

Urban community gardens: Enhancing household food security, ecosystem services and human well-being in Masvingo and Mutare Urban Areas, Zimbabwe

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The objectives of the study were to assess the contributions of community gardens to household food security and to identify the ecosystem services provided by the community gardens. Key informant interviews were conducted to obtain background information and characteristics of community gardens in Mutare and Masvingo, Zimbabwe. We also investigated how urban community gardens contribute to household food security and ecosystem services through literature survey. Results show that allocation of garden plots per household is determined by the availability of land and the number of beneficiaries per garden. In Masvingo, garden plot size is 100m² and in Mutare 200m² per each household. The relationship between garden plot size and food security was directly proportional, which suggests that the bigger the garden plot size, the higher income generated that increases the household's access to food. Literature review also revealed that urban community gardens have the potential to contribute to household food availability, improve the access and utilization through increased production, income generation and dietary diversity. Urban community gardens are also important based on their social functionality, role in building resilience, and their contributions to human wellbeing through the delivery of ecosystem services. It is recommended that urban community gardens be integrated into urban planning as part of green infrastructure, for continuous enhancement of ecosystem services and improved livelihoods.

Key Words: *community gardens, peri-urban area, ecosystem services, food security, Zimbabwe*

1. INTRODUCTION

Urban food insecurity is a major development challenge in the Zimbabwe. With a population of 13 million, 33% of Zimbabwe's population reside in urban areas and poverty levels were recorded to be high in the country's urban areas with about 38.2% of the urban population being poor and 5.6% regarded as very poor¹⁾. However, with the continuous increase in population and rapid urbanization, there is a need to ensure that millions of households living in urban areas have access to enough food for the maintenance of a healthy life²⁾³⁾⁴⁾.

For a long time, in Zimbabwe, food insecurity has been generally associated with rural livelihoods. However, that perception is changing as the national government and their partners are now recognizing that food security issues are also affecting peri-urban and urban areas in the country⁵⁾⁶⁾⁷⁾. Several factors

contribute and drive urban food insecurity in Zimbabwe. First, cyclical droughts have affected Harare, Bulawayo, Mutare, Masvingo, Gweru and other urban areas, resulting in limited food availability and access⁷⁾. Secondly most urban households depend on purchased foods, but the affordability is determined by the income received, and low-income level households have limited access to food resulting food insecurity⁸⁾. Zimbabwe has long been receiving humanitarian assistance to address issues of food insecurity. Therefore, humanitarian assistance has proved to be an unsustainable means of attaining food security, hence, there was a need to reinforce this with the longer-term programs to meet the needs of vulnerable households⁹⁾¹⁾. Therefore, in the attempt to reduce the challenges of food insecurity in both the rural and urban areas the government and local authorities with the aid of non-governmental organizations established community gardens to help

to address the food security issues⁹). Beyond the provision of food, urban gardens play an important role based on their social functionality, role in building resilience and their contributions to wellbeing through the delivery of ecosystem services¹⁰). Despite the growing attention to the contribution of community gardens to household food security, their appreciation in urban setting is generally poor. As much as there is a growing public interest and participation in food producing urban community gardens, only a limited number of research has examined socio-ecological processes in these spaces¹¹). In this regard, the study aims to assess the potential contribution of urban community gardens to household food security and ecosystem services. The objectives of the study are as follows (1) to identify the characteristics of urban community gardens, both in Masvingo and Mutare (2) to determine the contribution of community gardens to vegetable intake and food security, and (3) to explore the ecosystem services enhanced by urban community gardens.

2. METHODS AND MATERIALS

(1) Study Area

The study was conducted in Masvingo and Mutare (**Figure 1**), which are urban areas in Zimbabwe. Masvingo is situated in the southern part of Zimbabwe and it is the capital of Masvingo Province. It is a drought prone area which receives an average of 600mm/year and an average annual temperature of

19.4°C. It is characterized by hot and dry weather throughout the year. Mutare is the fourth largest city in Zimbabwe, and it is the capital of Manicaland Province. The average annual temperature is 19°C and average annual rainfall is 818mm.

(2) Data collection

Data was collected using key informant interviews. A total of 8 key informant interviews were conducted including where 2 City Council Officials, 1 Agricultural Extension officer, 1 garden coordinator and 5 garden chairpersons. The interviews were conducted to gain an under-standing on the development of gardens, compile background information about urban community gardens, the main characteristics and the number of beneficiaries per garden.

A standardized literature search was used to include words or phrases that relate to community gardens, food security, nutrition, dietary diversity, benefits of community gardens and ecosystem services using studies from 2005-2017 (**Table 1**). This was the period when community gardens started to flourish in Zimbabwe. For ecosystem services focus was on publications from 2005 when the importance of the ecosystem service concept began to be recognized. Search strategy was applied to the following databases Scopus, science direct and google scholar. Websites of relevant organizations were in searched for reports and other grey literature on food security and vegetable nutritional components.

