INNSPUB

International Journal of Agronomy and Agricultural Research (IJAAR)
ISSN: 2223-7054 (Print) 2225-3610 (Online)
http://www.innspub.net
Vol. 13, No. 6, p. 24-39, 2018

RESEARCH PAPER OPEN ACCESS

The role of home gardens in enhancing food security and sustainable livelihoods. A case study of Domboshava house hold gardens

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Article published on December 30, 2018

Key words: Home gardens, Food security, Nutritional Diversity, Sustainable livelihood.

Abstract

Food security and nutritional diversity is one of the key areas that developing countries should address. With varying local opportunities and challenges, home gardens can be a panacea to food insecurity and bring in self-reliance, sovereignty and dignity. The paper sought to examine the role of home gardens in enhancing food security and sustainable livelihoods in Domboshava communal areas focusing Maonera, Chivero and Cheza village households. Both quantitative and qualitative methods were triangulated to collect data through questionnaires and interview guides. Analysis of data was carried out using descriptive statistics and content analysis. The study revealed that home gardens goes beyond ensuring food security to sustainable livelihoods through home-based employment, reduction of household expenditure on food, income generation and recreation, empowered women and promoting social justice and equity. However constraints such as poor markets, lack of inputs, pest, diseases, thieves, unfavorable policies and extension services if addressed home gardens can be a viable food and nutrition security and sustainable livelihood strategy. Based on these results, it is recommended that home gardens program should be scaled-up and further expanded in other parts of the country.

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Introduction

The Zimbabwean economic meltdown has virtually paralyzed all socio-economic sectors including the agricultural sector. This coupled with climate change threat, have exacerbated the food and nutrition insecurity crisis exposing the poor resource and vulnerable rural populace. Never the less, food and nutrition security remains a high priority in the vision and mission of the Government of Zimbabwe (Zimbabwe National Nutrition Strategy, 2014). Henceforth, the government along with other non-governmental and international organizations, launched a number of strategies and rebuilding programs nationwide dedicated to eradicated poverty, hunger and malnutrition guided by the former MDG's and the current SDG's (Zim VAC, 2010). Amongst the strategies there is an attempt to vitalize and diversify the agricultural sector, and home gardens have been realized to be of fundamental importance in building local food production system and a safety net for household food security and sustainable livelihoods (Fisher, 2004).

This is because home gardens despite being the oldest production system are an integral part of the local food production systems and important for the socio-economic development of subsistent resource poor communities (FAO, 2010). Moreover home gardens are essential for household food and nutrition security because they provide income and sustenance throughout the year from the diverse crops contained within them which are harvested at different times and served on daily basis (Eyzaguirre and Linares, 2004). Tracing their history, home gardens have been an integral part of the local food systems since ancient times and were initiated back from the eighteenth and nineteenth centuries in Asia and Africa to increase household and intra household food and nutrition security (Kumar and Nair 2004). Home gardens exhibit a wide diversity of perennial and semi-perennial crops, herbs, ornamental, fruit trees and sometimes livestock which saves as supplementary source of food and income for sustainable livelihoods (Taylor and Francis 2009; Bonnard, 2010). Depending on the purpose and composition, home gardens have acquired a plethora of names such as home, mixed, backyard, kitchen, farmyard, and compound gardens but both with similar benefits of ensuring food and nutrition security, income generation and improving the livelihoods of the rural populace (Helen Keller International, 2003; Mitchell and Hanstad, 2004).

According to Johnson-Welch *et al,* (2000), home gardens are a time-tested local strategy commonly practiced in most rural areas as a remedy to alleviate hunger and malnutrition in the face of global food crisis (Johnson-Welch *et al,* 2000). However, in Zimbabwe home gardens are not considered at national level despite all those benefits which cuts across from eradicating poverty, ensuring food and nutrition security and enhancing sustainable livelihoods. Hence, it is against this background that a research should be carried to explore the role of home gardens in ensuring food and nutrition security and sustainable livelihood of rural populace.

Definition and characteristics of home gardens

Kumar and Nair (2004), while acknowledging that there is no standard definition for a home garden, summarized the various opinions by referring to it as an intimate, multi-story combinations of various trees and crops, sometimes in association with domestic animals primarily for household consumption and usually located around homesteads. On the other hand, several scholars described home gardens as the cultivation of small portion of land near family dwellings which encompass vegetables, herbs, ornamental, medicinal, fruit plants and sometimes livestock that save as the supplementary source of food, income and sustainable livelihoods (Hoogerbrugge and Fresco, 1993; Eyzaguirre and Linares, 2004; Sthapit, *et al*., 2006; Krishna, 2006: Odebode, 2006). Home gardening have evolved over the years and entails small scale economic production practice of cultivating, processing and distributing food in and around the village, town or city in confined areas located close to the family dwellings. Home gardens exhibit a wide diversity of perennial and semi-perennial crops intended for family consumption but they can be diversified in production of trees, medicinal plants, plus countless other plants of considerable technological, economic, cultural, social, ecological,

and ornamental while excess output can also be sold to generate additional income (Kombayashi 2010: Yiridoe and Anchirinah, 2005).

