stronger the willingness to pay for environmentally-green products of food (Gil et al 2000, Fotopoulos and Krystallis 2002 on organic food). However in our research as shown in tables 5.54, 5.55 and 5.56 the results seem that the smaller family size is the more WTP organic fruits and vegetables.

Table 5.56: Cross-tabulation between the WTP for non-use values of organic grapes and family size.

| Did you prefer organic grapes? | family size | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 13 | |
| No | 0 | 6 | 7 | 13 | 27 | 16 | 10 | 5 | 7 | 2 | 0 | 3 | 96 |
| Yes | 2 | 17 | 29 | 34 | 36 | 40 | 36 | 32 | 14 | 7 | 2 | 0 | 249 |
| Total | 2 | 23 | 36 | 47 | 63 | 56 | 46 | 37 | 21 | 9 | 2 | 3 | 345 |

Table 5.57: Cross-tabulation between the WTP for non-use values of organic tomatoes and family size.

| Did you prefer organic tomatoes? | family size | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 13 | |
| No | 1 | 5 | 6 | 15 | 27 | 17 | 9 | 6 | 7 | 2 | 2 | 2 | 99 |
| Yes | 1 | 18 | 30 | 32 | 36 | 39 | 37 | 31 | 14 | 7 | 0 | 1 | 246 |
| Total | 2 | 23 | 36 | 47 | 63 | 56 | 46 | 37 | 21 | 9 | 2 | 3 | 345 |

Table 5.58: Cross-tabulation between the WTP for non-use values of organic potatoes and family size.

| Did you prefer organic potatoes? | family size | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 13 | |
| No | 0 | 10 | 7 | 19 | 37 | 26 | 18 | 13 | 11 | 3 | 0 | 3 | 147 |
| Yes | 2 | 13 | 29 | 28 | 26 | 30 | 28 | 24 | 10 | 6 | 2 | 0 | 198 |
| Total | 2 | 23 | 36 | 47 | 63 | 56 | 46 | 37 | 21 | 9 | 2 | 3 | 345 |

## 5.4 CONCLUSION

The growing market around the world for organic foods, especially fruits and vegetable products, provides a potential opportunity to improve health and environmental saving of Palestinians and enable the development of a new value-added food sector. With the growing interest among consumers in the link between green environment and health, and the knowledge of the attributes benefits in organic food products that play a key role in consumers 'choices.

The results estimated in this chapter have answered the research questions related to the demand for organic fruits and vegetables as described in Chapter 1. Also, the Mixed logit model (ML) used for estimating Palestinian consumers 'organic fruits and vegetables choices. However, (ML) is a discrete choice model based on random utility theory.
WTP estimates for the main attributes were also provided for each of the discrete choice models. The WTP method provides a means of interpreting the estimated parameters and identifying the monetary values associated with changes in those attributes. Given the hypothetical nature of the choice experiment, the WTP estimates are most usefully interpreted as relative measures of the strength of preferences. The WTP values considering main effects allow further identification of the heterogeneity in consumers' preferences for the main organic fruits and vegetables attributes.

According to the results of the models, organic fruits and vegetables are better than conventional ones. Among the main attributes of organic fruits and vegetables made this kind of products the most preferred health claim by respondents. Also, these attributes of organic fruits and vegetables appear to be important to those Palestinian consumers to purchase this kind of food.

# CHAPTER SIX: CONCLUSIONS, POLICY IMPLICATIONS AND FUTURE RESEARCH

## 6.1 CONCLUSIONS & POLICY IMPLICATIONS

As discussed before, we indicate that consumers' growing interest in organic fruits and vegetables provides value-added growth opportunities to the Palestinians agricultural sector. Also, studying consumers' response to organic fruits and vegetables is a relatively new research area with many unanswered questions regarding public awareness of the health-enhanced properties of organic fruits and vegetables. Given the credence nature of organic fruits and vegetables, price, nutrition and the shape of them play a key role in helping consumers make consumption choices. However, tomatoes, potatoes and grapes have been selected as the products examined in this study, for many reasons: First, the fruits and vegetables sector is dominant in organic food sector, and fruits and vegetables are widely consumed among the Palestinian people. Second, organic fruits and vegetables play an important role to improving public health for both present and future generations. Third, increasing the level of environmentally-friendly food consumption in the households is an important element that can be utilized in the safeguarding of the environment and reduces the GHG emission. Fourth, in the West Bank, the willingness to pay for environmentally green food is a very interesting subject and is becoming more and more relevant to the business in the West bank. For example, explicit health claims for products enhanced with organic fruits and vegetables may increase farmers' profit.

Based on this study, households spend about 10% of their monthly income, which is about 4170 (NIS), on conventional fruits and vegetables without knowing the ultimate effects of them compared to the benefits of organic products. At the same time, households are more likely willing to pay 0.54 (NIS), 1.23 (NIS) and 0.81 premium for organic tomatoes, potatoes and grapes respectively over the conventional ones when knowing the ultimate benefits of the organic products in the West Bank. Also, households generally preferred organic products to be labeled and sold in specialized markets. However, the shape of organic products reduces the consumer's interest when making the purchasing decision but still increases their interest due to the better taste and nutritional benefits of organic fruits and vegetables and thus trying to produce these products with better shape and appearance can increase consumers' preference and in turn the demand.