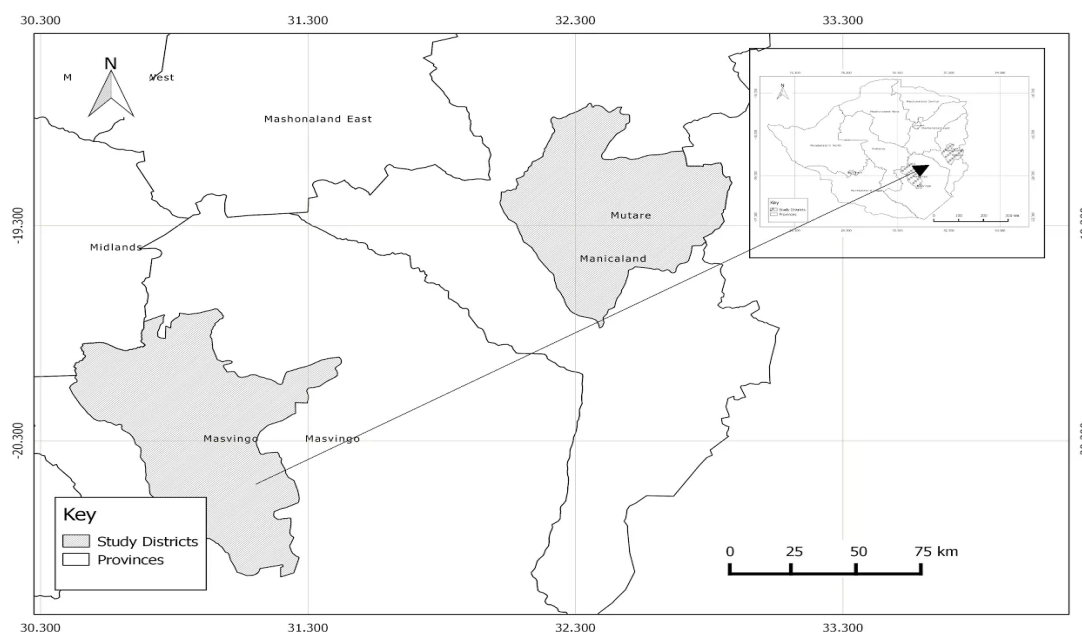


Figure 1 Study sites Masvingo and Mutare

Table 1 Strategy used to gather publications relating to the study

Concept	Subject heading
Food security	Food access, food availability, food supply, household food security, vegetable intake, dietary diversity
Gardens	Community gardens, home gardens, nutritional gardens, allotment gardens, horticulture
Ecosystem services	Benefits of community gardens, social benefits, ecological benefits, economic, provisioning services, regulating services, cultural services and supporting services

3. RESULTS

(1) Garden Characteristics in Masvingo and Mutare

The community gardening project was established by Non-Governmental Organizations (NGOs) to reduce poverty and food security issues for vulnerable households. In Masvingo the gardens were established by a French organization Action Contre La Faim in 2010, while in Mutare, urban community gardens were implemented by CARITAS International Zimbabwe in 2010. There are about 770 and 1000 beneficiaries in Masvingo and 1000 in Mutare, respectively. Masvingo has 26 community gardens less than or equal to 1 hectare in size. However, out of the 26 gardens, only 8 were functional during field visit. Most of them were abandoned due to heavy rains. In Mutare, 3 gardens were established. Of the three gardens, only one of 10 hectares and was still operational, whilst the other gardens were replaced by infrastructures.

(2) Community gardens and food security

The most common crops that were grown in both Mutare and Masvingo are the green leafy vegetables and cereals (maize) (**Table 2**). These crops are rich in macronutrients and vitamins important in contributing to household food nutritional status and health. Community gardens play a significant role in contributing to household food security. Results from the reviewed literature show that community gardens contribute to in-come generation through sale of vegetables, dietary diversity through the consumption of different types of vegetables and cereals (**Table 3**). In addition, community gardens are contributing to food availability through increased production because beneficiaries of community gardens own slightly bigger plots compared to the non-beneficiaries hence they obtain a greater yield.

(3) Ecosystem services provided by community gardens

Several ecosystem services and related functions were identified from literature and through field observation and these are provisioning services, regulating services, cultural services and supporting services. Our field observation and reviewed literature identified provision of food, medicinal resources, social inter-actions, aesthetics and physical exercise and education (**Table 4**). Cultural ecosystem services were the most identified type of ecosystem services both from the literature and field observations which

Table 2 Nutritional Composition of vegetable crops grown in community gardens in Mutare and Masvingo

