

An analysis of consumer preferences, perceptions and willingness to pay for agroecology and conventionally produced green leafy vegetables in Zimbabwe.

A dissertation submitted in partial fulfilment of the requirements for the Master of Science Degree in Food Security and Sustainable Agricultural (Production)

Bindura University of Science Education



**Faculty of Agriculture and Environmental Science
Department of Agricultural Economics, Education and Extension**

**Jane Gumbo
B203212B**

Supervisor: Dr L. Musemwa

May 2023

RELEASE FORM

Name of Candidate: Jane Gumbo

Registration Number: B203212B

Degree: Master of Science Degree in Food Security and Sustainable Agriculture

Project Title: An analysis of consumer preferences, perceptions and willingness to pay for agro ecology produced and conventionally produced green leafy vegetables in Zimbabwe.

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Permanent Address: 1 Lewin Road, Southerton, Harare.

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The undersigned certified that they have supervised and recommended to Bindura University of Science Education for acceptance of dissertation entitled '**An analysis of consumer preferences, perceptions and willingness to pay for agroecology and conventionally produced green leafy vegetables in Zimbabwe**' submitted in partial fulfillment of a Master of Science Degree in Food Security and Sustainable Agriculture.

Name of supervisor: Dr L. Musemwa

Signature:

Date:

DECLARATION

I hereby declare that the research project entitled: An analysis of consumer preferences, perceptions and willingness to pay for agro ecology produced and conventionally produced green leafy vegetables in Zimbabwe, submitted to Bindura University of Science Education, Department of Agricultural Economics, Education and Extension is a record of an original work done by me under the guidance and supervision of **Dr Musemwa** and this work is submitted in partial fulfilment of the requirements for the award of a Master of Science Degree in Food Security and Sustainable Agriculture. The results embodied in this thesis have not been submitted to any University or Institute for the award of any degree or diploma.

Author: Jane Gumbo

Reg Number: B203212B

Signature:

Date:

DEDICATION

This thesis is dedicated to my loving husband, Mr Dominic Nhire and my three children Kayla, Ethan and Kyle for their unwavering support throughout my studies.

ACKNOWLEDGEMENTS

I would like to take this opportunity to express my sincere gratitude to the Almighty God for enabling this research to take its toll up to the end successfully. Many thanks to my supervisor, Dr Musemwa from BUSE for continuously guiding, encouraging and supporting me throughout the course of this research. I would also like to thank him for the prompt feedback that he always rendered. I would also like to thank all the lecturers in the Faculty of Agriculture and Environmental Science for their support and teachings during the entire studies.

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ABSTRACT

Recently, there has been a global interest in the consumption of naturally produced foods. Due to consumers become more informed and with new research and discoveries in various studies, consumers have been made aware of how their diets and lifestyle have an impact on their health. Previous studies have shown some of the differences in organic and non-organic foods. This study explored the consumer preferences, perception and willingness to pay for agro ecologically and conventionally produced green leafy vegetables. An online survey was conducted through the use of Google Forms which were sent to the selected respondents. Survey method research design was used and random sampling was done in selection of respondents. The findings of this research show that consumers prefer agro ecologically produced green leafy vegetables than conventionally produced green leafy vegetables. Results also revealed that the majority of consumers (98.3%) perceive agro ecologically produced green leafy vegetables as health and safer for the environment than conventionally produced green leafy vegetables. The most preferred green leafy vegetable in this research was rape and consumers preferred to mix it with meat. Results from this research also revealed that the majority (68.6%) of the consumers are willing to pay more for agro ecologically produced green leafy vegetables. Consumers were willing to pay US\$2.00 for agro ecologically produced vegetables (10.7% of the respondents) and also US\$1.00 for agro ecologically produced vegetables (76.4% of the respondents). However, results showed that majority of consumers were only willing to pay US\$0.20 for conventionally produced vegetables (48.2% of the respondents whilst 42.9% of the respondents were willing to pay US\$0.50, only 8.9% of the respondents were even willing to pay US\$1.00 for a bundle of conventionally produced vegetables. This shows a significant variation in prices that consumers are willing to pay for conventionally and agro ecological produced leaf vegetables. One of the major constraints revealed in this study was that the prices of organic vegetables are usually premium thereby only enabling consumers to purchase them once in a while due to financial constraints. It is therefore recommended and concluded that more still needs to be done in order to facilitate an increase in organic vegetable production using cost effective methods such that prices will not be too much and at the same time producers still manage to realise profits in their business.

...
KEYWORDS: Awareness, Consumer preferences, Consumer perceptions, Organic vegetables, conventionally produced vegetables

LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-------|--|
| BUSE | Bindura University of Science Education |
| EU | European Union |
| SPSS | Statistical Package for Social Sciences |
| US\$ | United States Dollars |
| ZOPPA | Zimbabwe Organic Producers and Promoters Association |

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Over the past centuries, there has been a tremendous drive towards improving agricultural production so as to alleviate hunger and provide adequate food for the growing population. Many technologies such as the Green Revolution were developed and implemented successfully in order to alleviate hunger. According to John and Babu (2021), despite such advances in food production, many problems arose with the use of conventional farming methods such as the use of synthetic pesticides, herbicides and heavy tillage of land which resulted in land degradation. Practices such as mono-cropping became the order of the day as farmers were concerned with producing high yields (Frison et. al 2005). This posed various health problems and allergies to consumers. Over the years, trends in consumer behaviour show consumers do not worry a lot about the size or quantity of vegetables but rather are shifting their focus to the manner in which the vegetables were produced. Figure 1 outlines some of the important factors that drive consumers towards organic vegetables.

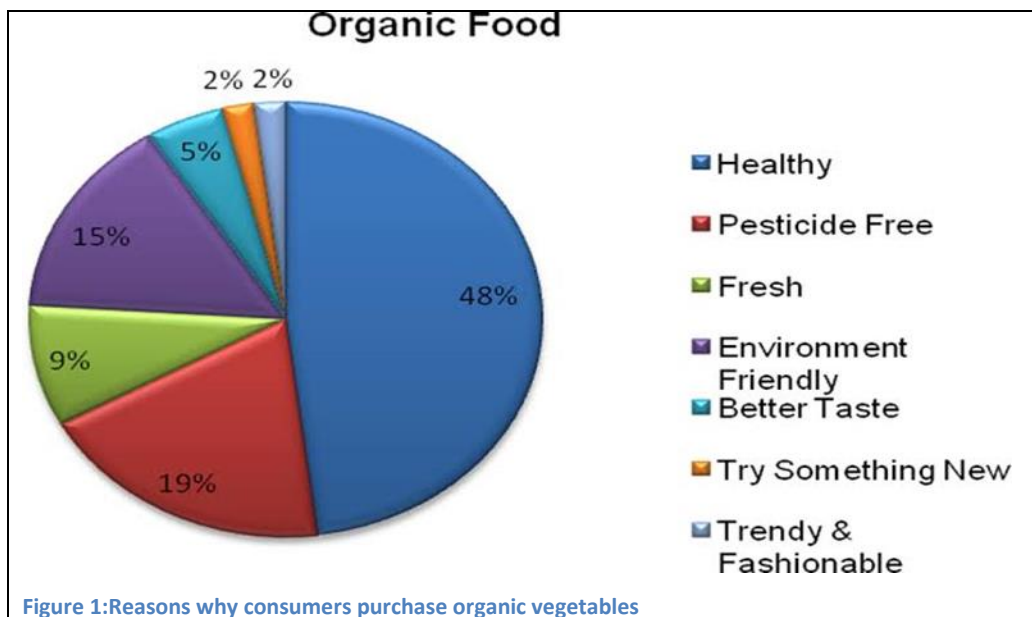


Figure 1: Reasons why consumers purchase organic vegetables

Source: (Gundala and Singh, 2021)

Organic foods now seem to be the number one super food both locally and internationally. In this study, the researcher seeks to determine the consumer preferences between agro ecologically produced green

...
vegetables versus conventionally produced green vegetables. There are several agro ecological methods which can be used in the production of green vegetables organically.