Home gardens are important in building local food production system and a safety net for household food security and sustainable livelihoods (Fisher, 2004). Home gardens are an integral part of the local food production system and important for the socio-economic development of subsistent resource poor communities (FAO, 2010). More so, home gardens provide income and sustenance throughout the year from the diverse crops contained within them which are harvested at different times and served on daily basis (Eyzaguirre and Linares, 2004).

Review of literature

In order to investigate home gardens the current study employed the DFID Sustainable Livelihoods Framework. The sustainable livelihoods framework was developed in the context of poverty reduction, but explicitly addressing vulnerability, hence it provides an entry point for integrating food and nutrition security into poverty reduction strategies (Carney *et al,* 1999). The sustainable livelihoods framework aims to increase the effectiveness of any intervention in two main ways, the first is by mainstreaming a set of core principles which determine that poverty-focused development activities should be people-centered, responsive, participatory, multi-level, conducted in partnership, sustainable, and dynamic. The second is by applying a holistic perspective in the programming of support activities, to ensure that these correspond to issues or areas of direct relevance for improving poor people's livelihoods (DFID, 1999).

Materials and methods

Experimental site

The study was carried out at Domboshava communal area which is under Mashonaland East, Goromonzi district. The area is located 32 km from the city center of Harare and lies at 17^{0} 36^{1} Latitude, 31^{0} 26^{1} Longitude and 1500 Altitude receiving an average annual rainfall in the range of 750-1000 mm and an average annual maximum temperature in the range of 20-30^{0}C (Mhazo *et al* 2013).

The study focused on three villages Cheza, Chivero and Maonera village. This site was selected because most smallholder farmers in the area are practicing home gardens and there is less information on how they contribute to food security and sustainable livelihoods.

Research design

A descriptive survey design was adopted which triangulated both qualitative and quantitative research methodologies. Qualitative research method was chosen for this research based on its ability to capture complex and rich data which is context-specific. According to Holloway and Wheeler (2002), qualitative research is a form of social enquiry that focuses on the way people interpret and make sense of their experience and the world in which they live carried out in a natural setup. The researcher also employed quantitative research methodology which is defined by Britten (1999), as a formal objective, systematic process in which knowledge about the world is acquired and is a research that presents results in numbers.

Population and sampling

The targeted population of this study comprised of all Domboshava farmers in Cheza, Maonera and Chivero village practicing home gardening. A subset of 65 respondents was selected using snow balling and purposive sampling method which implies that no special sub-group of the population is particularly favored in the sample selection (Tashakkori and Teddlie, 2003). Purposive sampling was used to avoid gender, distance and roadside biases. Purposive sampling technique and snowball were used because detailed data from a few cases was needed as the research focused on in-depth information which was generated from respondents.

Research instruments

Household interviews and key informant interviews were used to carry out this study using questionnaires, and interview guides to collect primary and secondary data. Data was collected through interviewing farmers, key leaders and the stakeholders in the area.

This was done through administering structured questionnaires to farmers and key informant interviews to the major stakeholders in the sector. To pursue the objectives of this study, field surveys were used to provide the primary data. Existing literature on role of households in food security was reviewed.

Data analysis

Excel statistical program was used for some descriptive explanations. Quantitative data was coded and summarized in tables, graphs, mean, frequency, and percentages. Descriptive statistics was used in the analyses of demographic information while graphs and tables were used to analyze relevant information pertaining to home gardeners.

Results and discussion

Socio-economic characteristics of respondents

Table 1 shows the socio economic characters of all the respondents. Most respondents (58%) were females and a greater number (46%) were married. 37% of the respondents were of the age of 31-40 years old and a greater number (46%) had reached their secondary level of education.

Table 1. Socio-economic characteristics.

Socio-economic variables	Frequency	Percentage
Sex		
Male	38	42
Female	27	58
Marital status		
Single	13	20
Married	30	46
Divorced	13	20
Widowed	9	14
Age		
20-30	14	22
31-40	24	37
41-50	17	26
51-60	9	14
< 60	1	2
Education level		
Primary	10	15
Secondary	30	46
Tertiary	11	22
others	14	17

Results

The physical, socio-cultural and economic factors that impacts productivity on home garden

The first objective was to examine the physical, socio-cultural and economic factors that impacts productivity on home gardens.

From the 65 respondents interviewed most of them indicated that physical, socio-cultural and economic factors have an impact on their production.

