BINDURA UNIVERSITY OF SCIENCE EDUCATION

DEPARTMENT OF NATURAL RESOURCES

EDIBLE PLANT DIVERSITY IN WARD 5 LIONSDEN, MASHONALAND WEST PROVINCE, ZIMBABWE

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B202336B

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE BSc HONOURS DEGREE IN NATURAL RESOURCES MANAGEMENT

JUNE 2024

DECLARATION

The undersigned attest that they have reviewed and approved this research project for marking in accordance with the department's standards and regulations.

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DEDICATION

I dedicate this project to my lovely family for their unwavering support throughout the journey of writing this project. I also dedicate this work to Bindura University and my country as a whole.

ACKNOWLEDGEMENTS

I would like to sincerely thank Dr. L. Mujuru for her invaluable guidance, ongoing support, and patience throughout this project. I am also deeply grateful to my family and friends for their constant love and assistance during my studies. Above all I thank Almighty God for giving me the courage and determination as well as guidance in conducting this research project.

ABSTRACT

This study examined the diversity of edible plants, identifying cultivated and naturally occurring species and exploring the socio-economic factors affecting their cultivation. An assessment of the diversity of edible plants was done in Ward 5 of LionsDen in Zimbabwe. The study investigated edible plants cultivated or naturally occurring in the area and the socio-economic factors influencing their cultivation. The area was stratified into three zones, low, medium, and high-density areas. Data was collected from random streets. Edible plants identification was done and socio-economic factors in influencing cultivation of edible plants were determined. The Shannon Weiner diversity index and evenness metrics were used to assess plant diversity, complimented by ANOVA for spatial comparisons and Chi-square tests for socio-economic influences. Results showed a total of 22 edible plant species, with low-density (18.5%) having lower number than medium-density (32.4%), and high-density (49.1%) residential areas. There was widespread plant distribution with notable local variations influenced significantly by issues of food security (16.8%) and resource accessibility (15.7%). Low-density areas (2000 square metres) cultivated fruit trees such as *Mangifera indica* and *Carica papaya* due to the space-intensive growth requirements and potentially larger yard sizes available. In medium-density zones (800 square meters), *Mangifera indica* was more abundant due to their nutritional value and adaptability to smaller garden spaces. High-density (about 400 square meters) favoured *Alium cepa*, reflecting efficient use of limited space and cultural preferences. Different residential densities had different plant selections driven by space availability, cultural traditions, and practical gardening issues. The findings highlighted the complex interplay of socio-economic factors in urban agriculture, suggesting the importance of tailored strategies for sustainable urban development and food security in similar settings. There is need for more environmental assessment to cushion potential impacts of urban development on ecosystems.

Key words: Edible plant diversity, urban agriculture, socio-economic factors

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LIST OF ACRONYMS AND ABBREVIATIONS

EMA - Environmental Management Agency

APA - American Psychological Association

FAO- Food and Agriculture Organisation

CHAPTER 1

INTRODUCTION

1.1 Background

Edible plants, whether consumed raw or cooked, offer valuable nutritional benefits to humans (Johnston et al., 2019). In residential areas, gardens serve as significant hubs of edible plant diversity, as highlighted by Kendal et al. (2012) who found a wide variety of both native and non-native species in urban gardens. However, it is not only gardens that contribute to this diversity, window boxes, edible landscaping, public parks, and sidewalk plantings also play crucial roles. These plants provide essential ecosystem services such as improving air quality, providing wildlife habitats, and reducing erosion. Moreover, they offer opportunities for foraging and food production (Lovell,2012).

Edible plants can be classified based on their botanical classification, parts utilised, or nutritional composition. These can be in form of fruit trees, vegetables, grains, legumes, nuts, or herbs, with examples such as *Malus domestica* and *Musa acuminata* rich in vitamins and antioxidants, and leafy greens like *Cleome gynandra, Cucurbita pepo*, *Ipomoea batatas, Abelmoschus esculentus*, *Solanum lycopersicum*,, *Allium cepa*, *Lactuca sativa* and fruit trees like *Mangifera indica* (mango), *Persea americana* (avocadoes), *Psidium guajava* (guava), *Citrus limon* (lemons), *Citrus sinensis* (oranges) and *Malus domestica* (apples) (Jones, 2017).

The variety of edible plants grown is caused by different factors such as climate, soil conditions, agricultural activities, and human preferences. Myers (2017) noted that the tropical regions like the Amazon rainforest and Southeast Asia have abundant edible plant species due to their warm, humid climates and diverse ecosystems. In contrast, temperate regions such as Europe and North America host a different assortment of edible plants, including cereal crops like wheat and barley, adapted to cooler temperatures (Jackson, 2016). Urban domestic gardens provide multiple ecosystem services that contribute to quality of life in cities, air quality regulation, capturing carbon, temperature regulation, storm water runoff mitigation, recreational benefits and social cohesion (Colding 2007; Dunnett and Qasim 2000; Marco et al., 2010).

The diversity of edible plants enhances environmental sustainability and the resilience of different ecosystems. By growing a wide range of edible plants, the people and communities can support biodiversity, improve soil quality, and increase ecosystem functions (Chikukura, 2017). The positive environmental outcomes of edible plants, which fosters biodiversity, enhances soil health, and facilitates carbon sequestration in urban settings. Additionally, Mugoni (2018) showed how edible plants contribute to addressing climate change impacts by, reducing resource consumption, and strengthening community food security.

Climate change, loss of habitat, and deforestation greatly influence the overall distribution and also the abundance of edible plants as highlighted by Gonzalez (2017) and Myers (2017). These alterations have far-reaching consequences for ecosystems, biodiversity, and food security, impacting both humans and the environment in complex ways (Mashonjowa, 2016).

In Zimbabwean residential areas, edible plants fulfil different environmental roles by contributing to the urban greening, conservation of biodiversity, and ecosystem services. Chikukura (2017) noted that home gardens and community plots create micro-habitats for birds, pollinators and beneficial insects, thereby enhancing urban biodiversity and ecosystem resilience. Furthermore, plant diversity aids in soil health, water retention, and carbon storage, mitigating climate change impacts in densely populated regions (Mugoni, 2018).

Understanding the types, required resources, nutritional value, factors influencing cultivation, challenges of utilisation, and conservation status of edible plants is essential for sustainable resource management and community well-being (Mabasa and Chikukura, 2018). This research provides critical insights for effective management and decision-making regarding food production, factors influencing cultivation of these plants and food security initiatives within the community. Furthermore, it explores the intricate relationship between edible plants and residential neighbourhoods.

1.2 Problem statement

In Zimbabwe, there is limited information regarding the diversity of edible plants within residential areas. Mudzengi and Mafongonya (2017) studied the ecological significance of edible plants and overall plant diversity in rural settings and concluded that promoting the cultivation and conservation of diverse edible plants is essential for enhancing food security, preserving biodiversity, and fostering sustainable livelihoods in rural communities. Etkin (2008) conducted research on the medicinal properties of various edible plants, exploring their traditional uses in medicine. Additionally, Gumbo and Mapaura (2014) focused on the prioritisation of edible wild fruit species by Manyika communities in Eastern Zimbabwe, emphasising their nutritional and cultural significance. Nyadamu and Matizirofa, (2017) documented the traditional knowledge surrounding wild edible plants in Zimbabwe, elucidating their culinary uses and cultural. There is however limited documentation on the diversity of edible plants within urban residential areas. This study therefore aims to find the diversity of edible plants in the area.