It is worthwhile to also note the benefits of the use of agro ecological farming systems such as good soil management practices like crop rotation which rotates plants away from diseases. Farmers are able to restore nutrients back into the soil through use of compost manure and this is beneficial in balancing soil pH which will cause an increase in yields, thus making the production of green vegetables more profitable for the farmers. According to Elwell (1999), the soil organic matter content and the associated microorganisms in Zimbabwe's soils have experienced a dramatic decline resulting from years of intensive conventional farming practices such as the continuous use of fertilizers and ploughing. This has resulted in poor quality produce and hence there must be a way to restore the soil chemical structure and improve soil fertility in order to improve the quality of produce that will come from the particular soil. In this manner, farmers will then be able to guarantee customer satisfaction whilst improving the overall well-being of the consumers which culminates into a healthier nation in overall.

Climate change is fast becoming one of the global pandemic as rainfall patterns become erratic with extreme weather conditions ranging from heavy flooding to extremely hot temperatures. This poses a threat to food security as farmers may not be able to mitigate such adverse effects of climate change. The production of green leafy vegetables and other crops agro ecologically results in the production of more resilient crops such that food security is not compromised. According to the EU (2007), it was noted that organic vegetables have the ability to help increase the nutrient intake of people who do not have access to five portions a day of fruits and vegetables and this could be of significance in building the physical and mental resilience of the nation. This makes it imperative that agro ecological production systems be fostered for the benefit of the whole country particularly in some poverty stricken rural communities who heavily rely on subsistence farming.

1.2 STATEMENT OF THE PROBLEM

Agro ecologically produced products are on the rise due to factors such as improved brand image, quality and economic performance in the agricultural market (Cote et. al., 2020). Many farmers are shifting back to these practices and in Zimbabwe, the government has put in place many projects to educate farmers on the need to efficiently utilize agro ecological practices (Masevere and Dzawanda, 2022). Much effort has been put by many scholars and researchers on the extent of use of these agro ecological practices but not much has been done to find out from the consumer's side, as to determine what the end user preferences are.

There is very little literature which mentions consumer preferences when it comes to conventionally produced and agro ecologically produced green vegetables. This study aims to find out the preferences of consumers in order to be able to give feedback to the farmers so that they know their consumer preferences which will enable them to produce green vegetables in the manner which is preferred by consumers and end- users as this will boost their profits since their products will be preferred within the market. In some cases, it may be noted that the yield obtained from conventional production methods is no different from that which was agro ecologically produced (Gloanec et al., 2016). This would then save farmers from the trouble and hard work which is needed in conventional agriculture whilst they will be able to guarantee customer satisfaction whilst incurring minimum costs possible and this makes agro ecological farming systems more profitable for the farmers. Moreover, the use of synthetic chemicals is hazardous to the environment as it affects the biodiversity within an ecosystem and does more harm to the environment. The chemical residues from the excessive use of pesticides and herbicides results in pollution of water bodies which results in the death of aquatic animals and consequently, the balance in biodiversity is compromised. According to Tilman et. al. (2002), the excessive use of fertilizers increase nitrates level and this result in an increase in eutrophication in rivers which consequently affect animals. The increase in nitrate levels in the atmosphere also results in climate change since this a greenhouse gas which facilitates global warming resulting in the rise in sea levels and thus, leading to climate change whereby there are erratic rainfall patterns which may be violent as well as extremely higher temperatures which result in the death of crops and animals due to severe heat.

1.3 RESEARCH QUESTIONS

1. What are the consumer preferences between agro ecologically and conventionally produced green leafy vegetables in Zimbabwe?
2. What are the consumer perceptions on agro ecologically and conventionally produced green leafy vegetables

Does the willingness to pay for agro ecologically and conventionally produced green leafy vegetables vary significantly in Zimbabwe?

1.4 OBJECTIVES OF THE STUDY

1.4.1 MAIN AIM OF THE STUDY

To determine consumer preferences, perceptions and willingness to pay for agro ecology and conventionally produced green leafy vegetables in Zimbabwe

1.4.2 SPECIFIC OBJECTIVES

1. To determine consumer preferences on agro ecology and conventionally produced green leafy vegetables in Zimbabwe.
2. To determine consumer perceptions on agro ecology and conventionally produced green leafy vegetables in Zimbabwe.
3. To determine whether willingness to pay for agro ecology and conventionally produced green leafy vegetables significantly vary in Zimbabwe.

1.5 HYPOTHESES

1. Consumers in Zimbabwe are willing to pay more for agro ecologically produced vegetables than conventionally produced vegetables.

1.6 SIGNIFICANCE OF THE STUDY

According to Fonarellas et al. (2020), urbanization and cultural patterns are changing people's dietary habits and food perception. Effort and study has been done towards finding the best practices for agro ecological production of vegetables to maximize yield and profit but many times, the end user is rarely consulted. The study shall give more insight as to what consumers prefer and also their thoughts on produced vegetables. As a result farmers producing green vegetables will be having a clear idea of what the consumer expectations are and when their production is aligned to consumer preferences, then they can guarantee customer satisfaction and significantly increase their profits in the business. This study shall also add to the existing body of knowledge on agroecology which is significant in the face of climate change where there is little rainfall where farmers still have to find a sustainable means of production so that they can provide nutritionally dense food for the growing population.

1.7 SCOPE/LIMITATION AND DELIMITATION OF THE STUDY

Consumer preferences vary when it comes to what they are willing to buy with their money and whether or not it brings value into their lives. Recently, there has been an interest in organic farming due to the drive by the government through initiatives such as Pfumvudza which seek to minimise environmental degradation due to poor agricultural practices. This research will seek to find out consumer preferences and willingness to pay more for organically produced vegetables as compared to the conventionally produced vegetables. The research aims to engage with various age groups within the population so as to get unbiased results so as to get a clearer picture as to what consumers prefer. However, some limitations may exist such as access to research material by the target population due to national problems such as power outages whereas the research survey is intended to be done using google forms.

1.8 ^{...}Outline of thesis

The rest of the chapters are outlined as follows:

Chapter two critically reviews the relevant literature on consumer preferences, perceptions and willingness to pay for agro ecologically produced green vegetables. This chapter also gives the conceptual framework for this study.

Chapter three gives an insight of the study area. It also describes the research design used, sampling technique that was applied as well as how the sample size was determined. The data analysis methods used were clearly explained.

Chapter four presents an analysis of the consumer preferences, perceptions and willingness to pay for agro ecologically produced vegetables.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Consumer purchasing trends reveal that there has been an increase in purchasing of organically produced vegetables when compared to the conventionally produced vegetables. There has been a rapid global rise in organic farming in a bid to meet the rising demand for organic produce particularly by younger generation (Leong et. al., 2022). Organically produced leafy vegetables are perceived to be healthier and more nutritious than conventional leafy vegetables. Given the growing interest in organic produce, it is imperative to review the existing literature on organic vegetables in order to determine to what extent are consumer expectations met (Magkos et. al., 2003).