Consumers currently added more importance to organic products because of health and environmental benefits. Some policy measures therefore need to be issued by the Government, non-governmental organizations and other stakeholders to promote the consumption of organic products. These include creating awareness on the relevance of consuming organic products through effective marketing and educational campaigns. Though most consumers were of the view that organic fruits and vegetables are good for health, their knowledge of the harmful effect of conventional fruits and vegetables that they causes blood pressure, stroke and diabetes must be corrected through educational programs. Consumers generally have a positive perception of the production enhancing characteristics of organic products. Unfortunately, these positive perceptions do not seem to matter much vis-a-vis their misconceptions, which are not based on scientific evidence. The scientific community, in collaboration with the media, therefore has a very important role in educating the public, so that consumers can distinguish between real and unsubstantiated diseases associated with conventional fruits and vegetables, and make a more informed decision. According to Table 6.2, It is recommended that if producers of organic fruits and vegetables intend to sell through the various marketing channels (outlets), then the premium should not exceed 0.54 (NIS), 1.23 (NIS) and 0.81 premium for organic tomatoes, potatoes and grapes respectively as consumers would not be willing to pay a premium which is higher. The government must: (1) increase the income level of Palestinian households and if not (2) the government should cover the difference in prices between organic and conventional fruits and vegetables. However the producer must (1)

label the organic product in term of quality perception of consumption; (2) find an agricultural method to make the shape of organic fruits and vegetables more attractive; (3) provide organic fruits and vegetables all the year round.

According to our research, Palestinian consumers are willing to pay a premium for organic fruits and vegetables. However, this price premium doesn't cover the actual price of this kind of products. This leads the Palestinian government to: (1) subsidizing the organic crops to make them artificially inexpensive. Also, the cost of cleaning up pollution and treating health problems created by conventional farming cost the government more money than if subsidizing the organic farming and encourages consumption of it; (2) the state's certification and labeling for products of foods and (3) State sponsored market research and marketing campaigns for organic products. Also, the Palestinian government can play a vital role in encouraging the supply of organic products. It is likely to draw new and effective regulations for cultivating organic agricultural products rather than conventional products to meet households needs for green products with reasonable prices. An increase of this kind of agriculture will offer new jobs for people, which will play a substantial role in reducing the level of an employment rate. Given this, an integrating organic agriculture into overall agricultural policies will help support poverty strategies and building organic agriculture supply capacities through education, research, extension services, local and regional market development and export facilitation.

However, claims about health effects are credence attributes, which means even in the presence of organic fruits and vegetables health claim, information asymmetry may still be present if consumers are uncertain about the validity of the health claim. Public policy makers should be aware that the verification of health claims plays an important role in reducing consumers' uncertainty and making health claims more credible. Also, public policy makers must minimize the main environmental pollutants (i.e. water pollution, air pollution, etc...).

## 6.2 LIMITATIONS & FUTURE RESEARCH

This thesis focuses on examining the Palestinian households WTP of organic fruits and vegetables in the West Bank through using the choicest experiment methodology of research. One limitation of this study is associated with the hypothetical nature of the stated preference approach, since respondents are asked to state their preference values, but actual choice behavior may differ. Consumers may provide unrealistic statements if there is no cost to over (or under-) state their willingness to pay. Estimation bias may be present due to strategic behavior by respondents, especially when consumers are unfamiliar with the product (e.g. a food product with a new functional attribute), their stated willingness to pay may be inaccurate. However, other methods, such as experimental auctions, have been widely discussed in the literature associated with economic evaluation methods and could be used in a future research of this topic. As discussed by Hu, Adamowicz and Veeman (2006), it is broadly believed that the use of experimental auctions in consumer research can capture the true willingness to accept a product and reduce the bias caused by strategic behavior. However, the costs of conducting auctions on representative samples are usually relatively higher than the Stated Preference Method and as a result, sample sizes tend to be smaller. Thus, another limitation of this study concerns only two organic vegetables and one organic fruit investigated due to time and budget constraints. Future studies should consider the WTP for other organic products. Also, Ramallah and Bethlehem governorates decided that, future studies should be replaced by other governorates in the country to determine the overall market size and consumers WTP for organic fruits and vegetables. However, some of the Variables tested in the WTP model were not statistically significant probably due to the sample size. To address this statistical limitation, future studies should consider a large sample size in order to increase the degree of freedom. Future research should focus on cost-benefit analysis of organic farming so that financial viability of organic farming in Palestine based on percentage willingness to pay could be explored.

# REFERENCES


Adamantios Diamantopoulos. Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. Journal of Business Research 2003: Volume 66, Issue 7, Pages 795-954.

Adamowicz, W. L., P. Boxall, M. Williams and J. Louviere (1998). Stated Preference Approaches for Measuring Passive Use Values: Choice Experiments and Contingent Valuation. American Journal of Agricultural Economics, Vol. 80, No. 1 (Feb., 1998), pp. 64-75.

Adamowicz, W.L., J. Louviere and M. Williams. 1994. Combining Stated and Revealed Preference Methods for Valuing Environmental Amenities. Journal of Environmental Economics and Management. (26):271-292.