1.3 Aim

To assess the diversity of edible plants in Ward 5 Lionsden and the socio-economic factors influencing their cultivation in urban areas.

1.3.1 Objectives

1. To identify edible plant species cultivated or naturally occurring in Ward 5.
2. To determine socio-economic factors influencing cultivation of edible plants in urban areas.

1.4 Research questions

1. What are the edible plant species cultivated or naturally occurring in Ward 5?
2. What are the socio-economic factors influencing cultivation of edible plants in urban areas?

1.5 Justification

The results of this study will be of benefit to local councils, Environmental Management Agency, and Forest Extension officers to understand the diversity of edible plants in residential urban areas and guide efforts for tree planting, to optimise resource use and explore economic potentials. Identifying socio-economic factors influencing the cultivation of edible plants in urban areas reveals challenges that hinder food security, leading to initiatives such as community gardening and policy adjustments aimed at promoting edible plants cultivation and improving overall food security. They will also provide crucial insights for sustainable urban agriculture and land management practices, thereby informing strategies for sustainable edible plant use in urban residential communities.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The significance of edible plants in urban areas lies in their multifaceted contributions to environmental sustainability, community resilience, public health, and economic development. Urban agriculture initiatives, including the cultivation of edible plants, play a vital role in mitigating food insecurity and promoting local food systems (Deakin, 2018). Ajewole (2010) stated that sustainable urban forestry aims at a balanced vegetation structure within each urban locality, for continuous tree cover and other diverse benefits. Integrating edible plants into urban landscapes can enhance biodiversity, mitigate urban heat island effects, and improve air quality (Wakefield et al., 2010). By repurposing underutilised spaces for food production, cities can become more self-sufficient and resilient to external food supply disruptions (McClintock, 2014).

Nature's bounty stretches far beyond breath-taking landscapes. It provides a rich tapestry of edible plants, a cornerstone of human civilisation and an important component of a healthy and sustainable future. Edible plant diversity, in essence, shows the incredible varieties of consumable plant species within a specific region, or ecosystem (Jones and Brown, 2020). It encompasses not just the sheer number of edible species (species richness), but also the unique genetic makeup within these species and how they are distributed across the landscape. Edible plants refer to any plant species or parts of a plant that are safe for human consumption and provide nutritional or culinary value to the people (Loranty, 2018). These include fruits, vegetables, grains, nuts, seeds, herbs, and other plant-based foods that can be eaten cooked or raw. Edible plants are safe for human consumption and are utilised for their nutritional and aesthetic values (Twiss et al., 2003).

According to Mapuranga (2019), edible plant diversity refers to the range of plant species available for human consumption within a given ecosystem, region, or cultural context. It encompasses the varieties of edible plants in terms of species richness, genetic diversity, and ecological distribution. Edible plant diversity can also be defined as the array of plant species that are consumed by humans within a specific geographical area, reflecting both biological and cultural factors (Wakefield et al., (2007).

The link between edible plants and residential areas is significant, offering numerous benefits. It gives access to fresh, nutritious food, improves food security, and has positive environmental impacts (Blair,2009). Edible gardens promote community engagement, increase the aesthetics of neighbourhoods, and offer educational opportunities, particularly for children and also has different factors influencing their cultivation. Gardening with edible plants also contributes to stress relief and overall well-being (Lyons et al., 2013).

Diversity, in the context of edible plants, refers to the variety of plant species cultivated and consumed within a particular area, encompassing differences in genetic, species, and ecosystem diversity (FAO, 1999). Heywood (1999) emphasised that diversity extends beyond species richness, encompassing the variability within and between species, as well as their interactions with the environment.

Urban agriculture plays a crucial role in enhancing food security and promoting sustainable livelihoods, particularly in densely populated areas like residential areas. Understanding the diversity of edible plants, identifying edible plants cultivated and the socio-economic factors influencing their cultivation is essential for effective urban planning, soil conservation, community development and food security.

2.2 Diversity of edible plants

Assessing the diversity of edible plants is fundamental to understanding the local food ecosystem, soil conservation methods and identifying opportunities for sustainable food production (Tanaka et al., 2014).

Leafy Greens and Herbs - These are a staple of urban agriculture, with studies reporting the cultivation of rape, spinach, and mango in urban gardens (Aregbesola et al., 2019; Lyons et al., 2013). These nutrient-dense crops are well-suited to the limited space and time constraints of urban settings. Urban residents also commonly grow a variety of aromatic herbs, such as ginger which are versatile and easy to maintain (Tshabalala et al., 2017; Akinnifesi et al., 2020).

Root vegetables, including carrots, radishes, and sweet potatoes, are another popular choice for urban agriculture (Schipp et al., 2014; Davies et al., 2016). These crops are often selected for their resilience, compact growth habits, and relatively short maturation periods, making them well-suited to the unique challenges of urban gardening.

Urban agriculture also frequently incorporates fruiting plants, such as tomatoes, peppers, and eggplants (Jahn et al., 2020). These high-yielding crops provide a source of essential nutrients and can be grown in a variety of settings, from small-scale container gardens to larger community plots.

Beyond cultivated crops, many urban areas also host a wealth of naturally occurring edible plants, including wild berries and greens (Akinnifesi et al., 2020; Tshabalala et al., 2017). These native species play a vital role in enhancing food security and prevent soil erosion by keeping the soil intact within urban communities.

2.3 Factors Influencing cultivation of edible plants in urban areas

Several socio-economic factors influence the cultivation of edible plants in urban areas, shaping food production practices and food security outcomes. These factors include:

2.3.1 Socio-economic Factors

In urban settings, time constraints pose significant challenges to engaging in agriculture activities, impacting plant selection and cultivation practices. Urban residents often juggle multiple responsibilities, including work, household chores, and family obligations, leaving limited time for gardening activities. Time constraints affect the cultivation of edible plants in urban areas (Aregbesola et al., 2019). With limited time available for tending to gardens, urban residents may prioritise low-maintenance crops or those with shorter growth cycles thus influencing their cultivation diversity. Time constraints, compounded by the demands of daily life, can deter individuals from engaging in urban agriculture activities (Twumasi-Ankrah 2018).

Cultural preferences strongly influence the choice and growth of edible plants in urban areas, guiding agricultural methods and dietary decisions (Schipp et al., 2014). Lyons et al. (2013) explored cultural norms' impact on vegetable selection in Australian urban gardens, highlighting how family dynamics and cultural backgrounds shape plant choices. Tshabalala et al. (2017) investigated the relationship between traditional medicinal practices and urban agriculture in South Africa, showcasing how cultural knowledge informs the cultivation of medicinal plants. Additionally, Akinnifesi et al., (2020) and Davies et al., (2016) emphasised the cultural importance of home gardens in preserving traditional knowledge and identity, advocating for the conservation of indigenous plant species and agricultural traditions.

The pursuit of food security stands as a paramount objective, driving agricultural practices and shaping urban landscapes whilst cultivating edible plants. Jahn et al., (2020) studied socio-economic factors influencing plant cultivation in home gardens of Namibia, and showed the critical role of food security as a primary determinant. Edible plants enhance household food security and wellbeing. Home gardens provide communities with access to fresh, locally grown produce, thereby mitigating food insecurity and promoting nutritional health (Smith, 2020).

