

Welfare Implications of Home Gardens Among Rural Households: Evidence from Ingquza Hill Local Municipality, South Africa

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ABSTRACT

Food insecurity is widely recognised as a global issue that requires immediate attention using multifaceted approaches. There is a generalised consensus about the positive role of home gardens in improving household income and food security. However, there is limited empirical evidence to support the above nexus worth exploring to enhance evidence of based programming. Therefore, this study used cross-sectional survey data from Ingquza Hill local municipality in the Eastern Cape Province of South Africa (n = 200) to estimate the correlation between participation in home gardening, household food security, and household income. Results revealed that income from home garden sales was the least source of income for most households in the study area, contributing an average of 10.4% to total household income. An insignificant negative correlation was confirmed between home gardens and household food insecurity access score, suggesting that home gardens fall short of addressing household food security. A positive linear significant correlation was also confirmed between home garden participation and household income. The study concludes that home gardens designed for cash crop production may have a better food security premise than those intended for home food consumption and the sale of surplus.

Keywords: Food security, Spearman's rho correlation, Household Food Insecurity Score, Income

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1. INTRODUCTION

Today the world faces the fundamental challenge of ensuring that millions of households living in poverty have enough food to sustain a better life. South Africa is food secure at the national level; however, the case is different at the household level, where households experience inadequate food access (Hendriks, 2014). According to the FAO (2015), South Africa has achieved the Millennium Development Goal (MDG) 1c of halving hunger by 2015. Nonetheless, South Africa is far from food security at the household level (Hendriks, 2014). Slightly over a quarter of households experienced hunger in 2012, while 28.3% were at “risk of hunger” (Hendriks, 2014). Approximately 26.5% of children aged 0-3 years were stunted in the same year. Evidence exists that micronutrient deficiencies (i.e., hidden hunger) are high among samples of South African children and adults. These deficiencies coexist with high levels of overweight and obesity (Steyn *et al.*, 2005).

Statistics South Africa (Stats SA) (2014) reports that about 17% of South African households have inadequate access to food, and about 34.4% of households are experiencing hunger. This means that measures addressing poverty and food insecurity need significant consideration at the household level, especially in rural areas where high unemployment, low literacy rate, and high dependency ratio are prevalent (Mahlangu & Garutsa, 2014). Hendricks (2014) also argues that hunger and unemployment are still significant challenges in South Africa. Galhena *et al.* (2012) state that household food insecurity among South African citizens is worsened by increased prices of services and goods such as electricity and oil, which has led to increased food prices. The items that constitute a staple diet of poor South Africans, mainly maize and wheat, have been the worst hit.

Food insecurity affects both rural and urban settlements. However, it is more pronounced in rural settlements, whereby the current statistics show a 4.5% increase in poverty over the past five years (Stats SA, 2017). In the Eastern Cape Province of South Africa, household poverty increased from 13.6% to 15.5% in the past five years (Stats SA, 2017). Mahlangu and Garutsa (2014) noted that the high poverty levels in the Eastern Cape could be attributed to unemployed households. Thus, it may be inferred that there are often large numbers of job seekers than available jobs, particularly for those considered unskilled. Such high levels of poverty and unemployment require interventions to help mitigate the high levels of food insecurity within the province. The Eastern Cape is the second poorest province in South Africa (StatsSA, 2011). Currently, the Eastern Cape Province poverty gap is 16.5% (Stats SA, 2017). This suggests a

need for the province to focus on poverty alleviation strategies through interventions by government and private organisations.

Over the years, Africa has sought ways to solve food insecurity (Schaetzel *et al.*, 2013). In developing countries, the agriculture industry has been considered a fundamental backbone in rural areas (Fanzo, Remans & Termote, 2016). However, numerous attempts in South Africa to implement home garden programs often fail to improve the food security of the poor (Adekunle, 2013; Reddiar, 2016). Home gardens are considered a community's most adaptable and accessible land-based activity and are essential in reducing vulnerability and ensuring food security (Adekunle, 2013). Also, home gardens form an integral part of urban and rural livelihoods. They are sites where people grow staple foods and cultivate plants for income and medicine (Reddiar, 2016). Home gardening also plays a significant role in household food production, improved household status, income generation, and nutrition (Gebremedhin *et al.*, 2017, Malahlela, 2015.).