Land suitable for garden

The results indicated that most farmers 83% have land that is suitable for gardening while a few 17% had no suitable land but they had to improvise so that they also practice home gardening. This is mainly because land for a garden requires having a constant supply of water, optimum soil type and good location which receives sunlight most times. One female farmer said,

"I also want to fully engage in these home gardens but as you can see my garden is slope, the soil is exhausted and most fertile soils have been washed away there is nothing much l can harvest in this area.

This is a clear indication that suitability of land impacts productivity of home gardens and seems to confirm the findings of Rukuni (2006), who postulated that most small holder farmers despite their passion of engaging in home gardens the major limiting factor is suitable land. Moreover similar results were obtained by Moyo (2002), who indicated that limited access to natural asserts such as land and water is the major factor impacting productivity of small holder farmers and in particular home gardening. Gardening requires fertile soils to maintain productivity of the heavy feeder horticultural crops. Therefore the results concurs with Svotwa (2008), in a similar study in Zimbabwe who opined that there is a gradual acidification and general decline in the nutrient status of soils in communal areas and if the trend continues, soil fertility may become a major limiting factor for crop production.

Table 4.1. Suitable land for garden.

Land suitable for garden	Frequency	Percent
Yes	45	83
No	11	17
Total	65	100

Water source

The majority 77% of the farmers had a constant water supply while a few 23% had no constant supply of water. Home gardens usually produce horticultural crops which requires consistent water supply therefore unavailability of water impede production.

Most farmers have their gardens along the stream but the majority of ward 5 in Maonera village had to drill boreholes at their back yards because there is no a stream nearby. Some in Chivero village had to locate their gardens in veils were they dug wells for water supply. These results are in agreement with Yiridoe (2005), who opined that farmers tend to densely populate areas whose physical environment support agricultural production to try and maximize yields. Some indicated that having seen others enjoying the benefits of home gardens they went on to drill boreholes at their back yards so that they could also have gardens despite the fact that they didn't have any source of water nearby.

Table 4.2. Water source.

Constant water supply	Frequency	Percent
Yes	50	77
No	15	23
Total	65	100

Size of garden

Farmers with only an Acre were the majority 55% followed by those with half of an acre 29% and lastly those with one hacter 15% as size of their gardens (table 4.3). Most farmers indicated that they only reserve a very small portion of land for gardening because they don't harvest much due to limited resources and knowledge. These results concurs with literature that in communal areas of developing countries most farmers who practice home gardens normally do it on a small piece of land due to limited resources and skills (FAO 2002). This however contradicts results obtained in Nigeria by Uzokwe (2016), who indicated that home gardens were being practiced on a larger scale ranging from a hacter to two hacters with maximum production as compared to field crop production. This is attributed to new innovations and techniques which have made home gardening possible even for the families that do not have or have small piece of land (Ranasinghe, 2009). Most farmers pointed out that the extension officers concentrate on disseminating information that is biased to field crops only and that of garden crops (horticultural) is limited hence they end up reducing size of the gardens. The small land sizes can also be an indication that there is pressure on land resources and this could reduce the potential of home gardens to ensure food security. This was also highlighted by Campbell *et al* (2002), who indicated that access to good-quality agricultural land was often limited, sometimes by high population densities or by the alienation of better farming land for large-scale commercial concerns in developing countries.

Table 4.3. Size of garden.

Size	Frequency	Percent
Half acre	19	29
Acre	36	55
Hacter	10	15
Total	65	100

Design of garden

Most gardens were constructed using locally available materials such as poles and grass although a few used fence. These results therefore collaborates the findings of UNDP, (1996) who postulated that home gardens can improve access to food for the poor and vulnerable groups because even the poor and landless can still engage in home gardens on small patches of homestead land, roadsides, edges of field, vacant plots or in containers using locally available materials. From the results it is evident that design also matter as it have an implication on security because those who used poles and grass faced problems of thieves and animal destruction as compared to those who used fencing as noted by one widow female farmer;

"I am very worried because of thieves whenever they think of stealing they come to my garden simply because around this area l am the only still using the traditional materials like grass whilst others use fence which is more secure"

Land ownership

Majority of land 69% is owned by males who are the heads of the family and a few females 25% followed by children 6% (table 4.4). These results are in agreement with Rukuni (2006), who indicated that land ownership in Zimbabwe is tied to culture despite government's efforts to try and address these inequalities. Most female farmers expressed their concern saying that they are the ones who practice agriculture at home yet they don't have control over the land due to culture.

Similar results were observed by Scones *et al*, (2010) who indicated that all over Africa, there are concerns about women's land rights where women are the main producers of food to meet household needs and generate income for the family, yet they have limited access to land rights. One farmer in Cheza Ward indicated that since the establishment of their gardens in 1970 land ownership was only based on sex,

"*When my father in-law died this piece of land was given to his son my husband, and when my husband died the same piece of land was given to my son despite the fact that I am still alive".*

These results shows that if the issue of land ownership is visited to address these inequalities household food security will not be an issue in the country because women constitute 70% of the agricultural sector but they don't have the means of production (FAO 2012). These socio-cultural factors impacts productivity because if one feel insecure the level of participation is also low.