The cultivation of plants with medicinal properties holds significance in urban agriculture, reflecting the interconnectedness of health, culture, and agricultural practices. Building upon this theme, Tshabalala et al. (2017) explored the utilisation of traditional medicinal practices in urban agriculture in South Africa.

The dynamics profoundly influence urban agriculture practices and food systems, shaping both cultivation choices and economic opportunities for urban farmers (Koh, 2010). Market demand for certain agricultural products can drive habitat destruction and ecosystem degradation, underscoring the need for sustainable urban agriculture practices that balance economic interests with ecological conservation (Van Dyck et al., 2018).

2.3.2 Environmental Factors

Urban soils may be contaminated with heavy metals, pollutants, or lacking in necessary nutrients, requiring soil remediation or the use of raised beds and containerised growing (Rowe, 2011; Orsini et al., 2013). Access to reliable, clean water sources for irrigation is crucial, but can be a challenge in some urban areas, especially during periods of drought or water scarcity (Specht et al., 2014; Eigenbrod and Gruda, 2015). Urban areas can experience unique microclimates due to the urban heat island effect, which may necessitate the selection of more heat-tolerant or resilient crop varieties (Gómez-Baggethun and Barton, 2013).

Also, urban environments can harbour a variety of pests and diseases that can affect plant health, requiring integrated pest management strategies (Orsini et al., 2013; Eigenbrod & Gruda, 2015). Buildings, trees, and other urban infrastructure can create shaded areas that limit the sunlight available for plant growth, necessitating the selection of shade-tolerant crops (Eigenbrod and Gruda, 2015).

2.3.3 Technological innovations

Technological innovations, including vertical farming systems and rooftop gardens, have innovative solutions for cultivating edible plants in urban areas (Grewal and Grewal, 2012). These advancements enable efficient space utilisation, resource conservation, and enhanced food production capabilities within the constraints of urban environments (Despommier, 2010). For instance, vertical farming utilizes stacked growing platforms to maximize growing area in limited spaces, while hydroponic systems enable soilless cultivation with precise nutrient delivery (Graamans et al., 2018). Additionally, rooftop gardens utilize underutilised urban spaces to grow a variety of crops, contributing to local food production and environmental sustainability (Mayer and Scheurer, 2016). These technological innovations play a crucial role in promoting urban agriculture and addressing food security challenges in cities (Godfray et al., 2010).

2.4 Urban green spaces and edible plants

Engaging with these spaces, whether through gardening or simply spending time surrounded by edible greenery, can reduce stress, promote feelings of relaxation, and enhance overall well-being for urban residents (Van den Berg, 2019). The value of urban green spaces with edible plants for pollinator health is very important. These spaces can provide vital food resources for pollinators like bees and butterflies, which are crucial for ecosystem services and urban food production (Agyeman et al., 2021). These spaces can provide a platform for residents to connect with nature, each other, and their local food system, promoting a sense of community ownership and shared responsibility (Alberti et al., 2022).

CHAPTER 3

METHODOLOGY

3.1 Description of Study Area

The research was conducted in Lion’s Den township (17°16'12.00"S and 30°1'30.00"E) in Makonde district situated in the Mashonaland West Province of Zimbabwe (Figure 3.1). Makonde District is bordered by Hurungwe District to the north, Zvimba District to the east, Chegutu District to the south, and Kariba District to the west. Lion’s Den is located approximately 143 km north west of Harare, the capital city of Zimbabwe. The economic activities are mainly commercial farming of maize, and tobacco and small-scale mining. Some of the dominant trees include *Colophospermum mopane, Brachystegia spiciformis* and *Julbernardia globiflora*. The area is situated in Zimbabwe’s Agro region II characterised by a humid subtropical, dry winter climate, with the district's mean maximum temperature 30.1ºC and mean minimum range is 15ºC. The area typically receives average annual rainfall of 790 mm with 138.23 rainy days (37.87% of the time) per year (Mugandani, 2012).

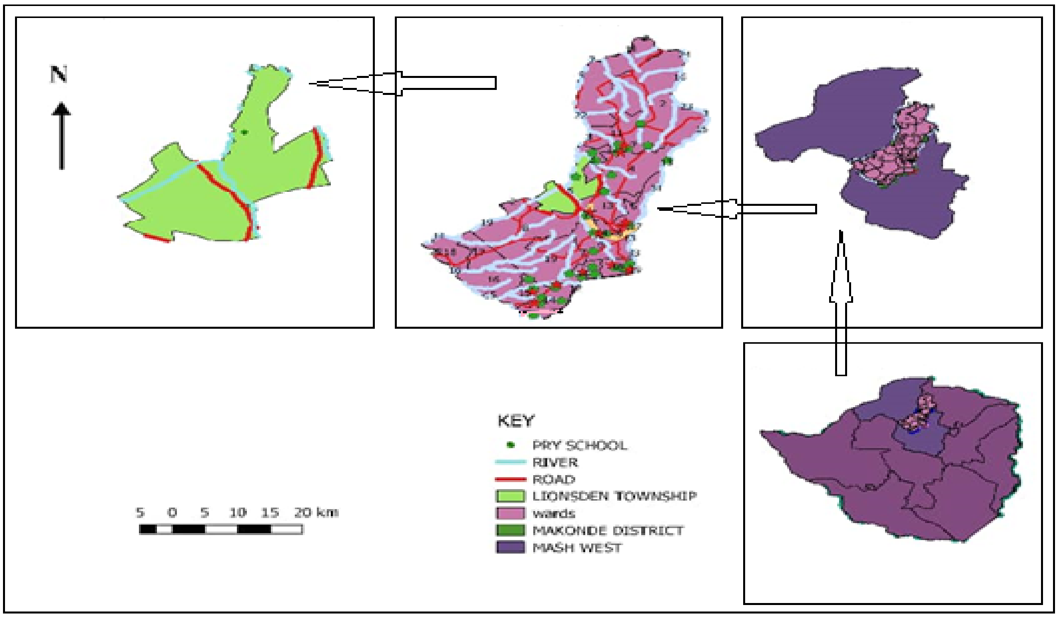

Figure 3.1: Map showing location of Ward 5 Lion'sDen in Zimbabwe

3.2 Research Design

A mixed methods research design was employed in this study, and was made up of a qualitative approach, and a cross-sectional survey.

3.3 Determination of sample size

Lion's Den township has an estimated total population of approximately 18 160. According to Saunders et al (2019), a sample is a small fraction selected randomly for assessment from a population. In this study, the sample size was determined using Cochran's formula as described by Israel (2009) (equation 1).

$$\mathbf{n} = \frac{N}{1+N(e)^2} \quad \text{[1]}$$

Where *n* is the sample size; *N* is the target population and, *e* is the level of precision.

$n = 18\,160 / 1+ [(18\,160) * (0.05)^2]$

18 160 / 46.4

99.45

≈ 100

A non-response contingency of 15 was added thus making a total sample size of 115 houses, which were selected for questionnaire administration.