Crop Name	Scientific Name	Sodium	Calcium	Potassium	Iron	Magnesium	Carbohydrates	Dietary Fiber	Protein	Vitamin A	Vitamin B	Vitamin C	Vitamin D	Vitamin E	Vitamin K
Green Leafy Vegetables															
Covo		✓	✓	✓	✓	✓		✓		✓	✓	✓			✓
Rape		✓	✓	✓	✓	✓		✓		✓	✓	✓			✓
Rape seed	<i>Brassica napus</i>	✓	✓	✓	✓	✓		✓		✓	✓	✓			✓
Okra (Lady Finger)	<i>Abelmoschus esculentu</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Roots and Tubers															
Onions	<i>Allium cepa</i>	✓	✓	✓	✓	✓	✓	✓	✓			✓			✓
Sweet Potatoes	<i>Ipomoea batatas</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Cereals															
Maize	<i>Zea mays</i>						✓		✓		✓				
Fruits															
Bell Pepper (Red, Yellow, Green)	<i>Capsicum</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			
Eggplant	<i>Solanum melongena</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Tomatoes	<i>Lycopersicon esculentum</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓

Source: United States Food and Drug Administration (2012)

Table 3 Benefits of Gardens according to a literature survey, n= 9

Food Security Indicator	Impacts		Reference
Production	+	-	Chazovachii et al. (2013) ¹² , CARITAS International (2014) ¹³ , FAO (2005) ¹⁴ , Chitongo and Magaya 2013 ¹⁵ ,
Income	+		Muzawazi (2014) ¹⁶ , Chitongo and Magaya (2013), Sithole et al (2012) ¹⁷ , Gwetsayi et al. (2016) ¹⁸ , ACF (2011) ¹
Dietary Diversity	+		Sithole et al. (2012), Gwetsayi et al. (2016)
Nutrition	+	-	Mutambara et al. (2013) ² , ACF (2011)

Table 4 Ecosystem services and functions from community gardens

Function	Goods and services from community gardens	Source Identification	
		Observation	Literature
Provisioning			
Food	Providing diverse and nutritious food	●	●
Medicine	Provision of medicinal plants		●
Cultural			
Stress reduction	Reduction of stress from spending the day at community gardens		●
Education	Environmental education (farming practices)	●	●
Physical exercise	Activities carried out in the gardens, weeding, watering and harvesting	●	●
Recreation	Some spent time in the community gardens for leisure		●
Maintaining Cultural Heritage	Natural feature that have cultural values		
Aesthetic	Community gardens aesthetic features	●	●
Social Relations	Social interactions with other beneficiaries	●	●
Regulating			
Air quality regulation	Cooling the environment,		●
Flood regulation	Flood prevention		●
Climate regulation	Contributing to carbon sequestration		●
Pollination	Enhanced crop production		●
Supporting /Habitat			
Biodiversity	Species richness and diversification/space for wild plants and small animals		●

indicate that these were the most valued from the community gardens.

(4) Constraints faced by gardeners

Participating in community gardening is not always an easy task despite the benefits. Gardeners often encounter issues that hinder production. Compared to any other agricultural production system, community gardeners have numerous limitations and challenges that include theft, access to water, pests and diseases, distance to the markets and lack of knowledge on marketing strategies.

4. DISCUSSION

(1) Food security

Community gardens contribute to the 3 pillars of food security, which are availability, accessibility and utilization. Factors that influence availability are levels of production and stock levels. The urban poor usually have small land holding sizes and it is a challenge for them to produce from their own homes. With the introduction of community gardens, households can get

an allocation of plots where they can cultivate their crops. High yield from the community gardens is correlated with large plot sizes¹²⁾¹³⁾¹⁴⁾. Community gardens indirectly improve household food access through provision of marketing opportunities¹⁵⁾. Gardens contribute to dietary diversity which in-turn improve household's health and nutritional status¹⁶⁾¹⁷⁾.

(2) Ecosystem services provided by community gardens

Community gardens are providers of plants, traditional medicine, fiber and raw materials¹⁸⁾. Urban community gardens are providers of aesthetic and psychological benefits that enrich human life with meanings and emotions¹⁹⁾. They offer multiple opportunities of recreation, social cohesion and cognitive de-velopment²⁰⁾. Cultural services are valued more than the others because of their nature to enhance environmental education, socialization, and the sharing of knowledge. Community gardens also provide regulating services to urban communities,²¹⁾ through their regulating services which include air quality regulation, local climate regulation and water regulation.

(3) Constraints to production

Garden beneficiaries in both Mutare and Masvingo identified market prices fluctuations, distance to the markets, pests and diseases, theft and access to water as the major challenges. Occurrence of pests and diseases vary with type of crops, the climate and the growing season⁴⁾. Therefore, there is need for increased technical support for the gardeners¹¹⁾. This would also allow the beneficiaries to avoid relying on expensive and environmentally damaging inputs.

5. CONCLUSION

Urban community gardens enhance household food security by providing diverse fresh and nutritious food and income to the urban poor. Although, gardens enhance household food security several challenges have limited their capacity to do so. These challenges include markets, pests and diseases. It is suggested that effective programmes and policies that enhance community gardens capacity to promote food security and nutrition be designed.

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