"I don't invest in something that l really know will not benefit me tomorrow, what if when my husband die today and his young brother comes to redeem the land which l will have developed as the next inheritor. This has however limited my capacity because without ownership l cannot fully participate", said one female farmer in Maonera village.

This is collaboration with Howard (2006), who opines that certain cultural values also affect effectiveness, productivity and welfare of agriculture. For high yields one need to invest whether in acquiring asserts or in good soil management, therefore due to insecurity most farmers end up using unsustainable means of production which have negative impacts on productivity. Asserts such as machineries, water pumps and irrigation equipment are essential for productivity which one cannot invest into if he is not secure in terms of land ownership hence impeding productivity.

Table 4.4. Land ownership.

Owner	Frequency	Percent
Father	45	69
Mother	16	25
Child	4	6
Total	65	100

Who normally works in the garden

The greatest number 60% of female (mother) working in the garden was recorded followed by that of the whole family 15%, hired labor 11%, male (father) 8% and the least children 6% (Table 4.5). This can be attributed to cultural and social beliefs that home gardening is for females and children which then concurs with Sthapit (2006), who posits that females contribute 70% of the labor in the agricultural sector. Culturally in Zimbabwe horticultural crops are considered to be feminine hence the results confirms these beliefs. The greatest number of women participating in home gardens can also be attributed to the fact that due to rural- urban migration most men might have moved in nearby towns in search of white collar jobs that are better paying as compared to agriculture. This seems to agree with Odebode (2006), who stated that family gardens have always been the responsibility of women who actively participate in agro economic activities as laborers and farm managers while men works in towns. Again the lower percentage of hired labour can be attributed to the fact that in most communal areas only a few people can afford to hire labour due to financial constraints, hence they depend on family labour supply. These results however, contradict the findings of Mendez *et al,* (2001), on a similar study who noted that depending on the economic capacity, affordability, and cultural beliefs families may work together or hire wage laborers to cultivate and maintain home garden which positively affect the composition and intensity of activities.

Table 4.5. Who normally works in the garden?

Who works in garden	Frequency	Percent
Mother	39	60
Children	4	6
Whole family	10	15
Father	5	8
Hired labour	7	11
Total	65	100

Times of attending the garden

Most farmers 85% attend to their gardens more than three times, followed by 6% attending three times while 5%, 4% attend their gardens 2, 1 times respectively (Table 4.6). Most women indicated that they always attend their gardens on daily basis, while

most men indicated that they only visit the garden during weekend when they are done with their field operations on Saturdays and Sunday. Although some men indicated that they visit the garden 2-3 times per week but the number was few as compared to that of women. This can be attributed to multiple roles that are done in communal areas which hinder maximum attendance to the gardens. As indicated by some farmers they have a lot of work to do which include house chores, livestock tending, attending to field crops and many other responsibilities which then deprive home garden. However attendance and production goes hand in hand which is evidenced by one of the farmers who said

"*I really wish to attend my garden several times per week but however, because l stay alone l am forced to do all the other household chores alone and found it then difficulty to attend it on daily basis, like what my neighbors do and usually l don't harvest much.*

Attendance again is linked to socio-cultural beliefs in the study area as revealed by the results most men believe it is the duty of women and kids to attend the garden on daily basis. Again most women indicated that they were being over burdened by their spouses who believed that home gardening is feminine, leaving the rest of the work to females yet those gardens provide for the entire family. This is evidenced by one of the male farmers in Chirevo village, who said,

"I don't normally visit the garden on daily basis because it is really the duty of my wife and kids and if I'm seen with my fellow men visiting the garden daily they will think I have gone out of my mind, so to avoid that l just make sure my wife and kids do the gardening while l concentrate on field crop production".

These cultural and social beliefs are indeed impeding productivity because if there is cooperation in management of these gardens between men and women the issue of household food insecurity will be history.

Table 4.6. Times of attending the garden.