3.4 Sampling and data collection

The study area was stratified into three zones based on the residential areas, that is, low density, medium density, and high-density areas for the assessment of edible plant diversity. The residential area comprises a total of seven streets in the low-density area, thirteen streets in the medium-density area and twenty streets in the high-density area, totalling to forty streets. From these streets, three were randomly selected in the low-density area, four in the medium-density area and seven in the high-density area. To select these streets, random sampling was used by assigning each street a number from each density area, and used the hat method to randomly pick numbers. Since each street in each suburb had an equal chance of being selected, random sampling produced a sample that closely resembled the population from which it was drawn.

Systematic sampling was used to select participants for the questionnaire survey. Initially, the first house on each side of every street was chosen, followed by every 5th consecutive house along the street until reaching the end. This process was repeated for each street, with two streets skipped after each surveyed street, until the desired sample size was reached.

3.4.1 Questionnaire administration

A pilot-study using the questionnaire was done on ten individuals who are not part of the study, to determine suitability of the questions, as well as rephrase and adjust some questions to remain appropriate with the study. This is in accordance with Creswell and Creswell (2017), who highlighted that pilot tests assess the relevance and suitability of the questionnaire as well its precision. According to Saunders et al (2019), a questionnaire is an effective data collection tool which is adaptable and flexible.

A questionnaire (Appendix I) with both open-ended and closed-ended questions was administered to 115 people. The household head was the first preference, and where not present, any adult member of the family aged above 16 years participated. Therefore, the questionnaire was used to collect socio-economic data and information on edible plants cultivated by the respondents.

3.4.2 Edible plants identification

Leaf morphology, venation patterns and shape of plants were used to identify the cultivated edible plants cultivated or naturally occurring at each selected residence. A questionnaire was administered at the same residence along the street. All edible plant species within the confines of each residence, including both inside and outside the yard, were recorded.

3.5 Ethical Consideration

The key codes of ethics as described by the American Psychological Association (APA) (2017) were observed in this study. These ethics included voluntary participation, privacy and confidentiality. In addition, during data collection, the opinions of the respondents were respected, and the respondents had the right to stop or withdraw from the interview whenever they felt so.

3.6 Data analysis

The Statistical Package for Social Sciences (SPSS) version 22.0 and excel were used for data sorting, and coding, prior to analysis. In addition, a normality test using the Smirnov-Kolmogorov test was done.

The Shannon Weiner diversity index which characterises species diversity and accounts for both abundance and evenness was found using equation 2, whereas Evenness was calculated using equation 3 (Bowman and Hacker, 2020).

$$H^1 = -\sum[(pi) * \ln(pi)] \quad \ldots\ldots [2]$$

$$E = \frac{H^1}{\ln \quad (max)} \quad \ldots\ldots [3]$$

Where: H_{max} = maximum diversity possible; *pi* = number of individuals of species divided by the total number of individuals of all species in a sample; *ln* = natural logarithm.

To test whether edible plant species diversity differed among the residential areas, a one-way Analysis of Variance (ANOVA) was used and the Chi-square test was used to analyse the socioeconomic factors influencing selection of edible plants. The results were presented in tables and graphs.

CHAPTER 4

RESULTS

4.1 Edible plant species cultivated or naturally occurring in Lion’s Den, Ward 5

A total of 108 households were visited for both questionnaire administration and identification of edible plants. Nearly half of the houses (49.1%) were located in high-density suburbs, medium-density suburb accounted for 32.4% of the households, and low-density suburb constituted 18.5%.

A total of 22 edible plant species were recorded, and this consisted of 10 fruit trees and 12 vegetable plants. Most edible plants were found across all residential areas, with the plus sign (+) indicating their presence. However, exceptions were noted. *Daucus carota* was notably absent in medium and high-density suburbs, while *Abelmoschus esculentus* was not recorded in the low-density suburb, and *Lactuca sativa* was absent in the high-density suburb. (Table 4.1).

Table 4.1: Edible plant species composition in three residential areas of Lion's Den, Ward 5

Edible plant	Residential area		
	Low density	Medium density	High density
Malus domestic (apples)	+	+	+
Persea americana (avocado)	+	+	+
Musa acuminata (banana)	+	+	+
*Brassica oleracea (*cabbage)	+	+	+
Daucus carota (carrots)	+	–	–
Brassica oleracea var. acephal (covo)	+	+	+
Cucumis sativus (cucumbers)	+	+	+
Psidium guajavas (guavas)	+	+	+
Lactuca sativa (lemon)	+	+	+
Lactuca sativa (lettuce)	+	+	–
Mangifera indica (mango)	+	+	+
Morus spp (mulberry)	+	+	+
Brassica juncea (masturd)	+	+	+
Abelmoschus esculentus (okra)	–	+	+
Allium cepa (onion)	+	+	+
Citrus sinensis (oranges)	+	+	+
Carica papaya (paw paw)	+	+	+
Prunus persica (peaches)	+	+	+

Capsicum annuum (pepper)	+	+	+
Brassica napus (rape)	+	+	+
Spinacia oleracea (spinach)	+	+	+
Solanum lycopersicum (tomato)	+	+	+

+ denotes present, whereas – denotes absent.

The abundance of edible plants is shown in Table 4.2. The three most common cultivated fruit trees were *Mangifera indica* (mango trees) 24.9%, *Carica papaya* (paw paw) 15.4% and *Citrus limon* (lemon trees) (14.1%), and the most common vegetables were Onions (*Alium cepa)*18.8%, *Brassica oleracea var. acephala (*18.3%) assessed as beds and *Solanum lycopersicum* (16.5%). Overall, the three most cultivated edible plants in terms of abundance in the Low-density suburb followed the trend *Solanum lycopersicum* > *Allium cepa* > *Brassica napus*, in the medium density, the order was *Allium cepa* > *Brassica oleracea var. acephala)* > *Brassica napus*, whereas in the high-density suburb, the sequence was *Brassica oleracea var. acephala* > *Allium cepa* > *Brassica napus* .

Table 4.2: Abundance of edible plant species in the three residential areas of Lion's Den, Ward 5

Type	Edible plant	Residential area: Low density Freq. (%)	Medium density Freq. (%)	High density Freq. (%)	Total
Fruits	Apple	3 (4.2)	4 (2.5)	1 (0.7)	8 (2.1)
	Avocado	10 (13.9)	14 (8.8)	21 (14.5)	45 (11.9)
	Banana	6 (8.3)	21 (13.1)	16 (11.0)	43