Allen, Gary J. & Albala, Ken, ed. (2007). The Business of Food: Encyclopedia of the Food and Drink Industries. ABC-CLIO. p. 288. ISBN 978-0-313-33725-3.

Birol E., K. Karousakis, and P. Koundouri (2006), Using Economic Valuation Techniques to Inform Water Resources Management: A Survey and Critical Appraisal of Available Techniques and an Application, Journal of Science of the Total Environment, 365: 105-122.

Blamey, R., J. J. Louviere and J. Bennett (2001). The Choice Modeling Approach to Environmental Valuation. Ed. J. Bennett an R. Blamey. Northampton. Publisher: Edward Elgar.

Blend, J. R and E. O. van Ravenswaay. 1999. "Consumer Demand for Eco-labeled Apples: Results from Econometric Estimation. American Journal Agriculture Economics. Staff paper Staff Paper 99-17.

Brookshire, D.S., L.S. Eubanks and R.A. Randall, (1983), Estimating Option Prices and Existence Values in Wildlife Resources,Land Economics, 69: 1-15.

Carson, R. T., Louviere, J. J., Anderson, D. A., Arabie, P., Bunch, D. S., Hensher, D. A., & Wiley, J. B. (1994). Experimental analysis of choice. Marketing letters, 5(4), 351-367.

Consumer-driven U.S. organic market surpasses $31 billion in 2011, Organic Trade Association (OTA), 2012.

Cranfield, J., B. J. Deaton and S. Shellikeri (2009). Evaluating Consumer Preferences for Organic Food Production Standards. Canadian Journal of Agricultural Economics, 57(1): 99-117.

Farrar Donald E. and Glauber, Robert R. 1967. "Multicollinearity in Regression Analysis: The Problem Revisited," The Review of Economics and Statistics 49(1):92-107.

German Development Agency GTZ; Internet.http://www.gtz.de/en. (Accessed on July 9, 2012).

Green P E & Srinivasan V. Conjoint analysis in consumer research: issues and outlook. Journal of Consumer. Rex 5: 103-23, 1978.

Green, J.R., Laffont, J.J. (1978). “A sampling approach to the free rider problem”. In: Sandmo, A. (Ed.), Essays in Public Economics. Lexington Books, Lexington, MA.

Hanemann, W.M. (1994). “Valuing the environment through contingent valuation”. Journal of Economic Perspectives 8 (4), 19–43.

Hanley, N., MacMillan, D., Wright, R. E., Bullock, C., Simpson, I. Parsisson, D. and Crabtree, B. (1998). Contingent Valuation Versus Choice Experiments: Estimating the Benefits of Environmentally Sensitive Areas in Scotland. Journal of Agricultural Economics Vol. 49, No.1 (Jan. 1998): 1-15.

Hensher, D. A., J. M. Rose, and W. H. Greene (2005). Applied Choice Analysis, A Primer. Cambridge Press, New York.

Holmes, T. P. and W. A. Adamowicz (2003). Chapter 6: Attribute-Based Methods. in A Primer on Nonmarket Valuation. edited by P.A. Champ K.J. Boyle and T.C. Brown. Dordrecht: Kluwer Academic Publishers, 171-219.

Hovde C. S., C. J. Wachenheim, R. Hearne and W. Nganje (2007). Identifying Market Preferences for High Selenium Beef. Working paper, Agribusiness and Applied Economics Report No. 611.

Huber, J. and K. Zwerina (1996) The Importance of Utility Balance and Efficient Choice Designs, Journal of Marketing Research, 33: 307-317.

International federation of organic agriculture movements (IFOAM) ,2012.

Jeffrey R. Blend and Eileen O. van Ravenswaay (1999).Measuring Consumer Demand for Ecolabeled Apples.American Journal of Agricultural Economics, Vol. 81, No. 5, Proceedings Issue (Dec., 1999), pp. 1072-1077.

Kanninen, B. J. (2002). Optimal Design for Multinomial Choice Experiments, Journal of Marketing Research, 39: 214-217.

Kelvin J. Lancaster, 1966. "A New Approach to Consumer Theory." Journal of Political Economy, 74, 132-157.

Kilbourne WE, Beckmann SC. Review and critical assessment of research on marketing and the environment. Journal of Marketing Management 1998;14(6): 513–32.

Kroes, E.P. and Sheldon, R.J. (1988) “Stated preference methods: an introduction”, Journal of Transport Economics and Policy, 22 (1) 11-25.

Kuhfeld, W. F., R. D. Tobias, and M. Garratt (1994) Efficient Experimental Design with Marketing Research Applications. Journal of Marketing Research, 21: 545-557.

Larue, B., West, G. E., Gendron, C. and Lambert, R. (2004), Consumer response to functional foods produced by conventional, organic, or genetic manipulation. Agribusiness, 20: 155–166. doi: 10.1002/agr.20006.

Lorenz Probst, Elysee Houedjofonon, Hayford Mensah Ayerakwa. Will they buy it? The potential for marketing organic vegetables in the food vending sector to strengthen vegetable safety: A choice experiment study in three West African cities. Journal of food policy Vol.37 (2012) 296–308.