Times per week	Frequency	Percent
1	3	4
2	3	5
3	4	6
More than 3 times	55	85
Total	65	100

Financial assistant from external sources

Majority of famers 75% indicated that they didn't receive any external funding from donors or from the government to establish their gardens, while a very few 25% indicated that they had been assisted by their relatives and spouses (Table 4.7). Unlike in other areas like Nyanga communal areas which received funding from different NGO's for example concern for the establishment of home gardens the study area never had such opportunities (Concern, 2002). Those who received assistance indicated that it was from their relatives, and from the results the ones who were assisted were the married from their spouses. This is in line with Gupta (1989), findings that married people have an advantage as compared to singles and widows in terms of resources. Despite not having any assistance from the government, some farmers indicated that since the advent of micro finances they have managed to borrow some money from these institutions to increase their production in home gardens. However only those, male headed families were the ones who indicated this, while most females were afraid of engaging themselves in credits. Confirming these results Marsh (1998), postulated that home gardens are usually practiced by women on a small piece of land resulting in lower yields which does not enable them to access financial assistant from the government or from donors. Moreover these micro finance institutions required collateral which most women do not have. These results seems to confirm FAO (2000) findings that in general, male-headed households had more access to different sources of credit compared to female-headed households because women are often hesitant to borrow money and their tendency towards risk-aversion and lack of title deeds which are required as collateral.

"However due to the economic hardships in the country since the economic meltdown in 2008 most financial institutions have long ceased to provide us with loans which make it very difficult for us to sustain our productivity", said one male farmer in Cheza village.

The agriculture sector is a capital intensive sector which requires more capital for one to have higher yields, hence if the farmers fail to acquire monetary assistance productivity is impacted.

Table 4.7. Financial assistant.

Financial assistance	Frequency	Percent
Yes	49	25
No	16	75
Total	65	100

Market

Most farmers 62% indicated that they sell their produce at Domboshava show ground while others go all the way to Hatcliff 23%, and the least 15% Mbare musika markets and a few indicated they relied with butter trade in exchange for other products in the area such as exchange of tomatoes with chickens (Table 4.8). One farmer said, *"Due to transport cost we end up exchanging most of our produce within the community like one may have tomatoes and l have onions so we just exchange but that will not be our will".*

This however is a clear indication that home gardens productivity can be impacted by availability of market places. If one fails to sell their produce the next season he will not engage in the production. Only a few indicated that they can afford to sell their produce to very far and competitive markets such as Mbare musika were they will fetch good prices.

Table 4.8. Market.

Market	Frequency	Percent
Mbare	10	15
Hatcliff	15	23
Domboshava show ground	40	62
Total	65	100

The results also indicated that even at community level the food and nutrition security can be attained because of the batter trade, those who cannot afford to produce tomatoes can still get them from others hence increasing the communities' base for nutritious food. Availability of market place within the production can also translate to higher income from sale since transport cost will be reduced and moreover it reduces post-harvest losses. This confirms the findings of Ninez (1998), who postulated that availability of local markets, boost the economic status of home gardens producers due to reduced transport cost and reduced incidence of post-harvest losses of the perishable products of home gardens.

In a nut shell the physical, socio-cultural and economic factors that impacts productivity on home gardens as revealed by findings are suitable land for garden, constant water supply, size and design of the garden, land ownership, day and times of attendance and the person who attend garden, financial assistance and market.

Challenges faced by gardeners

The second objective was to explore the major challenges being faced by home gardeners and most commonly cited problems included lack of market places, transport to the market, pest and diseases, poor storage facilities, thieves and water shortages.

Several common species of weeds were found in most home gardens and amongst them were the *Cyperus rotundus, Brassica sp*. (wild species), and *Cyanodon dactylon species.* Some of the most destructive insect pests include mealy bug, thrips, white flies, leaf miners, leaf hoppers, red spider mite and aphids. Amongst plant diseases affecting home gardens, viral and fungal diseases including yellow mosaic virus, bunchy top virus, and powdery mildew were frequently mentioned. However the occurrence of pests and diseases vary with the type of crop, environment, and management practices. Those who had the knowhow and resources to prevent and control pest and disease were not affected but to a little extend. Some indicated that due to limited resources they had resorted to use of organic chemicals to control pest and diseases although the results were not satisfying. The ineffective of organic chemicals can be attributed to lack of knowledge and limited information on how to use them. This is evidenced by one of the farmer who said,

"I can't afford to buy these expensive chemicals so l used my traditional knowledge in controlling pest and diseases. Usually l use cow dung and some roots of other plants which act as repellent to other types of insects like aphids".

Similar results were obtained in Nepal where small holder farmers were using cow dung to control aphids but results were not very effective (Gautan, *et al,* 2004). Confirming these results Gupta (2001), opines that from time immemorial pest and diseases have been a cause of concern in communal areas where there is limited knowledge and access to various pesticides and chemicals.

Some farmers mentioned the issue of seeds, indicating that horticultural seeds are very expensive and cannot be easily acquired like for example one farmer said,

"We also want to produce luxury and good money fetching crops like broccoli, lettuce and cauliflower but we don't even know where to purchase the seeds"

This shortage or unavailability of seeds in the local markets can also be attributed to the incompetence of the service providers in communal areas who are biased towards field cash crops only.