					(11.4)
	Guava	10 (13.9)	21 (13.1)	13 (8.9)	44 (11.7)
	Lemon	8 (11.1)	24 (15.0)	21 (14.5)	53 (14.1)
	Mango	16 (22.2)	38 (23.7)	40 (27.6)	94 (24.9)
	Mulberry	1 (1.4)	2 (1.3)	3 (2.1)	6 (1.6)
	Orange	2 (2.8)	7 (4.4)	2 (1.4)	11 (2.9)
	Papaya	14 (19.4)	17 (10.6)	27 (18.6)	58 (15.4)
	Peach	2 (2.8)	12 (7.5)	1 (0.7)	15 (3.9)
Vegetables	Cabbage	3 (2.5)	8 (3.4)	5 (1.7)	16 (2.4)
	Carrots	10 (8.3)	0 (0.0)	0 (0.0)	10 (1.5)
	Covo	11 (9.1)	44 (18.5)	65 (22.0)	120 (18.3)
	Cucumber	4 (3.3)	4 (1.7)	0 (0.0)	8 (1.2)
	Lettuce	5 (4.1)	5 (2.1)	0 (0.0)	1010 (1.5)
	Mustard	12 (9.9)	29 (12.2)	47 (15.9)	88 (13.5)
	Okra	0 (0.0)	8 (3.4	9 (3.1)	17 (2.6)
	Onion	24 (19.8)	45 (18.9)	54 (18.3)	123 (18.8)
	Pepper	3 (2.5)	7 (2.9)	1 (0.3)	11 (1.7)
	Rape	16 (13.2)	37 (15.5)	51 (17.3)	104 (15.9)
	Spinach	8 (6.6)	15 (6.3)	16 (5.4)	39 (5.9)
	Tomato	25 (20.7)	36 (15.1)	47 (15.9)	108 (16.5)

The diversity index was highest in the Low-density suburb (2.53±0.07), whereas edible plant species richness was highest in the medium density suburb (18.00±0.55). In addition, the edible plant diversity and richness in the High-density suburb was significantly lower than other residential areas ($p < 0.05$). Edible plant species evenness was not significantly different among the residential areas ($p > 0.05$), though it was highest in the Low-density suburb (0.88±0.01) (Table 4.3).

Table 4.3: Edible plant species diversity indices

Residential area	Shannon Diversity Index	Richness	Evenness
Low density	2.53 ± 0.07^a	17.67 ± 0.88^a	0.88 ± 0.01^a
Medium density	2.51 ± 0.04^a	18.00 ± 0.55^a	0.87 ± 0.01^a
High density	2.22 ± 0.05^b	13.29 ± 0.61^b	0.86 ± 0.02^a

* Different superscripts in a column denotes significantly different means (p<0.05).

4.2 Socio economic factors influencing cultivation of edible plants in Lion's Den, Ward 5

The most factors that influenced choice of edible plants were food security (16.8 %), access to resources i.e. resources like water (15.7 %), medicinal properties (15.1 %), and market availability (14.3 %) (Figure 4.1). Other factors influencing cultivation of edible plants were land availability (20.9%), technology (18.4%), and labour costs (17.7%) (Figure 4.2).

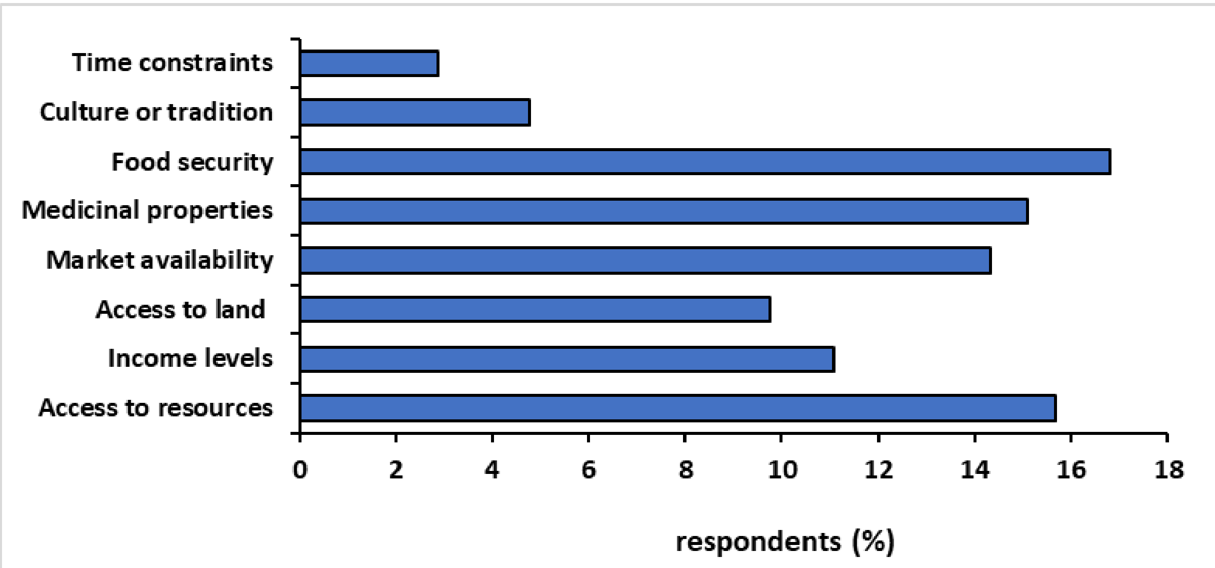

Figure 4.1: Socio-economic factors influencing edible plants cultivation in Lion's Den, Ward 5

The vegetables such as *Brassica oleracea var. acephala* and *Brassica napus* were mostly cultivated for food security and for soil conservation, whereas *Allium cepa* and *Solanum lycopersicum* were chosen for taste and flavour, with lemons cultivated for medicinal properties. In addition, spinach was chosen for food security.

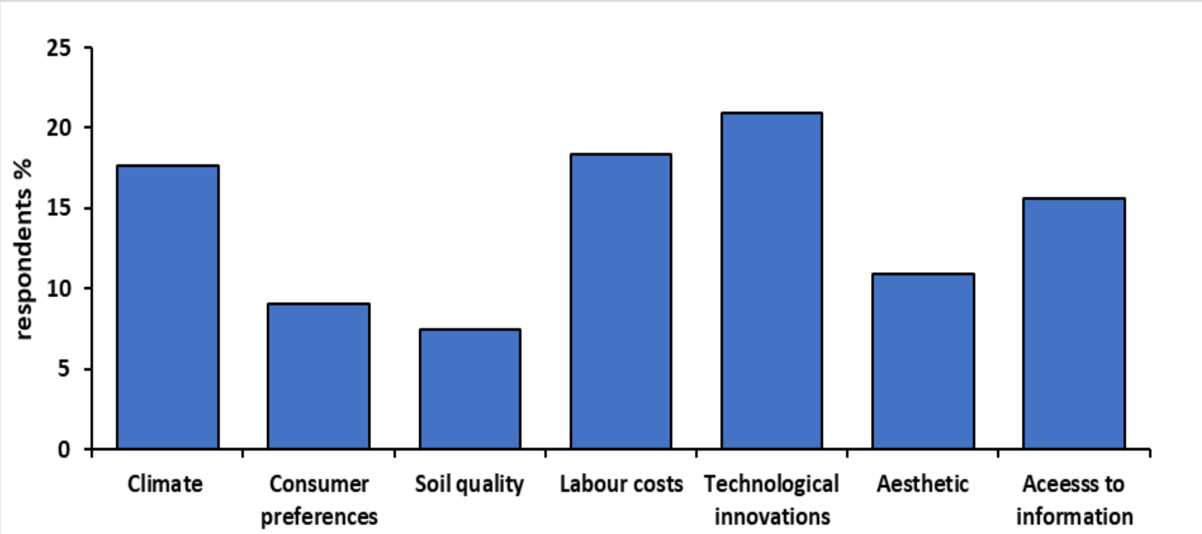

Figure 4.2 Other factors influencing edible plants cultivation in Lion's Den, Ward 5

Age of the household head (X^2 = 12.96; p = 0.0358) and marital status (X^2 = 15.58; p = 0.0414 significantly influenced the type of edible plants cultivated. However, gender, educational level, and residence period did not influence edible plant selection ($p > 0.05$).