Louviere, J.J. 1988b. Conjoint Analysis Modeling of Stated Preferences: A Review of Theory, Methods, Recent Developments and External Validity. Journal of Transport Economics and Policy. 10:93-119.

Louviere, J.J., Hensher, D.A., & Swait, J.D. (2000). Stated choice methods, analysis and application. Cambridge, UK: Cambridge University Press.

Lusk, L. J. and N. Parker (2009). Consumer Preferences for Amount and Type of Fat in Ground Beef. Journal of Agricultural and Applied Economics, 41(1): 75-90.

Manski, C. (1977). The Structure of Random Utility Models. Theory and Decision, 8: 229-254.

Mirel M. Volcan , Robert R. Hearne, Fargo. 2002. The Use of Choice Experiments to Analyze Consumer Preferences for Organic Produce in Costa Rica. Journal of American Agricultural Economics Association. 1 – 13.

Morikawa, T., Ben-Akiva, M., McFadden, D., 2002. Discrete Choice Models Incorporating Revealed Preferences and Psychometric Data. Econometric Models in Marketing 16, 27-53.

Ngene Software manual (http://www.choice-metrics.com/download.html).

Palestinian Central Bureau of Statistics - State of Palestine (PCBS), 2013.

Palestinian Ministry of Agriculture.

Paul A. Samuelson (1938) "A Note on the Pure Theory of Consumer's Behaviour", Economica, v. 5: pp. 61-71.

Quagrainie, K., J.Unterschultz, and M.Veeman. 1998. Effect of product Origin and Selected Demographics on Consumer Choice of Red Meats. Canadian Journal of Agricultural Economics 46: 201-219.

Roberts JA. Green consumers in the 1990s: profile and implications for advertising. Journal of Business Research, 1996, vol. 36, issue 3, pages 217-231.

Shihomi Ara (2003). Consumer Willingness to Pay for Multiple Attributes of Organic Rice: A Case Study in the Philippines. Contributed paper selected for presentation at the 25th International Conference of Agricultural Economists, August 16-22, 2003, Durban, South Africa.

Train K. E. (2009). Discrete Choice Methods with Simulation, Cambridge University Press.

Veeman and W. L. Adamowicz (2004). Labelling Genetically Modified Food: Heterogeneous Consumer Preferences and the Value of Information. Agribusiness and Applied Economics Project Report 04-01, AARI Project #2000D037.

West, G. E., C. Gendron, B. Larue and R. Lambert (2002). Consumers'Valuation of Functional Properties of Foods: Results from a Canada-wide Survey. Canadian Journal of Agricultural Economics, 50(4): 541-558.

# APPENDICE

## Appendix 1: Questionnaire for Household heads – Choice Experiment Survey

**Al-Quds University - Palestine**

**Institute of Business & Economics**

**Business Administration**

**Survey on demand management of improved environmentally friendly household Organic fruits and vegetables in West Bank**

**The questionnaire consists of five sections:**

**Section 1:** Introduction.

**Section 2:** Background Information.

**Section 3:** Health and Environmental Problems facing households in West Bank.

**Section 4:** Eating Habits and Buying Behavior.

**Section 5:** Household Attitudes about Conventional agriculture and Organic Fruits and Vegetables.

**Section 6:** Alternatives Fruits and Vegetables Choice Experiment

**Section 7:** Socioeconomic and demographic questions.

**Note Please:**

The data and information collected are very confidential, would be only for the purposes of scientific research, since your answers will be dealt anonymous.

### Section 1: Introduction

My name is Hasan Omar Abu latifa, I am working for a research project, initiated by a Master student at Al-Quds University - Palestine. **I am carrying out a thesis on managing the demand of organic fruits and vegetables in West Bank, further to develop socioeconomic paths, could play an important role in preserving the environment, your health and the health of your family.**

I would like to ask you a number of questions about your household. The household includes all individuals who are under the direct responsibility of the household head. We would appreciate if you kindly answer the questions for your household, however please answer the questions as accurately as you can and don't mind about other people or households who live in your region.

**Instructions:**

- This questionnaire is directed only to household heads of West Bank governorates including urban, rural, and refugee camps.
- Please tick the most suitable answer (☑) or complete the spaces as indicated.
- In case any ambiguous question; please don't hesitate to ask me.
- It would be preferable if you kindly answer all questions where possible.
- Multiple answers are allowed for one question where indicated only.
- Please start to fill the questionnaire as is sequenced.

**Hello, may I speak to the (male or female) head of the household?**

Yes, continue please _____

No, end the interview please _____

**Who is responsible to buy fruits and vegetables for your family:**

- ☐ Husband
- ☐ Wife
- ☐ Both
- ☐ Others, please specify ----------

**Are You Familiar enough with prices of fruits and vegetables you consume on your house?**

Yes, continue please _____

No, end the interview please _____

**Do you live within the bounds of Ramallah and or Bethlehem Governorates?**

Yes, continue please _____

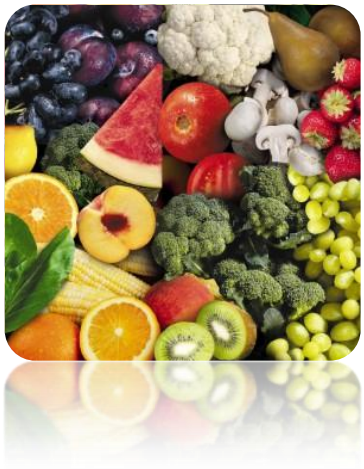
No, end the interview please _____

Don't know, end the interview please _____

**Section 2: Background Information and Choices Scenario**

Before we proceed, let me tell you some facts about the Organic fruits and vegetables