Another problem which was topical is the issue of thieves who visit during the night and harvest the whole garden before the farmer had even enjoyed the fruits of his sweat. These thieves were also reported to be in the market places again and are referred to as (makoronyera) who abuse most farmers especially women who are forced to sell their produce at very low prizes.

The issue of transport to fetch their products to the markets was also raised as one of the problems troubling the Domboshava farmers, despite the fact that transport and market play important roles in the sustainability of home gardens. Due to lack of transport most farmers indicated that they end up producing what is enough for home consumption. These results are consistent with the findings of ICRISAT (2007), who postulated that due to exorbitant prices charged for transporting their produce and the perishable nature of horticultural produce farmers will resort to subsistence farming to avoid crop losses. These results are in agreement with Jackson *et al,* (1997), who observed similar results in Mashonaland East that many times farmers prematurely harvested their produce to take advantage of any truck coming through their way while others leave the vegetables to over ripe in the garden because no transport has been available. As a result farmers end up selling their produce at very low prices or resorting to batter trade.

They also noted that there is lack and limited access to information and advisory services. Information is of paramount importance and lack of it impacts production, limiting the potential of home gardens in ensuring food security and sustaining livelihoods. Most farmers indicated that extension advisory is biased towards field crops depriving this sector. The results seems to support the findings of Rukuni (2012), who propounded that there is no link between research, extension and farmers in most developing countries due to limited resources. Farmers indicated that they end up using their indigenous knowledge which will be outdated due to climate change hence impacting their production. These results concurs with FAO (2012), who opined that in most developing countries the major limiting factor in small holder agriculture is lack of current and effective information on how to copy up with the fast changing world in terms of technology and climate change.

The other problem cited was that of storage, most crops that are produced in home gardens are perishables which require good storage facilities of which most farmers do not have. A large proportion of farmers indicated that besides crop losses caused by pest and diseases post-harvest loss has a larger share. They indicated that they don't have good storage facilities which can sustain and prolong the storage life of their produce hence they suffer post-harvest losses each year. Confirming these results, The Institute of Post-Harvest Technology (2002), opined that countries where infrastructure and marketing systems are profoundly weak depending on the food commodity post-harvest losses in fresh produce range from 25-50 percent. However, in this study the post-harvest losses experienced in home gardens were lower. This relatively small loss in production can be attributed to the fact that most of the produce is either consumed and shared by the household or sold in the local market.

Table 4.9. Post Harvest loss.

Post-harvest loses	Frequency	Percentage
Yes	16	25
No	49	75
Total	65	100

Lack of supportive policies

From the key informant interviews, results indicated that home gardens have been neglected in policy formulation. Some indicated that even if they want to fully engage themselves in these gardens for export, the process is very difficult for a small holder farmer

due to stringent phyto-sanitary measures. Most farmers indicated that although the markets were liberalized but still they don't have the capacity to compete in these highly competitive markets.

"Due to limited resources, skills and resources it is very difficult for us to compete with those with the means of production, producing at a very low production costs and moreover the quality of our crops will be of very low grades fetching little money in the public markets", said one farmer.

They even indicated that marketing policies are more biased towards cash crops were the government have set floor and ceiling prices to protect commercial cash crop farmers neglecting the small holder farmers. For field crops the government have also subsidized them to lower the production cost yet for home gardeners no such opportunities have be availed. Moreover to lower the transport cost government have also established grain marketing boards in every district but market places for the horticultural crops harvested from home gardens are not available unless if farmers come together and establish their center for marketing. One farmer noted that,

"In maize production there are so many programs that come their way for example it first came Maguta program in 2008 were farmers were given inputs and now its Command agriculture still focusing on field crops as if they are the only ones who ensure food security".

The role of home gardens in ensuring food security, nutrient diversity and sustainable livelihoods

The third objective was to examine the role of home gardens in enhancing food security, nutrient diversity and sustainable livelihood. From the 65 respondents most of them agreed that home gardens are a panacea to food insecurity and malnutrition hence sustaining the livelihoods of the community.

Types of crops grown

Several types of plants that are locally preferred and adapted to local conditions were found in most home gardens. An average of six plant species were found in individual home gardens and plant types included vegetables, fruits, plantation crops, flowering plants, medicinal and herbal plants.

The common vegetable crops in the home gardens included tsunga, covo, rape, onions, tomatoes, beans and some traditional leaf vegetables like amaranthus and cleome. The dominant fruit species included banana, mango, guava, and papaya. Some also venture into herb production for culinary and medicinal purposes. Thus, vegetables and fruits topped the list of identified useful crops in home gardens which seems to concur with the results in Nigeria, Uzokwe (2016), who found a similar pattern. From the crops being produced by farmers there is an indication that they are having a diverse of nutrients within their diet which then helps to fight hidden hunger the common phenomenon in Africa. These results are in agreement with the findings of F.A.O (2001), which indicated that home gardens in communal areas plays a pivotal role in fighting malnutrition and hidden hunger in communities. Similarly in Nhema, Zimbabwe Maroyi (2009), noted that home gardening contributes to nutrition and household food security by providing quick and direct access to different crops that can be harvested, prepared and eaten by family members often daily. The considerable diversity of useful plants found in home gardens is consistent with the findings from home gardens in other developing countries (Ninez, 1984; Trinh*, et al.*, 2003).