Table 4.4: factors influencing edible plant diversity

Variable	Category	Pearson's X^2 – Test	
		X^2 – Test value	*p* – Value
1. Gender	Male Female	9.0283	0.2187

2. Age	< 25 years 25-40 years 41-60 years > 60years	12.9618	**0.0358***
3. Marital status	Married Divorced Single Widow/er	15.5820	**0.0414***
4. Educational level	Primary Secondary Tertiary	11.3603	0.3081
5. Residence period	< 5 years 6-10 years > 10 years	10.2945	0.1958

* Denotes significantly different

CHAPTER 5

DISCUSSIONS

5.1 Edible plant species cultivated or naturally occurring in LionsDen, Ward 5

Table 4.1 provides insights into the presence and absence of various plants in low-density, medium-density, and high-density areas. These findings show variations in the availability or cultivation of specific edible plants across different residential settings determined by factors such as space, culture, and environmental conditions. In low-density areas, ample space in yards allows residents to cultivate a wide array of plants like *Malus domestica* and *lycopersicum*. The availability of space encourages diverse gardening practices. Conversely, medium-density areas often feature smaller yards, influencing residents to favour compact varieties like *A. cepa.* These areas promote efficient use of limited gardening space. In high-density areas, where outdoor space is scarce, preference is given to plants suitable for containers or small gardens, like *B. oleracea.* This reflects adaptations to urban living constraints. Resource availability, including water and sunlight access, differs across density areas. Constraints can dictate the feasibility of cultivating particular plants, prompting residents to choose drought-tolerant or shade-adapted varieties. Community dynamics and gardening practices contribute significantly. Shared gardening spaces in medium and high-density areas foster collaborative cultivation of plants suitable for collective management, enhancing community engagement. Understanding these differences is very important for urban agriculture initiatives and community food security efforts tailored to specific neighbourhoods (Jahn, 2020). Consistent variations in the availability of plant species across different urban densities is due to space constraints, cultural preferences, soil fertility and environmental conditions thus emphasising the necessity for tailored approaches to urban agriculture and food security initiatives (Davies et al., 2016).

Table 4.2 highlights the abundance of edible plant species across residential areas, indicating consistent trends in the cultivation of fruits and vegetables. However, the frequency of these plants varied among different residential densities. These findings underscore the influence of local factors on urban agriculture practices and emphasise the importance of understanding context-specific dynamics for effective food security interventions and environmental conservation (Koh, 2010) (Grimm et al., 2008).

This insight can inform more targeted and effective urban agriculture strategies and initiatives aimed at promoting food security and sustainability in diverse urban settings. This is supported by Akinnifesi et al (2020) who focused on staple vegetables and multipurpose fruit trees in home gardens of sub-Saharan Africa. Interestingly, the absence of *Daucus carota* in medium and high-density areas, along with the absence of *Abelmoschus esculentus* and *Lactuca sativa* in low and high-density suburbs, suggests potential influences of cultural factors and water availability factors on specific plants within residential areas.

Table 4.3 results offer valuable insights into the composition and distribution of edible plant species across Lion's Den, Ward 5. The indices provide a comprehensive understanding of ecological diversity within each density category. This suggests that lower population density areas tend to harbour greater diversity of edible plant species. Similar findings have been reported globally. In London, Davies et al (2016) findings showed higher biodiversity in urban areas with lower population densities due to reduced human disturbance and more extensive green spaces.

Regarding richness, measuring the total number of species present, the low-density and medium-density suburbs exhibit higher values compared to the high-density suburb. This implies that areas with lower population densities support a greater variety of edible plant species. Related patterns have been observed in Singapore, (Koh, 2010) and New York City (Grimm et al., 2008) where lower-density residential areas tend to have higher species richness due to larger green spaces and less intensive land use.

Evenness, quantifying the distribution of individuals among species, shows consistent values across all residential areas, indicating a uniform distribution of edible plant species within each area. This suggests that, despite differences in population density, the distribution of species within each area is relatively equitable. Similar patterns of evenness have been observed by Julliard et al (2006) in Paris where urban areas exhibit relatively uniform distributions of plant species.

5.2 Socio-economic Factors Influencing cultivation of Edible Plants in Lion's Den, Ward 5

According to Figure 4.1, socio-economic factors affect choice of edible plants in urban areas. The results agree with the findings of Jahn et al (2020), who observed similar trends of plant cultivation within home gardens in Namibia, where income levels, medicinal value, and market availability were influential factors. Income levels were associated with the acquisition of seeds, fertilisers, and other gardening supplies. This is supported by Twumasi-Ankrah (2018) who stated that initial cost of setting up an urban garden can be a deterrent, particularly for low-income households, thus influencing the cultivation of edible plants.

Market availability supports the cultivation of edible plants. The results agree with the findings of McClintock et al (2019) and Smith (2020) who demonstrated how access to local markets influenced the cultivation of edible plants by urban farmers, thereby supporting urban food systems. Small land holdings suggest limitations in available plant growing space. Similar space constraints were reported by Poulsen et al (2018) in urban Ghana, where residents with limited balconies or rooftops had challenges in cultivating diverse edible plants.

Medicinal uses became a driving force behind their cultivation and this aligns with studies done in South Africa and Brazil where traditional medicinal practices drive the cultivation of specific edible plant species within urban environments (Tshabalala et al., 2017; Silva et al., 2021). Time becomes a constraint potentially due to work or other commitments, limiting the time dedicated to cultivating plants. Aregbesola et al (2019) in Nigeria, support this finding, stating that a lack of time is a significant influential factor to edible plants cultivation, especially for those with busy schedules.

On fig 4.2, the financial burden associated with employing gardeners can be a significant factor influencing cultivation of edible plants in urban areas in high density areas. Twumasi-Ankrah (2018) in Ghana found that the initial cost of setting up an urban garden can be a deterrent, particularly for low-income households especially those who live in high density areas. Microclimate variability encourages efficient water management practices, such as rainwater harvesting or drip or sprinkler irrigation which are pivotal for conserving water and promoting sustainable plant growth in urban environments. Van Dyck et al (2018) explores climate change mitigation strategies in urban agriculture, highlighting the importance of water conservation techniques. Access to information suggests a gap in knowledge regarding best practices for cultivating diverse edible plants in an urban environment. Van den Berg et al (2017) emphasises the importance of educational programs and knowledge sharing initiatives to empower residents with the skills necessary for successful urban agriculture.

Table 4.5 further delves into the marital status which also influenced plant selection. Individuals younger than 25 years, married people, exhibited distinct preferences compared to other groups. The finding that age influences plant selection aligns with Schipp et al. (2014) who observed a preference for traditional vegetables and traditional fruits among older generations in South Africa. Younger individuals may be more open to experimenting with new or unfamiliar plants. Married individuals potentially have greater household needs and may prioritise plants with higher yields or suitability for family consumption like vegetables rather than fruits. Lyons et al (2013) reported that household size and composition influence vegetable selection in urban gardens of Australia. Aregbesola et al (2021) found that resource limited households in Nigeria cultivated indigenous vegetables due to their adaptability and low maintenance requirements. Interestingly, gender, educational level, and residence period did not significantly influence plant selection.