Home gardens are vital in providing income and sustenance throughout the year from diverse crops contained within them, harvested at different times of the year (Galhena *et al.*, 2013). Reddiar and Reddiar (2016) assert that the cultural value attached to home gardens has been reinforced by their essential contribution to household food security over the past 50 years. However, income is the principal determinant of household food security (Puett *et al.*, 2014). Walsh and Van Rooyen (2015) argue that home gardening remains the most important method of food production for most people in the developing world. Moreover, household members' daily nutrition and healthy food can be obtained from home garden production (Puett *et al.*, 2014). Thus far, home garden ownership is vital to urban and rural households since both locations encounter food insecurity and poverty (Schreinemachers *et al.*, 2016). Against this background, the study questions the claimed nexus between home gardens and household food security and the income premise, given the high food insecurity and low participation in home gardens among rural communities. Therefore, this paper focused on the contribution of home gardens to a household's food security and income.

2. PROBLEM STATEMENT

Household food insecurity remains a significant concern in developing countries (von Grebmer *et al.*, 2012). Hunger is not widespread in South Africa as in other Southern African countries (du Toit *et al.*, 2011), but household food and nutrition insecurity persist among the majority

of the Black South African population (Maliwichi *et al.*, 2010). Multiple strategies are required to address the issue of food production and food security (Bhandari *et al.* 2016). It is evident from the literature that home gardens are a part of the agriculture and food production systems in many developing countries and are widely used as a remedy to alleviate hunger and malnutrition in the face of a global food crisis (FAO, 2015; Uzokwe *et al.*, 2016; van Lier, 2017). Furthermore, several studies have documented home gardens as an essential supplemental source of food and nutritional security, livelihoods, and income generation in rural areas (Reddiar & Reddiar, 2016; Walsh & Van Rooyen, 2015). On the contrary, several studies by Masset *et al.*, 2012; Webb, 2013, also question home gardens' food and nutritional security contributions at the household level in rural areas. Therefore, the actual contribution of home gardens to household food and nutritional security remains a highly debated issue worth probing in different geopolitical environments.

From a policy perspective, the South African government developed the National Policy on Food and Nutrition Security in August 2013, intending to increase and better target public spending in social programmes. These programs play an imperative role in food security to increase food production and distribution, including increased access to production inputs for the emerging agricultural sector (DAFF, 2014). Through the National Food and Nutrition Security Policy, the state has set out several programs to support the food and nutrition-insecure population and promote food security across the country (DAFF, 2014; FAO, 2015). Literature, however, highlights that little is documented on the outcomes of the investment towards achieving food and nutrition security at the household level (Aryal *et al.*, 2022). Unfortunately, the blurring between income-based and subsistence rationales within programme and policy provisions frustrates the overall success of community gardening, with implementation processes failing to achieve its objectives (DAFF, 2014). Home gardens, therefore, fail to find a niche within broader production systems, marketing and availability, or as safety nets and social protection (Webb, 2013).

3. METHODOLOGY

3.1. Study Area

Ingquza Hill local municipality is one of the five local municipalities within the OR Tambo District Municipality of the Eastern Cape Province. Ingquza Hill is located to the northwest of the OR Tambo District with the coordinates 32°10'S 28°35'E. The Municipality seat is in

Flagstaff, and the municipal area is divided into 31 wards (Stats SA, 2017). It covers 2,477 square kilometres (956-metre square) of the municipality's total area (Stats SA, 2008). Ingquza Hill local municipality has approximately 278 481 people (Stats SA, 2008). Flagstaff town is part of Ingquza Hill local municipality of OR Tambo District. Flagstaff is located in the northeast of Umtata, in the former Pondoland.

3.2. Empirical Model Used

The study used a cross-sectional field survey whereby data was gathered from 200 households using the availability sampling method from four randomly selected villages of Ingquza Hill Local Municipality. A correlation analysis was used to estimate the association between participating in home gardens and household income and food security. Daniel (1990) notes that outliers, unequal variances, non-normality, and nonlinearity influence Pearson correlation. Spearman's rank correlation coefficient can be used (Daniel, 1990). Pearson correlation measures the strength of the linear relationship between X and Y. In the case of nonlinear but monotonic relationships, a useful measure is Spearman's rank correlation coefficient, Rho, which is a Pearson's type correlation coefficient computed on the ranks of X and Y values as detailed in equation one below (Daniel, 1990).

$$rho = \frac{[1-6\sum(di)^2]}{[n(n^2-1)]} \dots\dots\dots (1)$$

Where;

di is the difference between the ranks of Xi and Yi.

n = the number of (X, Y) observation (ranks).

rs = +1, if there is a perfect agreement between the two sets of ranks.

rs = - 1, if there is a complete disagreement between the two sets of ranks.