Times of harvest per week

The greatest percentage 57% indicated that they harvest their produce thrice per week, followed by those who harvest more than three times 18% (Table 4.10). The least percentages were obtained from those who harvest twice 15% and once 6% per week. Results indicated that farmers harvest different types of crops at different times and this alone however, can prove the availability of plenty food in households thereby combating food insecurity and nutrient diversity. Results concurs with the findings of Ninez (1984), who confirmed that if home gardens are well managed farmers can afford to harvest a variety of nutritious foods more than three times per week.

Table 4.10. Times of harvesting per week.

Time	Frequency	Percent
Once	6	9
Twice	10	15
Thrice	37	57
More than three times	12	18
Total	65	100

Number of famers still buying vegetables

The greatest number indicated that they are no longer buying any vegetables 71%, followed by those who are still buying sometimes 20% and the least number were still buying 9% (table 4.11). These results prove that the gardens have surely increased the availability of food in these households except for those who had little space for production and limited resources. One female widow said,

"If l had a bigger space l doesn't think l would be still buying vegetables, again l doesn't have the capacity to produce more due to limited resources and labour."

Having a greater number of people who are no longer buying vegetables is a clear indication that home gardens have transformed the lives of the farmers in the study area indirectly and directly. It means they now have enough food for the family with diverse nutrient content and can now use the money for other important things like purchasing of asserts hence improved livelihoods.

Table 4.11. Number of farmers still buying vegetables.

Still buying	Frequency	Percent
Yes	6	9
No	46	71
Sometimes	13	20
Total	65	100

Improved food supply

Majority of farmers 82% indicated that they now have increased food supply in the households while a few 18% indicated they are still facing challenges of food availability. These results confirms the findings of Labadarios *et al* (2011), who noted that farmers investing in home gardening have an average of one additional meal per day compared with non-participating households acting as a buffer against drought and crisis. From the interviewed farmers most who had small piece of land have also indicated that they now have increased food supply which then corroborates the findings of Abebe, *et al* (2006) who opined that home gardens provide the main source of staple food for people in heavily degraded and densely populated areas with limited croplands. Therefore from the results it is evident that a greater number have realized the importance of home gardens in food supply.

Table 4.12. Improved food supply.

Improved food supply	Frequency	Percent
Yes	53	82
No	12	18
Total	65	100

Improve food variety

Most farmers 75% have indicated that they are now having a variety of food on their tables since the established of home gardens as compared to 25% a few number which indicated that they are still having challenges in accessing a variety of food. This is also attributed to availability of resources such as labour, land, water and inputs for sustainable production. The results of this research concurs with Trinh *et al,* (2003), who observed that despite their size if production is diversified with more species and managed well, home gardens can increase dietary diversity and help address household malnutrition. Availability of different varieties of plant species allows farmers to have nutrient diversity which is essential for fighting against hidden hunger. This concurs with Marsh and Talukder (2000), who stated that home gardening provides a diversity of fresh foods that improve the quantity and quality of nutrients available for family consumption.

Table 4.13. Improved variety of food.

Food variety	Frequency	Percent
Yes	49	75
No	16	25
Total	65	100

Availability of food in drought

A greater number 86% indicated that during drought time the garden has played a significant role of providing them with food, while only 14% indicated that they had some challenges in accessing food during drought time. Most farmers indicated that unlike the 1992 drought which troubled them the 2002 drought seem to have no impact on them because of the home gardens which supplied food despite the harsh conditions.

"*We survived the drought of 2002 because the wetlands sustained us, we managed to harvest a bump harvest of maize and beans, so in other words this garden is like a buffer to me in times of drought",* said one famer in Cheza ward

It is therefore evident that in times of drought home gardens do sustain most rural people in terms of food, the major reason being most of them are located in vleis and along river banks which do not dry easily in times of drought. Home gardens can therefore act as a buffer in times of stress, lean season and harvest failure.

Table 4.14. Food supply during drought.

Food supply during drought	frequency	Percent
Yes	56	86
No	9	14
Total	65	100

Number of meals per day before

54% of the respondents indicated that before the establishment of gardens they used to have 2 meals per day, while 34% were at the mid having one meal per day and lastly 12% used to have 3 meals. The results confirms the findings of WHO (2007), who indicated that in most developing countries due to food insecurity one can only access a single meal per day depending on the socio-economic status of the family.