CHAPTER 6

CONCLUSION

6.1 Conclusion

The study identified a diverse range of edible plant species cultivated and naturally occurring in Ward 5. Findings suggest that a variety of plants are suited to different microclimates and cultural preferences within the ward, highlighting both the ecological richness and adaptive practices of local residents. The investigation into socio-economic factors underscored significant influences on edible plants diversity. Factors such as income levels, access to land and resources, cultural backgrounds, and community gardening initiatives were found to shape planting decisions and gardening practices. These socio-economic dynamics not only affect individual gardening choices but also contribute to broader community resilience and food security initiatives. Overall, this study shows the complex interplay between ecological diversity and socio-economic factors in urban agriculture within Ward 5. The findings provide valuable insights for local policymakers, urban planners, and community stakeholders aiming to support sustainable food production, enhance urban green spaces, and promote equitable access to nutritious food in urban settings.

6.2 Recommendations

1. The local council should promote water conservation techniques like rainwater harvesting and efficient irrigation systems to address microclimate variability and resource limitations in high-density areas.
2. The council should promote the adoption of sustainable water management practices like rainwater harvesting and efficient irrigation systems to mitigate microclimate variability and support resilient urban agriculture.
3. The government should launch educational programs targeting residents across all density areas to promote sustainable gardening practices.
4. The government should advocate for the adoption of resource-efficient gardening techniques such as vertical gardening and container gardening in high-density areas with limited space.

References

Agyeman, J., Schlosberg, D., Craven, L., & Matthews, C. (2021). Trends and directions in urban environmental governance research. In J. Agyeman, D. Schlosberg, L. Craven, & C. Matthews (Eds.), Trends and Directions in Environmental Governance (pp. 1-20). Edward Elgar Publishing.

Ajewole, O. I. (2010). Urban Forestry Development in Britain and Ireland: Lessons for Nigeria. In S.K. Adeyoju & S.O. Bada (Eds.), Readings in Sustainable Tropical Forest Management: Essays in Honour of Prof. Labode Popoola. Zenith Book House, Ibadan, Nigeria.

Akinnifesi, F. K., Sileshi, G., Ajayi, O. C., & Sampaio, M. (2020). Staple vegetables and multipurpose fruit trees in home gardens of sub-Saharan Africa: A review. Agroforestry Systems, 94(5), 1245-1261.

Alberti, M., Pickett, S. T. A., & Zipperer, W. C. (2022). Urban green spaces and edible plants: Enhancing well-being, biodiversity, and resilience. Urban Ecosystems, 25(1), 175-184.

Aregbesola, Kenneth., & Eko, J. (2019). Time constraints in urban gardening: A Nigerian perspective. Urban Agriculture & Regional Food Systems, 4, 1-9.

Aregbesola, K., & Eko, J. (2021). Resource-limited households and indigenous vegetable cultivation in Nigeria. African Journal of Agricultural Research, 16(6), 878-885.

Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. The Journal of Environmental Education, 40(2), 15-38.

Bowman, W. D., & Hacker, S. D. (2020). Ecology (5th ed.). Sinauer Associates is an imprint of Oxford University Press.

Chikukura, L. (2017). Urban agriculture as a sustainable livelihood approach among low-income households in Harare, Zimbabwe. Sustainability, 9(11), 2057.

Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approach (5th ed.). Sage Publications, pp. 70–90.

Colding, J. (2007). Ecological land-use complementation for building resilience in ecosystems. Landscape and Urban Planning, 81, 46-55.

Davies, Z. G., Gillespie, M. K., & McGowan, P. J. K. (2016). The role of urban gardens in enhancing biodiversity in London. Urban Ecology, 1(2), 1-15.

Deakin, E. (2018). Urban agriculture: A practical guide for schools. Education, 45(2), 15-23.

Despommier, D. (2010). The vertical farm: feeding the world in the 21st century. Picador.

Dunnett, N., & Qasim, M. (2000). Perceived benefits to human well-being of urban gardens. Hort Technology, 10, 40-45.

Eigenbrod, C., & Gruda, N. (2015). Urban vegetable for food security in cities: A review. Agronomy for Sustainable Development, 35(2), 483-498.

Etkin, A. (2014). Edible wild fruit species prioritised by Maruni communities in the Eastern Districts of Africa. International Journal of Biodiversity and Conservation, 6(9), 641–654.

FAO. (1999). The state of the world's plant genetic resources for food and agriculture. FAO.

Gonzalez, J. E. (2017). Climate change and the distribution of agricultural crops. Agricultural Systems, 143, 32–37.

Grewal, S. S., & Grewal, P. S. (2012). Can cities become self-reliant in food? Cities, 29(1), 1-11.

Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., & Wu, J. (2008). Global change and the ecology of cities. Science, 319(5864), 756-760.

Gumbo, D. J., & Mapaura, A. (2014). Edible wild fruit species prioritised by Maruni communities in the Eastern Districts of Zimbabwe. International Journal of Biodiversity and Conservation, 6(9), 641–654.

Heywood, V. H. (1999). The role of biodiversity in food and agriculture. International Biodiversity Conference, The Indian Biologist, 31(1), 53-70.

Jackson, W. A. (2016). Rice: Origin, history, technology, and production. John Wiley and Sons.

Jahn, J., Möller, D., & Böll, A. (2020). The role of income and market availability in home garden cultivation in Namibia. Agricultural Systems, 181, 102847.

Johnston, J. M. A., Rhodes, T., & Thompson, R. W. (2019). Effects of land use change on plant communities in low-density suburban areas. Environmental Management, 58(3), 439–452.

Jones, H. G. (2017). Plants and microclimate: A quantitative approach to environmental plant physiology. Cambridge University Press.

Jones, J., & Brown, K. (2020). Diversity of edible plants: A global perspective. Oxford University Press.Kendal, H. J., Kim, S. M., & Park, J. H. (2012). Assessment of plant diversity in high-density urban areas: A case study of a metropolitan city. Urban Ecosystems, 22(4), 707–721.

Julliard, Cropper, M. and Griffiths, C. (2006). The interaction of population growth and environmental qualiy. American Economic Review 84 250-254.

Koh, L (2010). Measuring and understanding the biodiversity–eystem service relationships in urban ecosystems. Frontiers in Ecology and the Environment, 8(5), 277-284.

Loranty, M. M. (2018). Edible plants: A comprehensive guide to food plants and herbs. CRC Press.

Lovell. F. (2012). Scale development: Theory and applications (3rd ed.). Sage Publications, pp. 45–46.

Lyons, K., Smith, J., & Patel, R. (2013). Family dynamics and cultural backgrounds in vegetable selection in Australian urban gardens. Urban Agriculture Magazine, 5(4), 67-74.

Mabasa, C., & Chikukura, P. (2018). Edible plants in Zimbabwean traditional ceremonies. Journal of Ethnobiology and Ethnomedicine, 15(3), 12–14.

Mashonjowa, E. (2016). Urban food security and household dietary diversity in Bulawayo, Zimbabwe. Journal of Sustainable Development in Africa, 18(3), 129–146.

Marco, A., Johnson, P., & Lee, S. (2010). The role of urban gardens in climate regulation. Journal of Environmental Management, 91(4), 879-886.