2.2 1 Nutritional status of organic vegetables versus conventional vegetables

There is not much literature which gives conclusive evidence with regards to nutritional status of organic vegetables versus their counterpart, the conventionally produced vegetables. Despite this, few studies reveal a few significant differences between the two. The concentration of several micronutrients such as vitamins, minerals and trace elements with organically produced vegetables having a higher quantity of nutrients than conventionally produced vegetables. Makgos et. al also highlights the significant difference in the quantity of ascorbic acid which is higher in organically produced leafy vegetables than in the conventionally produced leafy vegetables.

Table 1 Nutritional comparison between organic and non-organic vegetables

ORGANIC VS CONVENTIONAL

| Minerals (in milliequivalents) | | | | | | | |
|--|---------|-----------|-----------|--------|-----------|--------|--------|
| Vegetables Type of Soil Management | Calcium | Magnesium | Potassium | Sodium | Manganese | Iron | Copper |
| Snap Beans | | | | | | | |
| Organic | 40.5 | 60.0 | 99.7 | 8.6 | 60.0 | 227.0 | 69.0 |
| Conventional | 15.5 | 14.8 | 29.1 | 0.0 | 2.0 | 10.0 | 3.0 |
| Cabbage | | | | | | | |
| Organic | 60.0 | 43.6 | 148.3 | 20.4 | 13.0 | 94.0 | 48.0 |
| Conventional | 17.5 | 15.6 | 53.7 | 0.8 | 2.0 | 20.0 | 0.4 |
| Lettuce | | | | | | | |
| Organic | 71.0 | 49.3 | 176.5 | 12.2 | 169.0 | 516.0 | 60.0 |
| Conventional | 16.0 | 13.1 | 53.7 | 0.0 | 1.0 | 1.0 | 3.0 |
| Tomatoes | | | | | | | |
| Organic | 23.0 | 59.2 | 148.3 | 6.5 | 68.0 | 1936.0 | 53.0 |
| Conventional | 4.5 | 4.5 | 58.6 | 0.0 | 1.0 | 1.0 | 0.0 |
| Spinach | | | | | | | |
| Organic | 96.0 | 293.9 | 257.0 | 69.5 | 117.0 | 1584.0 | 0.0 |
| Conventional | 47.5 | 46.9 | 84.0 | 0.8 | 1.0 | 19.0 | 0.5 |

Research conducted by Firman E. Bear at Rutgers University in the Natural Gardener's Catalog (1995)

Source: (Lance J. 2012)

2.2.2 Sensory quality of organic versus conventionally produced vegetables

Studies conducted in the previous years reveal that in as much as the use of fertilisers, pesticides and other chemicals enhanced sensory qualities such as texture, taste, flavour, crispiness and firmness, these attributes were found to be more enhanced in organically produced vegetables (Stolz et. al 2010). According to Rahman et al. (2021), the shelf life of organic vegetables was found to be extended than that of conventionally produced vegetables.

2.2.3 Consumer preferences, health issues and environmental awareness

Global trends reveal a significant shift in consumer preferences when it comes to organic and inorganic food production. Consumers are becoming more aware and alert in terms of what they consume, how it was produced and where it was produced (Steingoltz et. al., 2018). It is worthwhile to note the eagerness and desire that consumers have to know about primary production and processing of the food that they consume (Komatsuzaki, 2011). In Zimbabwe, there is an increased interest in organic vegetables because of the increasingly informed and educated population together with the growth of the middle class. The conventional methods of farming have proved to have adverse effects on the environment such as land degradation, depleted soil nutrient content and also a reduction in the number of soil microbes on the surface of the soil profile. Other problems which have arose due to conventional farming methods also include leaching of nutrients in the soil.

Due to the intensive manner of production in conventional farming, pests have become resistant to pesticides. Farmers rely heavily on growth regulators, pesticides and herbicides in order for them to realise higher yields and these exert adverse effects on human health such as genotoxic, neuro destructive, endocrine, allergic and carcinogenic effects (Huber et. al., 2011). Figure 2 outlines some of the major differences between organic and conventional vegetable production. According to Rahman et. al (2021, despite the higher yield in conventional production, the costs of production are significantly higher than in organic production as shown in Figure 2. It also shows that there are more benefits in organic than conventional farming.

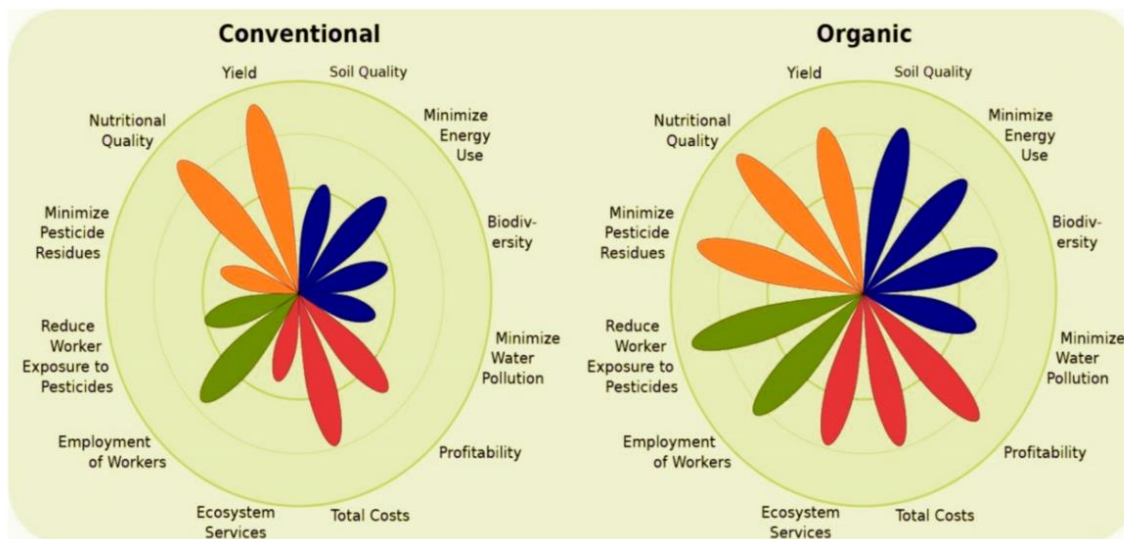


Figure 2: Differences between organic and conventional vegetable production

Source: Rahman et. al. (2021)

2.2.4 Consumer willingness to pay more for organic vegetables

Due to the numerous perceived benefits of the consumption of organic vegetables than that of conventionally produced, previous studies reveal that consumers are willing to pay more for organic produce. Gumber and Rana (2017) define willingness to pay as the amount of money an individual is willing to sacrifice in order to acquire a service or product. According to Eco Child's Play (2012), studies by the Institute of Food Technology at Rutgers University revealed that consumers are willing to pay 10% to 40% more on organic vegetables in avoidance of chemical residues and genetically modified foods. This however, is dependent on the amount of income that a household has, those who have high income are able to purchase organic produce whilst low income households fail to do so even though they might be willing to purchase due to financial constraints.