Table 4.15. Number of meals before.

Meals per day before	Frequency	Percent
Once	22	34
Twice	35	54
Thrice	8	8
Total	65	100

Number of meals per day after

The majority 69% indicated that they are now having three meals per day, followed by 25% who are now having two meals and the least 6% being those who are still having one meal per day. This can be attributed to availability of food in households leading to food security at house hold level. Comparing the results before and after the establishment of gardens it is evident that home gardens have drastically increased food availability in the households. This outcome is in concurrence with Machakaire and Hobane (2005), who posits that nutritional gardens have multiple benefits for communal households, some of the benefits include; optimized health, reduced risk of diet-related chronic diseases and dietary change that complements the seasonal availability of foods produced and processed by the local food and agriculture system. There is evidence to prove that farmers investing in home gardening have an average of one additional meal per day compared with non-participating households.

Table 4.16. Meals per day after.

Meals per day after	frequency	percent
Once	4	6
Twice	16	25
Thrice	45	69
Total	65	100

Selling of produce

Most farmers 71% are selling some of their produce, while a few 29% are not able to sell. This can be attributed to different factors like yield, size of family and production capacity. The study further showed that some household consume all their produce while others sell the surplus after the family food needs had been met to generate additional income for the household. This provides additional income and also fills the pre harvest food gap. Bonnard (2010), noted that nutritional gardens are an important nutritional supplement and income earning activity. Most home gardens contained food crops that were primarily cultivated for household consumption and use while the excess produce was intended to be shared or sold.

Table 4.17. Selling of produce.

Selling produce	Frequency	Percent
Yes	46	71
No	19	29
Total	65	100

Asserts acquired using income from gardens

Acquiring of asserts is one of most farmers priorities, most of them managed to buy livestock (chickens, cattle and goats) while others have also managed to buy household furniture (TV, solar, tables and radio) others bought bicycles, tractors and cars. The other group also managed to buy garden equipment like water engines, garden forks hoes and watering cans. FAO (1995), assert that home gardening has a dual purpose of provision of food and income generation for households that practice it. Ability of acquiring asserts is an indication that home gardens can provide some extra income besides that of buying food only which proves that home gardens can sustain livelihoods of those participating in them. Home gardens can provide a cash buffer and asset to the household. Besides acquiring of asserts some also indicated that they have managed to send their children to school even up to university.

"*If it wasn't this home garden my son would have not been a teacher today, since the death of my husband l was struggling to place food on the table but ever since l engaged in the production of home gardens my life has become easier. I can now afford to have several meals per day, sent my kids to school and even buy my own asserts like radio and solar*, said one female farmer.

Number of labour hired per month

Most farmers indicated that they hire few labour 32% per month while 19% of the famers indicated that they don't hire labour. The least number was 3% who hire four people and above per month. These results indicated that despite providing food security home gardens can also be a source of employment within the communities thereby lowering crime rates and improving sustainable livelihoods. These results seem to agree with Hoogerbrugge (1993), who postulated that home gardens if they are properly managed can be a source of employment within communities. Confirming these findings Kobayashi *et al*, (2010) indicated that community gardens funded by the USDA, provided an estimated 2,300 jobs and incubated over 3,600 micro-businesses.

Table 4.18. Hired labour.

People hired	Frequency	Percent
None	19	29
1	11	17
2	21	32
3	12	18
4 and above	2	3
Total	65	100

Conclusion

This paper concludes by affirming that home gardens can be a viable panacea to food and nutrition insecurity if farmers have access to livelihood assets such as human, financial, physical, natural and social asserts for maximum production. Basing from the findings of this research the researcher concludes that home gardens goes beyond ensuring food to sustainable livelihoods through home-based employment, reduction of household expenditure on food, income generation and recreation, empowered women and promoted social justice and equity. Constraints such as poor markets, lack of inputs, pest, diseases, thieves, unfavorable policies and extension services if addressed home gardens can be a viable food and nutrition security and sustainable livelihood strategy.

Recommendation

In regard to the role of home gardens in improving household food and nutrition security and sustainable livelihoods revealed by the empirical and theoretical evidence, the following recommendations can be suggested.

- Awareness campaigns from different stake holders on the potential of home gardens.
- There is need for a link on Research, Extension and Farmers for proper dissemination of information concerning general management of home gardens.
- The governments need to consider support policies and regulation that are necessary to motivate and stimulate growth among the smallholder and emerging home garden farmers.
- The government and research institutes need to come up with workshops to train people about home gardens and benefits of engaging in agriculture.
- The government and farmers support organizations to come up with better infrastructural development and agricultural inputs for the home gardeners
- Expansion and scaling-up of home garden programs is thus recommended as a mechanism to minimize adversities of food insecurity, malnutrition, and poverty on communities in Goromonzi District and other parts of the country.

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