**General Information:**



There are lots of reasons to buy organic. First, it's better for the environment. No pesticides mean healthier soil, water, and wildlife. Buying organic food supports small farmers. Organic farmers can earn a fairer price for organic produce compared to factory farming. Organic farming is good for biodiversity. Organic farmers are growing a wide variety of non-genetically modified (non-GMO) fruits and vegetables. Where factory farming has shrinked our choices in the supermarket to one or two types of any produce variety, organic farmers are resurrecting many heirloom varieties. Finally, organic foods are healthier for you.

**Benefits of Eating Organic Produce - Organic Fruits and Vegetables**

1. The organic supporters claim that these chemicals are antioxidants and that organic fruit and vegetables are better at protecting the body from cancers and heart disease.
2. Organic fruits and vegetables have higher levels of minerals and vitamins. They are vitamins A, C, D, B group and minerals like zinc and calcium. All these micro nutrients take major role in your health. The other part of this benefit is that your body absorbs the natural vitamins and minerals a lot better and easier as if you like to take them as an supplement.
3. Organic fruits and vegetables are produced with environmentally friendly methods and are free from Genetically Modified (GM). That means that the produce does not

depend on the success of the method, that has been used. And it means that you will taste the produces own flavour.

4. Organic fruits and vegetables allow you to get a great mixture of season produce. In that way you will always know what to choose and your body will benefit from the quality. This will also allow you to buy mainly locally and not break your bank.
5. Organic fruits and vegetables will help you on getting your daily amount of vitamins and minerals easy. There is a good old saying"One apple a day-doctor go away. Eating organic means, that you are looking after your body. This also will put your mood levels up, which will benefit your overall health
6. Organic fruits and vegetables are very easy to grow. All you need is some space and desire to have your own organic garden. You will be using the mother nature goodness-sun, rain and season. It is a great hobby, which will protect your health.
7. Organic fruits and vegetables are really tasty. The benefit for you is that you will enjoy eating your fresh produce-cooked or fresh. There is nothing that can replace the taste of a nice organic fruit salad. Don't forget its tasty, healthy and really natural.

We all live in a world full with choices. At any moment of our lives you need to make small or a big decision. Sometimes the choice is really easy when you have to choose between organic and non-organic food. And the choice is even easier when you know what will bring benefits for your health and well-being.

**Section 3: Health and Environmental Problems facing households in West Bank**

In your opinion what are the main problems facing our country today?

| **No.** | **Health problems facing households in West Bank** | **A very high degree** | **A high degree** | **Medium** | **A few degree** | **Very few degree** |
|---|---|---|---|---|---|---|
| 1. | Cancer Diseases | | | | | |
| 2. | Heart Diseases | | | | | |
| 3. | Diabetes Diseases | | | | | |
| 4. | Learning & Emotional Problems | | | | | |
| 5. | Stomach, Intestines & Liver | | | | | |
| **No.** | **Environmental Problems facing households in West Bank** | **A very high degree** | **A high degree** | **Medium** | **A few degree** | **Very few degree** |
| 1. | Air pollution | | | | | |
| 2. | Soil erosion | | | | | |
| 3. | Water pollution | | | | | |
| 4. | Enhanced greenhouse effect | | | | | |

**Section 4: Eating Habits and Buying Behavior.**

1. The following statements concern your eating habits. To what extent do you agree with the following statements?

| **Eating habits** | Completely Disagree | Disagree | Neutral | Agree | Completely Agree |
|---|---|---|---|---|---|
| Eating for me is always a question of taste. | | | | | |
| To me eating has to be fast. | | | | | |
| I pay attention to healthy food. | | | | | |
| I look for food with low calorie content. | | | | | |
| When I eat, I do not think about my weight. | | | | | |
| Eating for me is pure pleasure. | | | | | |
| Eating makes me happy. | | | | | |
| I prefer to eats fruits and vegetables after the lunch. | | | | | |

2. In the following section we are interested in what is important for your food shopping. If you are not the one purchasing the food, please indicate what would be important for you if you bought food.

| **Buying Behavior** | Completely Disagree | Disagree | Neither Agree nor Disagree | Agree | Completely Agree |
|---|---|---|---|---|---|
| I prefer products produced in my region. | | | | | |
| When buying food products for myself, the cheapest price is the most important factor. | | | | | |
| I specifically buy fruits which are environmentally friendly. | | | | | |
| I specifically buy vegetables which are environmentally friendly. | | | | | |
| At the supermarket I like to look at new products. | | | | | |
| I specifically buy products which are socially consumed. | | | | | |
| I often read the information on the packages of products just out of curiosity. | | | | | |
| Shopping for food has to be fast for me. | | | | | |
| I prefer organic products. | | | | | |
| I am willing to pay extra for organic fruits and vegetables which are produced in an environmentally friendly way. | | | | | |

**Section 5: Household Attitudes about Conventional agriculture and Organic Fruits and Vegetables**

I would like to know your level of satisfaction about our conventional agriculture, and what are the major problems with this kind of agriculture method? Please indicate on the following questions that best reflect your feelings or complete the spaces as indicated.