2.2.5 Organic farming as a sustainable practice

In order to reduce the adverse effects of conventional farming, the establishment of sustainable farming practices such as organic farming have to be used. Instead of the use of synthetic inputs, organic farming systems uses cover crops, compost and animal manure to build up soil fertility and these practices produce good yields with minimum effects on the environment. This enhances rural vitality, health risk reduction, employment opportunities and ecotourism particularly in developing countries such as Zimbabwe where the majority of the economy is agriculture based and farming being the major source of income particularly in the rural communities. According to Chausali and Saxena (2021), organically produced vegetables have high quality protein as compared to conventionally produced green leafy vegetables. Such practices also reduce risk

of consumption of residues of synthetic fertilisers and pesticides as is usually the case with conventionally produced vegetables.

2.3 Conceptual framework

The conceptual framework to be used in this study is as shown below in (Figure 3). It lays out the factors which consumers will consider when purchasing green leafy vegetables and also the factors which drive them away from use or consumption of conventionally produced vegetables.



Figure 3: Conceptual Framework on factors affecting consumer preferences, perceptions and willingness to pay for organic vegetables

Source: Aryal et.al (2009)

2.4 Summary of Literature Review

A study of consumer preferences, perceptions and willingness to pay for organic vegetables is of paramount importance in determining the availability of the right products which are on demand so that farmers are able to make profits. Whilst farmers may focus on intense production of vegetables, it is imperative to understand the behaviour and preferences of consumers so that their needs may be met. Climate change is a global matter wreaking havoc in all agricultural systems so it important to find means of vegetable production which minimise negative impacts on the environment so as to ensure sustainability vegetable production.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 introduction

This chapter focuses on the research methodology that was taken into consideration and found appropriate for this research in order to analyse consumer preferences, perceptions and willingness to pay for organic vegetables. In this chapter, the research design, target population, sampling procedures, sample size and data analysis will be discussed.

3.2 BRIEF DESCRIPTION OF STUDY AREAS

The research was conducted in Zimbabwe. Zimbabwe (Figure 4) is one of the landlocked countries found in Southern Africa. The capital of Zimbabwe is Harare and the country has 10 provinces namely Manicaland, Matebeleland North, Matebeleland South, Midlands, Masvingo, Mashonaland East, Mashonaland West, Mashonaland Central, Harare and Bulawayo. In 2022, the country held a national census and according to the findings of ZIMSTAT (2022), the country's population was estimated to be approximately 15million. The country has an agriculture based economy and maize is a staple food together with other cereals. According to ZIMSTAT (2019), many of the farming activities that take place in Zimbabwe occur at household level or subsistence farming and this is whereby household members are heavily involved in much of the farming activities as a labour force. Vegetable production at household level is one of the prevalent activities across the country. The different parts of the country receive different rainfall quantities with other provinces receiving more rainfall than others, for example Manicaland receives more rain than Matebeleland (Bradley et.al. 2023).



Figure 4: Map of Zimbabwe

Source: (ZIMSTAT 2022)

3.3 RESEARCH DESIGN

In this survey research, cross sectional research design was used since it enables the researcher to analyse effectively the factors affecting consumer preferences, perceptions and willingness to pay for organic vegetables. According to Check et al., (2012), a survey research is the collection of information from a sample of individuals through their responses to questions. Cross sectional survey method was used to collect data. Quantitative and qualitative research strategies were implanted in collecting data from respondents. This enabled the researcher to explore human behaviour and these are frequently used in social and psychological research (Singleton and Straits 2009).

3.4 SAMPLING PROCEDURE

The researcher used random sampling method to draw up a sample of respondents from the population in Bindura town. According to Creswell (2005), the sample size needs to large enough for statistical procedures to be applied so that the results which will be acquired are representative of the whole population and also reduce sampling error. It is critical that the population was representative of the whole population so random sampling reduces bias so that accuracy of results may be ensured since it is impossible to conduct the survey across the entire population in Bindura. Survey monkey was used to calculate the sample size at 95% confidence interval and 5% margin of error.

Sampling formula used:

$$n = N \div (1 + Ne^2)$$

Where:

$n = \dots$
 $n =$ Sample size

$N =$ Population size

$e^2 =$ degree of precision (Squared)

$$n = 50\,400 \div (1 + (50\,400 * 0.05 * 0.05))$$
$$= 396 \text{ respondents}$$

3.5 DATA COLLECTION PROCEDURE

Primary data was collected from the study population in Zimbabwe data reported that the population is around 16.49 million (City Population 2022). Due to time constraints and scarcity of resources, it is impossible to cover the whole country of Zimbabwe hence purposive sampling was used to draw a representation of the whole population with little or no bias. According to SSC (2001), purposive sampling enables equal representation of the target population. Data collection was done through the use of a survey that was conducted through the use of Google forms. Respondents who were responsible for food preparation and purchasing within households were selected from the researcher's contact list and through references with fellow classmates. Respondents received these forms electronically via platforms such as WhatsApp and email so that they can complete them. After completion of the forms, respondents were able to submit their responses which the researcher was able to access remotely. Unfortunately, the questionnaire was available in English because of the demographics of the target population which is assumed to have a certain level of English proficiency and a significantly higher level of literacy. Regardless of this, the researcher has structured the questions in a simple and straightforward manner which will not be a problem for the target respondents to comprehend. In some of the questions, the respondents were requested to rank sets of options. This enabled the researcher to find out exactly the consumer preferences as it was one of the objectives of the study.

3.6 DATA ANALYSIS PROCEDURE

Data analysis was done using Statistical Product and Service Solution (SPSS). Descriptive statistics such as measures of central tendency (mean, median and mode) were done so as to comprehend consumer preferences, perceptions and willingness to pay for agro ecologically produced vegetables. Measures of dispersion were used so as to capture variability within the sample. According to Kaur (2018), these assisted the researcher to find out any similarities and differences in consumer preferences, perceptions and willingness to pay for agro ecologically produced vegetables.

Determining Consumer Preferences on Agro ecological Produced Green Leafy Vegetables and Conventionally Produced Green Leafy Vegetables

After data collection was done through Google Forms, SPSS software was used to analyse the data. In this research objective, the researcher captured frequencies (N) and percentages in order to find out consumer preferences on Agro ecological produced green leafy vegetables and conventionally produced vegetables. Some of this data was presented in graphical form.

Determining Consumer Perception on Agro ecological Produced green Leafy Vegetables and Conventionally Produced Vegetables

The researcher analysed data collected using SPSS software .Frequencies and Percentages were used to establish consumer perception on agro ecological produced green leafy vegetables and conventionally produced green leafy vegetables.

Determining Consumer Willingness to Pay for Agro ecological Produced Green Leafy Vegetables and Conventionally Produced Green Leafy Vegetables

In this research objective, the researcher analysed the collected data using SPSS software. Frequencies and percentages were used in establishing the willingness of consumers to pay for agro ecological produced vegetables and conventionally produced green leafy vegetables. Some of this data was presented graphically.

3.7 ETHICAL CONSIDERATIONS

During the course of the study, researchers developed relationships with the people with whom they interacted (respondents) and so it was critical that there exist mutual trust and respect between them. The researcher maintained good work ethics and professionalism. The researcher was guided by ethical principles which included informed consent as well as anonymity and confidentiality. The researcher requested for permission and consent from respondents to ensure that they could participate freely and willing fully.