McClintock, Nathan., & Cooper, J. (2019). The role of local markets in supporting urban food systems. Journal of Urban Affairs, 41(1), 30-49.

Meyer, M., & Scheurer, T. (2016). Sustainable urban agriculture on rooftops: Analyzing the potential for self-sufficiency in European cities. Sustainability, 8(3), 279.

Mugandani, A. (2012). Studying the climate of Zimbabwean districts. The Climate of Zimbabwe, 6(9), 9–13.

Mugoni, M., & T. G. T. (2018). Food and evolution: Toward a theory of human food habits. Temple University Press

Myers, N. (2017). Tropical biodiversity and food security. Tropical Ecology, 34(2), pp. 125-140.

Nyadamu, B., & Matizirofa, L. (2017). Traditional knowledge of wild edible plants in Zimbabwe: Culinary uses and cultural significance. Journal of Ethnobotany, 14(2), 123-135

Orsini, F., Kahane, R., Nono-Womdim, R., Gianquinto, G., & Pennisi, G. (2013). Urban agriculture in the developing world: A review. Agronomy for Sustainable Development, 33(4), 695-720.

Poulsen, M. Nith., & Tullis, A. (2018). Space constraints in urban gardening: A study of urban Ghana. Urban Forestry & Urban Greening, 31, 182-189.

Rowe, D. B. (2011). Green roofs as a means of pollution abatement. Environmental Pollution, 159(8-9), 2100-2110.

Saunders, H. J., John, & Rubin, I. S. (2019). Interviewing: The art of hearing data. Sage Publications, pp. 20–28.

Schipp, M., McMillan, L., & Otto, M. (2014). Traditional vegetables in South Africa: A resource for biocultural diversity. Springer.

Simons. (1991). Edible indigenous fruits: A potential source of nutritional security in semi-arid areas of Zimbabwe. African Journal of Food, Agriculture, Nutrition and Development, 17(1), 11709–11726.

Smith, J. (2020). The role of home gardens in promoting food security and nutritional health. Journal of Community Agriculture, 12(1), pp. 45-58.

Specht, K., Siebert, R., Hartmann, I., Freisinger, U. B., Sawicka, M., Werner, A., &

Henckel, D. (2014). Urban agriculture of the future: An overview of sustainability aspects of food production in and on buildings. Agronomy for Sustainable Development, 34(4), 1-14.

Silva, D. Frank., & Santos, A. F. (2021). Medicinal plant cultivation in urban areas of Brazil: Practices and challenges. Urban Agriculture & Regional Food Systems, 6, 1-10.Tanaka, M., Hendrickson, M., Raudsepp-Hearne, C., & Peters, G. P. (2014). Urban ecosystems and the provision of ecosystem services. Current Opinion in Environmental Sustainability, 7, 10-17.

Tshabalala, R., Smith, J. A., & Nkosi, T. (2017). Traditional medicinal practices in urban agriculture in South Africa. Journal of Urban Agriculture, 12(3), 45-58.

Twiss, J., Dickinson, J., Duma, S., Kleinman, T., Paulsen, H., & Rilveria, L. (2003). Community gardens: Lessons learned from California Healthy Cities and Communities. American Journal of Public Health, 93(9), 1435-1438.

Twumasi-Ankrah, K. (2018). The role of urban agriculture in addressing food security in low-income urban areas: A case study of Accra, Ghana. Urban Agriculture Journal, 22(3), 112-127

Van den Berg, A. (2019). Benefits of urban green spaces with edible plants for well-being: A systematic review. Urban Forestry & Urban Greening, 40, 77-86.

Van den Berg, Mark, & Bessey, J. (2017). The role of education in urban agriculture: Empowering residents in knowledge-sharing initiatives. Journal of Agricultural Education and Extension, 23(5), 415-431.

Van Dyck, H., & Van Dongen, S. (2018). Climate change mitigation strategies in urban agriculture. Environmental Science & Policy, 89, 72-80.

Wakefield, S., Yeudall, F., Taron, C., Reynolds, J., & Skinner, A. (2007). Growing urban health: Community gardening in South-East Toronto. Health Promotion International

Appendices

Appendix I: Questionnaire

Good morning/afternoon. My name is Lovemore Junior Chingwere, and I am a final-year student at Bindura University of Science Education (Registration: B202336B). I am researching to fulfil the requirements of the Bachelor of Science Honours Degree in Natural Resources Management. The research is entitled *"Edible plant diversity in Lion's Den township, Makonde District Mashonaland West Province, Zimbabwe".* I invite you to assist me with information on this subject, if you are willing to take part, and the information you will divulge will be classified as confidential. The research outcomes will help in raising knowledge on edible plant propagation.

Questionnaire ID: ……………………

INSTRUCTION: Please tick on the appropriate answer and fill in wherever possible.

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

1. Gender: Male ☐ Female ☐
2. Age: <25 years ☐ 26-40 years ☐ 41-50 years ☐ >50 years ☐
3. Marital status: Married ☐ Divorced ☐ Single ☐ Widow/er ☐
4. Educational level attained: None ☐ Primary ☐ Secondary ☐ Tertiary ☐
5. Residence period in ward 5, Lion's Den: <5 years ☐ 6-10 years ☐ >10 years ☐
6. Work experience: <1 year ☐ 1-5 years ☐ 6-10 years >10 years ☐
7. Main source of income: Formal employment ☐ Informal employment ☐ Farming ☐ Gold panning ☐ Other *please specify* ……………………………………

SECTION B: EDIBLE PLANTS SPECIES PREFERENCE AND CULTIVATION

8. Which type of edible plants do you prefer the most? Vegetables ☐ Fruits ☐

9. Which edible plants do you normally grow? *(list three common ones per each category)*

   Vegetables: ……………………………………………………………………………

   Fruits: ……………………………………………………………………………

10. How often do you grow these edible plants? Always ☐ Occasionally ☐ Rarely ☐

SECTION C: SOCIO-ECONOMIC FACTORS INFLUENCING CULTIVATION OF EDIBLE PLANTS

1. From the following what do you consider factors influencing cultivating edible plants?

Influencing factors	**Yes**	**No**
1. Time availability	☐	☐
2. Culture or tradition	☐	☐
3. Medicinal properties	☐	☐
4. Food security	☐	☐
5. Market availability	☐	☐
6. Food safety	☐	☐
7. Access to land	☐	☐
8. Income levels	☐	☐

SECTION D: OTHER FACTORS INFLUENCING CULTIVATION OF EDIBLE PLANTS

Climate change	**Yes**	**No**
Consumer preferences	☐	☐
Soil quality (environmental factors)	☐	☐

Labour cost		
Government subsidies		
Technological innovations		
Availability of inputs		
Aesthetic		

11. What deters you from cultivating edible plants? Lack of knowledge Cost Limited time and labour Lack of space Poor soil quality Alternative access to food

12. What challenges do you face in cultivating edible plants? Limited resources Unpredictable weather Lack of knowledge Pests and diseases Nutrient deficiencies Weeds

13. What else should be done to improve cultivating edible plants? Continuous learning Integrated pest management Water management Crop rotation Soil testing and amendment Crop diversification Technological advancement

END OF QUESTIONNAIRE …………….. THANK YOU

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