1. Could you please give me an idea about your household expenditure on fruits and vegetables per month? _____ (in NIS).

2. What is your buying source of fruits and vegetables?
   - ☐ Farmers' market, % of total buying ……
   - ☐ Fruits and Vegetables stores, % of total buying ……
   - ☐ Super Markets, % of total buying ……
   - ☐ Malls, % of total buying ……
   - ☐ Other, please specify ……

3. In your opinion, what do you think are the causes of organic fruits and vegetables is not widespread in West Bank? You can tick more than one choice:
   - ☐ Knowledge of organic fruits and vegetables does not available
   - ☐ The limited possibilities for Palestinian farmers
   - ☐ Government's lack of interest in organic agriculture
   - ☐ Awareness bulletins by the Ministry of Health does not available
   - ☐ Higher price of organic fruits and vegetables
   - ☐ Scarcity of natural resources
   - ☐ Others specify _____ , _____ , _____.

4. Could you tell me, what are the negative impacts of eating conventional fruits and vegetables? You can tick more than one choice:
   - ☐ Health problems
   - ☐ Environment problems
   - ☐ Soil erosion
   - ☐ Destroy biodiversity
   - ☐ Others specify _____ , _____ , _____.

5. Please tell me whether the following statements are true or false – or just indicate "don't know if you are unsure of the answer. Check the appropriate box. Please tick the most suitable answer (☑).

| **Statements** | **Yes** | **No** | **Don't Know** |
|---|---|---|---|
| Organic food more nutritious than conventionally produced Food | | | |
| Organic food tastes better than conventionally produced food | | | |
| The appearance of organic products is more attractive than products produced from conventional methods. | | | |
| Organic labels necessary to guarantee organic origin of products. | | | |
| Organic agriculture conserves soil and has less impact on the environment. | | | |
| Palestinian farmers making feasible profit from producing organic fruits and vegetables. | | | |
| Consumer behavior is an important element for selecting their fruits and vegetables (either organic or conventional). | | | |

**Section 6: Alternatives Fruits and Vegetables Choice Experiment**

**Please choose between fruits and vegetables in each of the scenarios below. All products are the same size but the price varies depending on its properties. Please look at the benefits of each product and tick the box below (☑) the product you most prefer in each scenario.**

**Alternative 1: Choice Experiment**

The tomato fruit is consumed in diverse ways, including raw, as an ingredient in many dishes and sauces, and in drinks. While it is botanically a fruit, it is considered a vegetable for culinary purposes, which has caused some confusion. The vegetable is rich in lycopene, which may have beneficial health effects.

**Option A: organic tomato advantages and disadvantages:**

***Advantages:*** Organic tomatoes are produced in an environment that has lower nutrient supply as nitrogen-rich chemical fertilizers are not added. This leads to excessive formation of antioxidants such as quercetin (79% higher) and kaempferol (97% higher) in organic tomatoes. As we all know, antioxidants are good for health and help in reducing heart diseases.

***Disadvantages:*** organic tomato production is not as productive as of conventional tomato grown by modern methods. Organic tomato has a shorter life than non-organic one for this reason the cost of organic tomato is higher than conventional tomato. Also the shape of organic tomato is less freshness than conventional tomato.

**Option B: conventional tomato advantages and disadvantages:**

***Advantages:*** Health benefits of tomato include eye sight, good gut health, low hypertension, diabetes, skin problems and urinary tract infections. It is a rich source of vitamins and minerals and exerts a protective effect against cardiovascular diseases. Also the price of it is less than organic produced tomato.

***Disadvantages:*** farmer using chemical pesticides when producing it that may damage human being health.

Here you will find two products, organic and conventional tomatoes which should be evaluated as follows:

The products vary in price, production methods. Specifically organic tomatoes had higher vitamin C, carotenoids, and polyphenol contents (except for chlorogenic acid) than conventional tomatoes.

In the following windows different offers of tomatoes are shown. Each tomato has been packaged measuring in kilogram; the prices vary from 2 NIS to 4 NIS. The tomatoes have been produced either conventionally or organically from Palestinian Territories.

| No. | Attributes | Option A | Option B | Option C |
|---|---|---|---|---|
| 1. | Price per Kg | 4 NIS | 2 NIS | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 2. | Levels of minerals and vitamins | Contain higher level | Contain lower level | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 3. | Tasty | Very Tasty | Tasteless | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 4. | Nutritious | Nutritious | Less nutritious | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 5. | Shape | Less perfect looking | Perfect looking | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 6. | Texture | Rough | Soft | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 7. | How tomato where grown | Certified Organic | Not Organic | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |

**Alternative 2: Choice Experiment**

Potato plants are herbaceous perennials that grow about 60 cm (24 in) high, depending on variety, the culms dying back after flowering. They bear white, pink, red, blue, or purple flowers with yellow stamens.