The researcher introduced herself to the respondents and outlined clearly the goals of this study. Respondents were informed on how they were selected from within a huge population. The researcher ensured confidentiality of the respondents by making sure that all the information they have submitted will not be presented or shared with anyone who was not part of the study, if need be, the researcher has to use passwords to protect and safeguard the respondents' information in their computer. The researcher ensured and politely clarified the fact that no incentives would be given to the respondents so that the respondents would not expect any form of remuneration after this study as it was solely for the purpose of the researcher's academic studies.

3.8 Summary ...

This chapter has outlined how the researcher conducted the research. Data collection methods and data analysis methods were also outlined. The researcher also mentioned some of the challenges faced during data collection such as the scarcity of data for the respondents to be able to respond since the forms were sent electronically.

RESULTS

Consumer Preferences, Perceptions and Willingness to pay for agro ecologically produced green leafy vegetables.

ABSTRACT

The purpose of this study was to find out what consumers prefer and consider when they are making purchases for green leafy vegetables. This study also delved into different types of green leafy vegetables that at the disposal of consumers, taking into consideration whether they were produced conventionally or agro ecologically. It also looked into how much the consumers would be willing to pay for the green leafy vegetables. Quantitative research design was employed and random sampling was used in drawing up a sample of respondents from the target population.

Keywords: Willingness to pay, Organic, Conventional, Consumers, Nutrition

4.1 Introduction

This chapter presents and analyses data collected during the course of this study in order to find out the consumer preferences, perceptions and willingness to pay for agro ecologically produced green leafy vegetables. Results of this study were presented in this chapter and discussion of these results was done.

4.2 Materials and methods

The survey method was utilised to collect data regarding consumer preferences, perceptions and willingness to pay for agro ecologically produced green leafy vegetables. Survey method was used to obtain information from the consumers. Survey made use of questionnaires which were sent to the consumers electronically as Google Forms upon which, after completion, they would be able to submit their responses immediately.

4.2.1 Description of study area

This study was conducted in Zimbabwe. Details on description of the study area are outlined in chapter 3.

4.2.2 Research Design

The survey research design was used in this study. An electronic questionnaire was sent to respondents via email and other communication platforms such as WhatsApp. Details regarding the research design are given in Chapter 3.

4.2.3 Sampling procedure

Respondents were randomly selected from the target population, this process occurred from January 2023 to March 2023. Details regarding the sampling procedure are given in Chapter 3.

4.2.4 Data collection Procedure

During the research, the data collection procedure which was used was the administration of a pretested questionnaire which was completed by respondents remotely through the use of technologies such as email, WhatsApp and other lines of communication.

4.2.5 Data Collection Procedure

The researcher used descriptive statistics for data analysis in order to find out consumer preferences, perceptions and willingness to pay for agro ecologically produced green leafy vegetables. Other details regarding data collection procedure have been outlined in Chapter 3.

4.2.6 Challenges encountered during data collection

Some of the challenges incurred during this study include the fact that this research was administered remotely using an electronic questionnaire. This posed a challenge for both the researcher and the respondents as there was no face to face interaction hence respondents were not able to immediately ask questions or interact with the researcher as could have happened if it was a face to face survey.

In other cases, respondents completed the questionnaire in the manner they felt necessary and appropriate and not necessarily as the researcher would have preferred. Some respondents did not fully complete the questionnaire and were probably not free to give out information. One major challenge encountered in this research was the fact that respondents took longer to complete the questionnaire and submit their responses, this can be due to factors such as the unavailability of electricity due to load shedding in the country. Respondents' gadgets like phones and laptops were out of battery power for most of the times. Most participants had financial constraints which led to them not having mobile data bundles in order for them to access the Google Forms in order for them to participate in the survey. The researcher had to use more finances than what was budgeted for in order to purchase data bundles for respondents to be able to go online and access the Google Forms, in other instances, the researcher had to do mobile hotspot so as to enable respondents to access the survey questionnaire.

4.3 Results and Discussion

4.3.1 Demographics of respondents

In this study, there were male and female participants who took part in the survey. According to Table 2 below, more females took part in the online survey than men with a percentage of 59.6% whilst male respondents were at 40.4%. It is worthwhile to note the significant difference between male and female numbers because women have always been primarily responsible for purchasing food and food preparation. According to Crane et.al (2018), women are known as the nutritional gatekeepers of the home. All the respondents were of different age groups ranging from 18years to 62 years.

Table 2: Demographics and socio-economic status of respondents

| VARIABLE | OPTIONS | NUMBER | PROPORTION (%) |
|--------------------------|-------------------|--------|----------------|
| GENDER | MALE | 139 | 40.4 |
| | Female | 205 | 59.6 |
| MARITAL STATUS | Cohabiting | 9 | 4.5 |
| | Divorced | 13 | 6.5 |
| | Married | 74 | 37 |
| | Single | 104 | 52 |
| EDUCATIONAL LEVEL | Masters/Doctorate | 73 | 26.4 |
| | Bachelors | 114 | 41.2 |
| | Diploma | 50 | 18 |
| | Secondary | 38 | 13.7 |
| | Primary | 2 | 0.7 |
| EMPLOYMENT STATUS | Professional | 203 | 59 |
| | Self employed | 64 | 18.6 |
| | Semi-skilled | 26 | 7.6 |
| | Unemployed | 18 | 5.2 |
| | Unskilled | 33 | 9.6 |

Table 2 shows the different marital statuses of the respondents, who took part in the survey. Over half of the respondents (52%) were single and 37% were married whilst 6.5% were divorced and 4.5% cohabiting. These figures are significant because, to some extent the marital status of a person determines the type of food that they prefer. Previous studies (Moumtapa and Wallace, 2017) have revealed that married individuals tend to be more healthier choices when it comes to food than unmarried counterparts.

The information obtained from the respondents played an important role in getting a clearer view and perspective of consumer preferences, perceptions and willingness to pay for agro ecologically produced green leafy vegetables. Previous studies have revealed the growing interest in organic foods as consumers are getting more knowledge on the importance of eating healthy and exercising to avoid lifestyle diseases such as hypertension, cancer, stroke, diabetes and many others. According to Balwan and Kour (2021), choosing healthier diets and avoiding chemical residues in foods such as conventional foods have a significant effect

...
on the reduction of lifestyle diseases.

The educational levels exhibited in Table 2 suggest that the respondents were mostly those who have a Bachelor's degree, 114 respondents had Bachelor's degrees whilst 73 had a Master's Degree or a Doctorate, the other respondents had either secondary school education or a Diploma hence the majority of the respondents were having some skills to a certain extent as 59% of the respondents were recorded as professionals, under their employment status as shown in Table 2. This knowledge is essential in building knowledge about consumer perceptions and preferences and how they view the agro ecological production of green leafy vegetables as compared to conventional production of green leafy vegetables.

Puska (2018) stated that consumer behaviour, particularly, willingness to buy heavily relies on their employment status and based on the table above, the willingness of respondents to purchase organic green leafy vegetables can be established.

4.3.2 Consumer Preferences on agro ecologically produced green leafy vegetables and conventionally produced green leafy vegetables

There are a number of various green leafy vegetables and these belong to the Brassica oleracea family. According to Muyambo (2023), green leafy vegetables, commonly known as “muriwo” in Zimbabwe have always been served with a starchy meal called sadza. Previous research had focused much on indigenous leafy vegetables such as pumpkin leaves (muboora). In this study, the researcher listed six of the most commonly utilised vegetables in Zimbabwe namely covo, rape, chembere dzagumhana, tsunga, lettuce and cabbage.