4. RESULTS AND DISCUSSION

4.1. Basic sample statistics

This section presents the basic sample statistics of home gardeners and non-home gardeners. Table 1 below summarises the sample statistics from the study area. A sample of 200 participants was selected from the study area, with a mean household head age of 59 years. The mean education level was 2, meaning that participants were educated on average to the primary level.

TABLE 1: Basic Sample Statistics of the Respondents

	Valid	Mean	Std. Deviation	Skewness	Minimum	Maximum
Gender	200	.77	.422	-1.293	0	1
Age	200	58.48	12.651	-.608	27	84
H/size	200	5.63	2.369	-.182	0	12
Education level	200	1.98	1.147	.685	1	4
T/Household income	200	3151.63	2865.708	2.776	0	19000
Distance to markets	200	.66	.477	-.657	0	1
Ext. services	200	.60	.492	-.390	0	1
Member of CBOs	200	.39	.488	.476	0	1
Access to land	200	.87	.337	-2.217	0	1
Market access	200	.43	.496	.306	0	1
Access to credit	200	.40	.491	.411	0	1

Key: Age (number of years), Total household income (total income received by a household per month), distance to market (in kilometres), Gender (0 = male; 1 = female), Education (1 = informal, 2 = primary; 3 = secondary; 4 = tertiary), Access to extension (0 = no access; 1 = access), Membership to CBOs (0 = Non-membership to CBO; 1 = Membership to CBO), Access to credit (0 = no access; 1 = access), Access to market (0 = no access; 1 = access), Access to arable land (0 = no access; 1 = access).

The results also revealed that there were more females than males in the study area, with an average monthly income of R3151.63. Primary sample results show an average household

size of six family members, with a minimum of 0 and a maximum of 12 family members. Most respondents did not have access to markets, membership to CBOs and credits. The distribution asymmetry was positively and negatively skewed, as shown in Table 1 above. Most of the characteristics had skewness values below and close to one (except household income and access to land); this suggests that the distribution did not differ significantly from a normal symmetric distribution.

4.2. Contribution of Home Gardens on Total Household Income

This section presents results for home gardens' contribution to total household income, as illustrated in Figure 2 below. The primary income sources emerging from the study results were old-age pensions, home garden sales, salaries and wages, welfare grants and remittances.

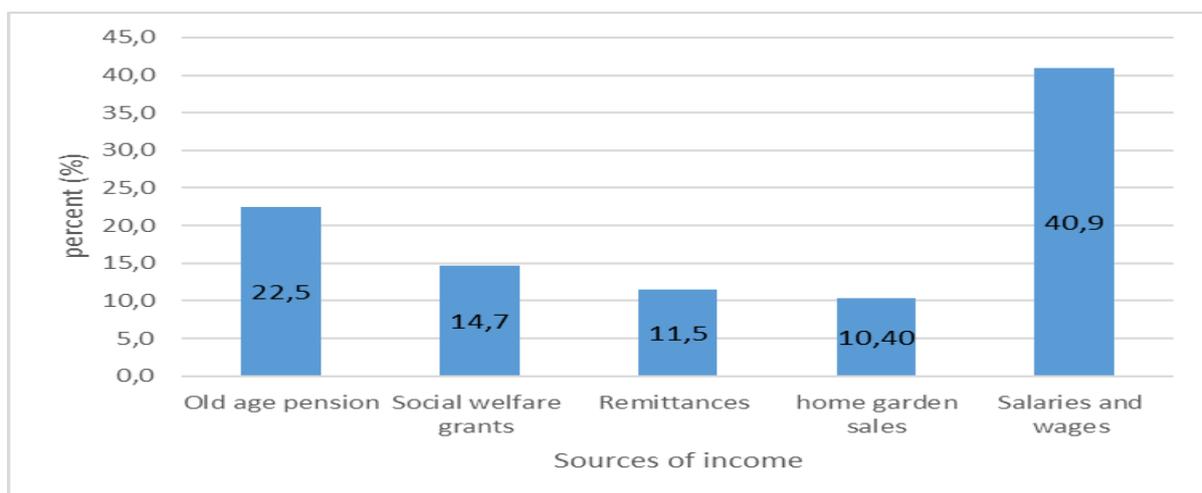


FIGURE 2: Share of Different Sources of Income to Total Household Income

The results presented in Figure 2 above indicate that although being a minor contributor to total household income (10.4%), home garden sales positively represent household income. Similar findings are also shared by several studies that mentioned that surplus produce from home gardens can be sold for additional income and used for other essential household needs (Chauhan, 2015; Uzokwe, Giweze & Ofuoku, 2016). However, Muzawazi *et al.* (2017) caution against the income premise of home gardens since the bulk of home garden crops is used for household consumption.