**Option A: organic potato advantages and disadvantages:**

***Advantages:*** Organic potatoes are produced in an environment that has lower nutrient supply as nitrogen-rich chemical fertilizers are not added. Organic potato contains higher level of vitamins C, B and B6 in addition to essential minerals like potassium, calcium, iron, phosphorus, magnesium and selenium. Potato contain vitamin-C present in potatoes can help prevent this dreaded deficiency disease, caused due to lack of vitamin-C.

***Disadvantages:*** Organic potato production is not as productive as of conventional potato grown by modern methods. Organic potato has a shorter life than non-organic one and due to insects there might be considerable crop loss for this reasons the price of organic tomato is higher than conventional potato. Also the shape of potato is less freshness than conventional tomato.

**Option B: Conventional potato advantages and disadvantages:**

***Advantages:*** Potatoes are high calories food and it is high in fat but it is good source of vitamins and minerals as well as fiber. The skins of the potatoes are good that contains vitamins in potatoes and minerals.

***Disadvantages:*** low in proteins and contains high carbohydrates so due to this reason only the potatoes are not considered as the health diet by most of the people.

**Here you will find two products, organic and conventional Potato (small, round, sweet tasting tomatoes), which should be evaluated as follows.**

The products vary in price, production methods. Specifically organic potato has a lower nitrate content and higher vitamin C and chromogenic acid content to be the parameters most consistently differentiating organically from conventionally produced potatoes. Each potato has been packaged measuring in kilogram; the prices vary from 1.5 NIS to 3 NIS. The potato has been produced either conventionally or organically from Palestinian Territories.

| No. | Attributes | Option A | Option B | Option C |
|---|---|---|---|---|
| 1. | Price per Kg | 3 NIS | 1.5 NIS | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 2. | Levels of minerals and vitamins | Contain higher level | Contain lower level | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 3. | Tasty | Very Tasty | Tasteless | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 4. | Nutritious | Nutritious | Less nutritious | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 5. | Shape | Less perfect looking | Perfect looking | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 6. | Texture | Rough | Soft | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| 7. | How tomato where grown | Certified Organic | Not Organic | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |

**Alternative 3: Choice Experiment**

Grapes are a type of fruit that grow in clusters of 15 to 300, and can be crimson, black, dark blue, yellow, green, orange, and pink. The health benefits of grapes include its ability to treat constipation, indigestion, fatigue, kidney disorders, macular degeneration and prevention of cataract.

**Option A: organic grapes advantages and disadvantages:**

***Advantages:*** Organic grapes are produced in an environment that has lower nutrient supply as nitrogen-rich chemical fertilizers are not added. Also organic grapes have a higher level of vitamins C and B.

***Disadvantages:*** Organic grapes production is not as productive as of conventional grapes grown by modern methods. Organic grapes has a shorter life than non-organic one and due to insects there might be considerable crop loss for this reasons the price of organic grapes is higher than conventional grapes. Also the shape of grapes is less freshness than conventional tomato.

**Option B: Conventional grapes advantages and disadvantages:**

***Advantages:*** The health benefits of grapes include its ability to treat constipation, indigestion, fatigue, kidney disorders, macular degeneration and prevention of cataract. Grapes, one of the most delicious fruits, are rich sources of vitamins.

***Disadvantages:*** Grapes cause problems with digestion and contains high level of calories for these grapes are not considered as the health diet by most of the people.

**Here you will find two products, organic and conventional Potato (small, round, sweet tasting tomatoes), which should be evaluated as follows.**

The products vary in price, production methods. Specifically organic grapes have a higher level of vitamins C and B. Each grape has been packaged measuring in kilogram; the prices vary from 3 NIS to 6 NIS. The grapes have been produced either conventionally or organically from Palestinian Territories.

| No. | Attributes | Option A | Option B | Option C |
|---|---|---|---|---|
| 1. | Price per Kg | 6 NIS | 3 NIS | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | | |
| 2. | Levels of minerals and vitamins | Contain higher level | Contain lower level | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | | |
| 3. | Tasty | Very Tasty | Tasteless | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | | |
| 4. | Nutritious | Nutritious | Less nutritious | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | | |
| 5. | Shape | Less perfect looking | Perfect looking | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | | |
| 6. | Texture | Rough | Soft | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |
| | | | | |
| 7. | How tomato where grown | Certified Organic | Not Organic | Don't Know |
| | Please choose one of these choices. | ☐ | ☐ | ☐ |

**Reasons behind the households in WB interest to consume organic fruits and vegetables.**

| Reason | Agree | Neural | Disagree |
|---|---|---|---|
| Organic fruits and vegetables are more beneficial to health than conventional fruits and vegetables. | | | |
| Organic food is necessary to protect the environment. | | | |
| Organic vegetables and fruits reduce cancer disease. | | | |
| Organic vegetables and fruits reduce heart disease. | | | |
| Organic vegetables and fruits play a role in maintaining good eyesight. | | | |
| Organic vegetables and fruits play a role in maintaining strong teeth. | | | |
| Organic vegetables and fruits play a role in maintaining bone strength. | | | |
| Organic vegetables and fruits play a major role in maintaining the health of the skin. | | | |
| Organic vegetables and fruits help to control blood pressure. | | | |