Results in Table 3 show the most preferred green leafy vegetables by the respondents who participated in the online survey. Despite the disparity in consumer preferences, these green leafy vegetables contain folate, iron and many other nutrients.

Table 3: Consumer preferences of green leafy vegetables

| VEGETABLE TYPE | FREQUENCY (N) | % |
|----------------------------|----------------------|----------|
| Covo | 61 | 17.7 |
| Rape | 152 | 44.2 |
| Tsunga | 56 | 16.3 |
| Chembere dzagumhana | 11 | 3.2 |
| Cabbage | 4 | 1.2 |
| Lettuce | 17 | 4.9 |

Results show that the most preferred green leafy vegetable is Rape which had a frequency of 44.2%. This was followed by Covo which had a frequency of 17.7% and Tsunga which a frequency of 16.3%. This was then followed by Lettuce which had a frequency of 4.9%. Another popular green leafy vegetable was chembere dzagumhana and it had a frequency of 3.2%. The least preferred green leafy vegetable according to the analysis done was cabbage which had a frequency of 1.2%.

Table 4: Consumer preferences regarding vegetable production

| METHOD OF PRODUCTION | FREQUENCY (N) | % |
|---|----------------------|----------|
| Agro ecologically, with no use of synthetic fertilizers, herbicides and pesticides | 326 | 94.8 |
| Conventionally, with the use of synthetic fertilizers, herbicides and pesticides | 8 | 2.3 |
| Any way the farmer or producer does | 10 | 2.9 |

Table 4 shows how consumers prefer their green leafy vegetables to be produced. The majority (94.8%) of the respondents prefer their green leafy vegetables to be produced organically with no use of synthetic chemicals such as herbicides or fertilizers. This is because these are good for their health as no chemical residues may be found on their vegetables, it also ensures the naturalness of food. Only 2.3% mentioned their preference for conventional green leafy vegetables, whilst 2.9% of the respondents stated that they can have their green leafy vegetables being produced any way that the farmer wants.

Results in Table 5 show that the most preferred method of vegetable preparation is frying and it has 57.8% of the respondents mentioning this. Considering the soft texture of the most preferred vegetable which is rape (Figure 5), frying is the easiest and quickest method to prepare rape whilst being able to bring out all the flavours in the vegetables without losing their nutritional value.

Table 5: Cooking method frequently used in preparing green leafy vegetables

| Cooking method | Frequency (N) | % |
|----------------|---------------|------|
| Baked | 45 | 13.1 |
| Boiled | 19 | 5.5 |
| Fried | 199 | 57.8 |
| Pickled | 1 | 0.3 |
| Raw | 1 | 0.3 |
| Sautéed | 61 | 17.7 |
| Steamed | 18 | 5.2 |



Figure 5: Rape

The least preferred added ingredient is margarine which has a frequency of 0.3%. From Table 6 it is evident that the most preferred added ingredient is meat with a frequency of 37.8% which is then followed by tomatoes and onions (15.4% and 13.1%). This is usually one of the popular delicacies in Zimbabwe and other African countries and it is usually served with a starchy food called sadza that is made from maize meal (Masiwa, 2017).

Table 6: Most preferred added ingredient when preparing green leafy vegetables

| INGREDIENT | FREQUENCY (N) | % |
|----------------|---------------|------|
| Tomatoes | 53 | 15.4 |
| Onions | 45 | 13.1 |
| Meat | 130 | 37.8 |
| Cheese | 36 | 10.5 |
| Potatoes | 16 | 4.7 |
| Powdered Soups | 5 | 1.5 |
| Peanut butter | 2 | 0.6 |
| Cooking oil | 2 | 0.6 |
| Margarine | 1 | 0.3 |
| Water | 5 | 1.5 |
| Plain | 3 | 0.9 |
| Missing* | 46 | 13.4 |

Figure 6 below shows two different presentations of green leafy vegetables with meat and such is a way of life for most of consumers in the country at large.



Figure 6: Sadza and green leafy vegetables mixed with meat

4.3.3 Consumer perceptions on agro ecologically produced green leafy vegetables and conventionally produced green leafy vegetables.

Only 48.8% are involved in farming, whether it is part time or full time. Despite not being involved in farming, the respondents exhibited knowledge of farming systems, particularly organic vegetable production. Farmers perceive organic vegetable farming as better than conventional vegetable production. The majority (98.9%) of the study participants rated organic vegetables as tastier than conventionally produced green leafy vegetables.

Table 7 shows that more than half of the respondents were aware of agro ecological farming practices and this implies that are knowledgeable of agro ecological production. According to Meemken and Qaim (2018), organic farming is perceived as a sustainable farming method because it could reduce the negative externalities resulting from conventional farming.

Table 7: Awareness of agro ecological farming practices

| Level of awareness | FREQUENCY (N) | % |
|--------------------|---------------|------|
| Moderately aware | 188 | 54.7 |
| Not very aware | 2 | 0.6 |

| | | |
|------------|----|------|
| Very aware | 91 | 26.5 |
|------------|----|------|

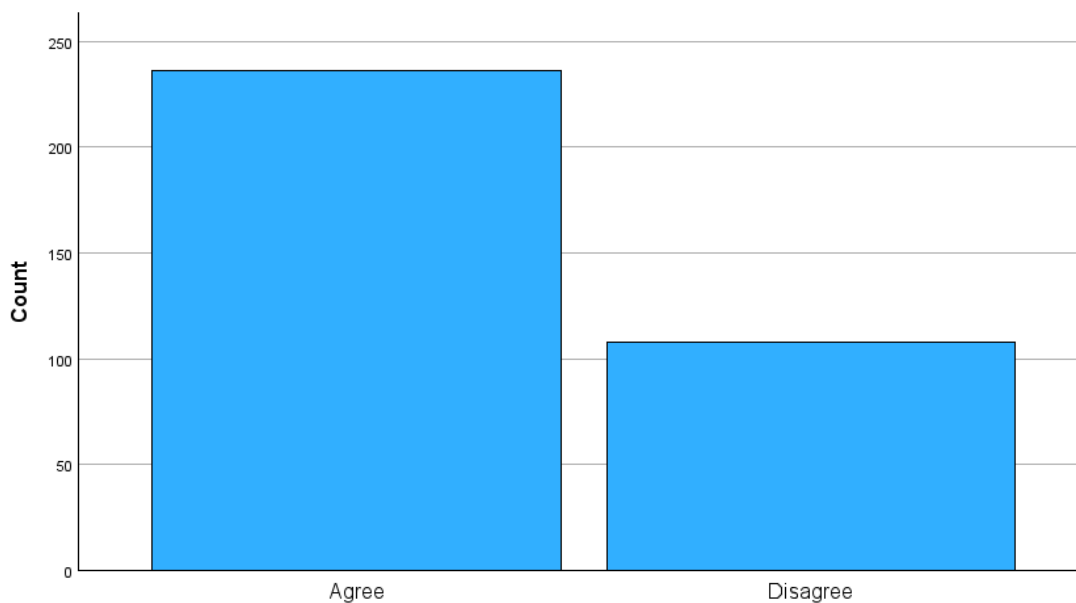
Results also revealed that consumers perceive organic green leafy vegetables as more nutritious and safe than conventionally produced green leafy vegetables as shown in the table below:

Table 8: Agro ecological /Organic leafy vegetables have more nutrition than conventionally produced vegetables

| | FREQUENCY (N) | % |
|-------------------|----------------------|----------|
| Agree | 282 | 82.0 |
| Disagree | 37 | 10.8 |
| Don't know | 25 | 7.3 |

This perception can be attributed to the fact that no chemicals are used to enhance flavour, size or appearance of the produce, they are always in their natural state. Hence 97.7% of the respondents mentioned that agro ecological farming is safer for the environment since biocontrol approaches are used in dealing with weeds and pests without chemical usage (Leong et. al., 2022).

4.3.4 Consumer willingness to pay for agro ecologically produced green leafy vegetables



20. Consumers should be willing to buy healthier green leafy vegetables despite the price

Figure 7: Willingness of consumers to buy healthier vegetables despite the price

...
 In this research, results show that the respondents believe and agree that consumers should purchase green leafy vegetables that are organic due to the fact that they are healthy and that consumers must not be mindful of the price. According to Figure 7, approximately 68.6% of the respondents agree to the notion that consumers must buy healthier green leafy vegetables despite the price. Previous studies have revealed that consumers are willing to pay for organic vegetables due to the health benefits but the majority of the consumers fail to purchase it often because of higher prices that are constantly attached to organic foods. According to Pawlewicz (2020), the price premium of organic vegetables is the major obstacle when it comes to purchasing of organic green leafy vegetables.

Consumers believe that organic vegetables are more expensive. 67.2% of the respondents agree that despite these vegetables being healthy, they are more expensive than conventional green leafy vegetables. Only 14 respondents (4.1%) viewed organic vegetable prices as the same as conventionally produced green leafy vegetables whilst 28.8% believed that the organic vegetables are not expensive. From the study, it was found out that consumers were willing to pay more for agro ecologically produced vegetables than for those produced conventionally. Table 9 shows that 76.4% of the respondents were willing to pay US\$1.00 for a bundle of organically produced green leafy vegetables, 10.7% of the respondents were willing to pay as much as US\$2.00 for agro ecologically produced vegetables. However, the case was not the same for

conventionally produced vegetables as only 8.9% of the respondents were willing to pay as much as US\$1.00 for a bundle of conventionally produced vegetables. Most of the respondents (48.2%) were willing to pay only US\$0.20 for a bundle of conventionally produced vegetables whilst 42.9% of the respondents were willing to pay US\$0.50 for a bundle of conventionally produced vegetables. This clearly shows that consumers are willing to pay more for organic vegetables despite the price even when it is higher than conventionally produced vegetables.

Table 9: Prices consumers are willing to pay for agro ecologically and conventionally produced vegetables

| Agro ecologically produced vegetables | | Conventionally produced vegetables | |
|--|------------------|---|------------------|
| Price consumers willing to pay | Frequency | Price consumers willing to pay | Frequency |
| US\$ 0.50 | 12.9% | US\$0.20 | 48.2% |
| US\$ 1.00 | 76.4% | US\$0.50 | 42.9% |
| US\$ 2.00 | 10.7% | US\$1.00 | 8.9% |
| | | | |

4.4 Recommendations

Results from this study reveal the preferences, perceptions and the willingness to pay by consumers. It is highly recommended that all the relevant stakeholders who are involved in organic vegetable production ensure the support of small scale producers through setting up additional infrastructure such as irrigation since vegetable production relies heavily on irrigation water. There is need for investment in solar pump technologies and tanks for water storage so as to ensure that the production of organic green leafy vegetables can be done efficiently and on large scale so as to meet the rising consumer demand. It is also imperative that the government through agricultural advisory services within the Ministry of Lands, Agriculture, Fisheries, Water and Rural Resettlement initiate campaign programs so as to educate rural communities on the benefits of agro ecological farming systems as these are very beneficial for the soil.

4.5 Conclusion

It can be concluded from the results of this research that organic green leafy vegetables are preferred more than conventionally produced green leafy vegetables. Consumers also perceive green leafy vegetables as healthier than the conventional green leafy vegetables which they deem as harmful to the environment due to the use of chemicals during the production process. Basing on the results of this study, it can be deduced that consumers are willing to pay for agro ecological green leafy vegetables even higher prices so that they can improve their health and improve lifestyle through making safer and healthier food choices.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives the summary, conclusions and recommendations of the study. The summary of the research study includes the problem which caused the researcher to look into the problem, the objectives, and the data analysis procedures together with the results which the researcher got. These results will then be used as a guide for conclusions, policy implementation and recommendations for further action. Areas of further study can also be drawn from the findings of this research.

5.2 Research Summary

The main objective for research was to find out consumer preferences and perceptions towards organic and non-organic green leafy vegetables. The first objective was to find out consumer preferences for agro ecologically produced green leafy vegetables and conventionally produced green leafy vegetables. The second objective was to find out consumer perceptions of agro ecologically produced green leafy vegetables and conventionally produced green leafy vegetables. The third objective was to determine consumers' willingness to pay for agro ecologically produced green leafy vegetables.

During this study, a survey research design was used. An online questionnaire was created using Google Forms and was administered electronically via communication channels like WhatsApp and Email. Respondents were randomly selected. Descriptive statistics such as percentages and frequencies were used in data analysis which was done using SPSS. There were significant variation in terms of willingness to pay for agro ecological produced green leafy vegetables and willingness to pay for conventionally produced green leafy vegetables.

Results in the study showed that consumers preferred agro ecologically produced green leafy vegetables as compared to conventionally produced vegetables. More females than males preferred agro ecologically produced green leafy vegetables. The most preferred type of vegetable was rape; *Brassica Oleracea rapa* and the most preferred cooking method was frying. Results obtained from study also revealed the most preferred added ingredients to rape were meat, followed by tomatoes and onions. Results also showed that respondents preferred fresh green leafy vegetables the most than frozen or dried vegetables.

Results also revealed that consumers perceived agro ecologically produced vegetables as healthier (with a frequency of 98%) than the conventionally produced green leafy vegetables which had a frequency of 1.1%.

From the results, it can also be drawn that consumers have more knowledge on agro ecologically produced green leafy vegetables and are aware that agro ecologically produced vegetables are produced without chemicals such as fertilizers and herbicides whereas in conventionally produced vegetables, these are heavily used to enhance productivity. Most respondents have the perception that agro ecologically produced green leafy vegetables have more nutrition content than conventionally produced green leafy vegetables respondents with a frequency of 82%.

Results also showed that consumers were willing to pay for agro ecologically produced vegetables. 64.5% of respondents were willing to pay US\$2 for a bundle of agro ecologically produced green leafy vegetables whereas they were not willing to pay not more than US\$1 for conventionally produced green leafy vegetables.

5.3 Conclusions

The study has given evidence that consumers prefer agro ecologically produced green leafy vegetables as compared to conventionally produced green leafy vegetables. Results revealed that some of the consumers are farmers full time whilst some are part time and this enables them to be able to produce their own organic green leafy vegetables for household consumption as well as for selling to consumers who are willing to pay for agro ecologically produced green leafy vegetables.

Consumers are nowadays more aware and critical to a greater extent, of what they buy for consumption as there is an increase in knowledge being passed around due to ongoing research studies such as this one. Based on the results obtained in this study, it can be concluded that consumers prefer fresh green leafy vegetables and prefer the easiest and quickest way of preparing them which is frying.