**A reason behind the households in WB doesn't interest to consume organic fruits and vegetables.**

| Reason | Agree | Neural | Disagree |
|---|---|---|---|
| The price of organic fruits and vegetables is high compared with that of conventional fruits and vegetables. | | | |
| Income level is not quite enough to buy organic fruits and vegetables. | | | |
| The government should cover the difference in prices between organic and conventional fruits and vegetables, so I can buy them. | | | |
| I'm not sure of the level of quality of organic fruits and vegetables. | | | |
| The shape of organic products is less attractive than the shape of conventional products | | | |
| Organic fruits and vegetables aren't available constantly in the Palestinian market | | | |
| The culture of consuming this kind of products is not widespread in Palestine | | | |
| We must minimize the main environmental pollutants (i.e. water pollution, air pollution, etc...) before thinking about organic products. | | | |

**Section 7: Socioeconomic and Demographic Questions**

1. **Age (In years):**
   - ☐ 25 or less than that
   - ☐ 26-36
   - ☐ 37-44
   - ☐ 45-52
   - ☐ 53-60
   - ☐ 61 or more than that

2. **What is your family status?**
   - ☐ Husband
   - ☐ Wife
   - ☐ Eldest son
   - ☐ Eldest daughter
   - ☐ Others, please specify_____

3. **Are you male or female?**
   - ☐ Male
   - ☐ Female

4. **What is your family size? (Number of persons includes yourself) _____.**

5. **Where do you live?**
   - ☐ Urban areas.
   - ☐ Rural areas.
   - ☐ Refugee camps.

6. **How long have you lived in this region? (In years) _____.**

7. **Which was the highest level of formal schooling that you have completed?**
   - ☐ Completed primary school or less than that
   - ☐ Completed diploma degree
   - ☐ Completed bachelor degree
   - ☐ Completed master degree or higher than

**8. How would you describe your current employment status?**

- ☐ Employed full time
- ☐ Employed part time
- ☐ Work at more than one work
- ☐ Unemployed / Looking for work

**9. Which category best describes your occupation?**

- ☐ Government employee
- ☐ Private sector employee
- ☐ NGO's sector
- ☐ Self-Employment
- ☐ Other, please specify _____

**10. How many members of your family are under your direct responsibility?**

Please specify _____.

**11. How many persons in your family, including yourself, is/are employed?**

- ☐ Only I who receive income in the family
- ☐ Two persons who receive income in the family
- ☐ Other, please specify _____

**12. In Order to question number 11 could you please give me an idea about the income of your family members in NIS?**

| **Worker Name** | **Work sector** | **Salary in (NIS)** |
|---|---|---|
| | | |
| | | |
| | | |

**13. Have you been using the land phone?**

- ☐ Yes ⟹ Go to question 14
- ☐ No ⟹ Go to question 15

**14. How much money you will pay for using the land phone? _____** (in NIS)

**15. Have you been using the Internet?**

- ☐ Yes ⟹ Go to question 16
- ☐ No ⟹ Go to question 17

**16. How much money you will pay for the Internet access? _____** (in NIS)

**17. Do you own a car?**

- ☐ Yes ⟹ Go to question 18
- ☐ No ⟹ Go to question 19

**18. What is the type of your car? _____, the year of your car production is _____.**

**19. I would like to learn the amount you pay for electricity. How often do you pay the electricity bill? _____**(in NIS)

**20. I would like to learn the amount you pay for water. How often do you pay the water bill? _____**(in NIS)

**21. Do you have owned a house/s or rent it?**

| | | |
|---|---|---|
| ☐ Owned, | 1. | How many square meters is your land? _____ Square meters. |
| | 2. | How many square meters is your house? _____ Square meters. |
| | 3. | Could you please estimate the house price including the land? _____ (in NIS) |
| ☐ Rent, | 1. | What is the amount price you pay per month? _____ (in NIS) |

**22. Do you have own any of the following? Please specify how many units of each are you have in the house?**

| | | **Numbers of units (ex. 1 TV, 3 Mobile…etc.** |
|---|---|---|
| 1. | Colored TV | |
| 2. | TV Satellite dish | |
| 3. | Refrigerator | |
| 4. | Mobile | |
| 5. | Telephone | |
| 6. | Washer | |
| 7. | Gas oven | |
| 8. | Microwave | |

**23. On average, how much do you spend for your kitchen expenses(food, beverages, etc.) each month? _____** (in NIS)

**24. Are you a smoker?**

☐ Yes ⟹ Go to question 25

☐ No ⟹ Go to question 26

**25. About how much is spent monthly for smoking? _____** (in NIS).

**26. Let us now discuss other expenses of your household. Please tell me your monthly expenditure for each item:** (in NIS)

| | | **Monthly** | **Annual** | **None** | **Don't know** |
|---|---|---|---|---|---|
| 1. | Clothing expenses like dress, t-shirts, etc…. | | | | |
| 2. | Shoes expenses. | | | | |
| 3. | Transportation expenses. | | | | |
| 4. | Gasoline and or Diesel expenses. | | | | |
| 5. | Cooking gas expenses. | | | | |
| 6. | Medical care expenses. | | | | |
| 7. | Medicines expenses. | | | | |

**27. Could you please give us an idea about your whole family income per month?** _____ (in NIS).

**`Thank you very much for your participation!**