Evidence from the study also reveal that consumers are willing to pay even more for agro ecologically produced green leafy vegetables than they are willing to pay for conventionally produced green leafy vegetables. This is because of the perceived benefits of agro ecologically produced green leafy vegetables.

5.4 Policy Implication and recommendations

The government plays a very critical regulatory role in encouraging both producers in the private and public production sector to create a conducive competitive environment which will do away with harmful production practices such as the excessive use of chemicals in vegetable production. Women should also be equally empowered in production of organic green leafy vegetables, so it is recommended that the government empowers them with adequate resources for capital, infrastructure and inputs.

Based on the results of this research study, the following are policy implications and recommendations for policy makers:

- There is need for the government to assist organizations such as ZOPPA in order for increasing capacity and reach.
- Investments are required so as to incorporate more farmers as organic producers
- More organic certifying and inspection agents need to be recruited and thoroughly trained so that they will be able to work with organic farmers and equip them with relevant knowledge so that they will be able to meet market demand for organic produce.
- There is need to facilitate and foster farmer-buyer relations as this will assist the farmer to understand the consumer preferences and produce accordingly
- There is need for the establishment of more pack houses for effective organic vegetable production.
- The government should put in place a policy framework which makes organic certification easier, efficient and timely.
- There is need to incentivize farmers who produce vegetables in an environmentally friendly manner through setting higher market prices for such products.

5.5 Areas for Further Research

Participatory On-farm research and specific agricultural extension services are necessary in order to improve agro ecological vegetable production. There is a need to look further into the use of good soil management systems and cultivation systems that are less strenuous, tedious and costly for the producers. Further research can also be conducted with regards to improving the quality, ecological, technical and economic performance of organic vegetable production through breeding systems.

5.6 References

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5.7 Appendices

Appendix 1: Google Form

**SURVEY ON CONSUMER
PREFERENCES, PERCEPTIONS AND WILLINGNESS TO PAY FOR AGRO
ECOLOGICALLY PRODUCED GREEN LEAFY VEGETABLES**

This survey is being conducted by Jane Gumbo, a final year student at Bindura University of Science Education studying towards an MSc in Food Security and Sustainable Agriculture. The survey is aimed at finding out whether consumers prefer agro-ecologically produced green leafy vegetables or they prefer the vegetables produced conventionally with the use of synthetic fertilizers, pesticides and herbicides. In order to achieve this objective, you are kindly requested to respond to the questions in this questionnaire

* Indicates required question

SECTION A

Demographic information

SEX *

Mark only one oval.

Male

Female

AGE: In years *

...
MARITAL STATUS

Mark only one oval.

Married

Single

Divorced

Cohabiting

EDUCATIONAL LEVEL *

Mark only one oval.

Primary

Secondary

Diploma

Bachelors

Masters/ Doctorate

EMPLOYMENT STATUS *

Check all that apply.

Semi- skilled

Unskilled

Professional

Self- employed

Unemployed

Location *

Check all that apply.

Rural

Urban

Province *

Check all that apply.

- Manicaland
- Matebeleland North
- Matebeleland South
- Midlands
- Masvingo
- Mashonaland West
- Mashonaland East
- Mashonaland Central
- Harare
- Bulawayo

Are you a farmer? *

Check all that apply.

- Yes
- No

How much time do you spend in farming? *

Check all that apply.

- Full time
- Part time
- Not applicable

SECTION B

Consumer Preferences

for Agro ecologically produced green leafy vegetables

How often do you purchase green leafy vegetables on a weekly basis? *

Mark only one oval.

Daily

Once a week

Twice a week

Never

Other: _____

2. Which green leafy vegetables do you prefer the most? Rank in order of preference with one being the most preferred

Mark only one oval per row.

| | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Covo | | | | | | |
| Rape | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Tsungu | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Chemberre | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dzagumana | | | | | | |
| Cabbage | | | | | | |
| Lettttuce | | | | | | |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

3. What is the price you are willing to pay in United States dollars for a bundle of * the most preferred vegetable if it's produced organically?

*

...

4. What is the price you are willing to pay per bundle in United States dollars if it's produced conventionally?

5. Where do you buy your vegetables? Select with one being where you mostly buy the vegetables

Mark only one oval per row.

1 2 3 4

Farm gate

(local farms)

Vendors

Local vegetable markets

Retail outlets (e.. g spaza

shops,, supermarket)

6. Where do you get information about green leafy vegetables? Rank with one being where you mostly get the information

Mark only one oval per row.

1 2 3 4 5

Television

Radio Internet

Family/friends

Farmers/Producers

7. In your own view, which green leafy vegetables taste better? *

Mark only one oval.

Organic vegetables (Produced agro ecologically)

Non Organic (Produced conventionally with fertilizers and other chemicals)

8. How do you prefer your vegetables to be grown/produced? *

Check all that apply.

Agro ecologically, with no use of synthetic fertilizers, herbicides and pesticides

Conventionally, with the use of synthetic fertilizers, herbicides and pesticides

Any way the farmer/producer does

9. Which method of cooking vegetables do you prefer? Select with one being the most preferred.

Mark only one oval per row.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Boiled | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fried | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Baked | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Steamed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Sautéed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pickled | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Raw | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

10. Which of the above methods do you frequently use? Select one. *

Check all that apply.

- Boiled
- Fried
- Steamed
- Baked
- Sautéed
- Raw
- Pickled

11. What are your most preferred added ingredients when cooking vegetables? Rank with one being the most preferred

Mark only one oval per row.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Tomatoes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Onions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cheese | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Meat | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Potatoes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Powdered soups | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Peanut butter | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | | | | | | | | |
| Cooking oil | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Margarine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Water | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | | | | | | | | |

12. In what form do you prefer your vegetables? *

Check all that apply.

- Fresh
- Frozen
- Dried
- Powdered

13. Are these forms readily available when you need them? *

Check all that apply.

- Always available
- Moderately available
- Scarce (Rarely available)

SECTION C

Consumer perceptions on agro ecologically produced vegetables

14. How aware are you of agro ecological farming practices? **Check all that apply.*

- Not very aware
- Moderately aware
- Very aware

15. In your own view, do you think organic green leafy vegetables are very expensive or not? *

Check all that apply.

- Yes
- No
- Same as all other vegetables

16. In your own opinion, which are healthier? *

Check all that apply.

Organic/ Agro ecologically produced green leafy vegetables

Non organic/ Conventionally produced green leafy vegetables

17. Agro ecological/organic leafy vegetables are produced with no chemicals. Do *
you agree?

Mark only one oval.

Yes, I agree

No, I don't agree

18. Agro ecological/organic leafy vegetables have more nutrition than *
Conventionally produced vegetables

Mark only one oval.

Agree

Disagree

Don't know

19. Agro ecological farming practices are environmentally safe and friendly *

Mark only one oval.

Agree

Disagree

20. Consumers should be willing to buy healthier green leafy vegetables despite *
the price

Mark only one oval.

Agree

Disagree

21. What do you consider when purchasing vegetables? Rank in order of preference, with one
being the most considered.

Mark only one oval per row.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Tenderness | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Color | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Softness | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Crispiness | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Freshness | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Price | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Bitterness | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Availability | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Accessibility | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Smell | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Spots | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Packaging | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



THANK YOU!