4.3. The Contribution of Home Gardens to Household Food Security and Income

TABLE 2: Observed Household Food Insecurity Access Score (HFIAS) by Home Garden Participation Status of Respondents

Household Food Insecurity Access Score (HFIAS)	Low	Medium	High
	0 – 9	10-18	19-27
Home gardeners		13	
Non-home gardeners		12	
Food security proxy	Less food insecure	Moderate	More food insecure

The emerging results indicate that HFIAS for the home gardeners was 13, while that of non-home gardeners was 12. These results suggest that although both groups were classified as moderately food insecure, non-home gardeners are relatively more minor food insecure than home gardeners. However, by broad classification, results suggest that there may be no difference in the food insecurity status of home gardeners and non-home gardeners from the study area. The study also tested the significance of the “no difference hypothesis,” as suggested above. The results of this are presented in the next section.

4.4. Bivariate Correlation Analysis

This section presents the association between participation in home gardening, household food insecurity status and household income, as highlighted in Table 3 below. A non-parametric correlation model (Spearman's rho) was used to assess the association between participation in home gardening, household food insecurity status, and household income.

TABLE 3: Correlation Matrix Exploring the Association Between Participation in Home Gardening, Household Food Insecurity Status, and Household Income.

Correlations					
			Participation	HFIAS	total H/income
Spearman's rho	Participation	Correlation Coefficient	1.000	-.018	.133*
		Sig. (1-tailed)	.	.403	.030
		N	200	200	200
	HFIAS	Correlation Coefficient	-.018	1.000	-.617**
		Sig. (1-tailed)	.403	.	.000
		N	200	200	200
	Total H/income	Correlation Coefficient	.133*	-.617**	1.000
		Sig. (1-tailed)	.030	.000	.
		N	200	200	200
*. Correlation is significant at the 0.05 level (1-tailed).					
**. Correlation is significant at the 0.01 level (1-tailed).					

4.5. Household Food Security

Results indicate a statistically insignificant (p -value = 0.403) weak negative correlation (coefficient = -0.018) between home gardening participation and household food insecurity access score. These findings suggest that as participation in home gardening increases, there is a slight decrease in households' food insecurity access score. However, this association is statistically insignificant, implying that the observed negative association may result from chance. As such, results suggest that the observed association is not statistically significant, meaning that, based on the results from the study area, home gardening does not influence household food security. Previous descriptive statistics also confirm a "no difference hypothesis" for home gardeners (HFIAS = 13) and non-home gardeners (HFIAS = 12). This may be explained by the low-income contribution of home garden sales to total household income (10.4%), which is spread across several households' cash demands. Also, the diversity

of crops grown from the study area typically under 1ha; [cereals (maize); vegetables and tubers (cabbage, spinach, and potatoes, pumpkin) and fruits (oranges, peaches and plums)] falls short of a balanced food basket to address food requirements for average family size. The dominant home garden crop (yellow maize – 40%) was mainly used for stock feed. In line with these findings, previous studies also cautioned about the home gardens and food security nexus in the absence of an adequate amount of food produced to meet food security requirements at the household level (Caskie, 2000; Vavra *et al.*, 2018).

4.6. Household Income

Results reveal a weak positive significant correlation between home gardening and household income. These results suggest that household income is slightly increased as home gardening participation increases. Although participation in home gardening and household income highlighted a significant positive linear association with the Spearman's rho p-value (0.030), the coefficient's (0.133) absolute value was not large enough to give a convincing clue of the observed relationship. These results confirm the slightly higher contribution of home garden sales (10.4%) to total household income. Comparable previous studies note a positive contribution of home gardens to household income (Joel *et al.*, 2018; Neelamegam *et al.*, 2017), arguing that income revenue generated through home gardening sales boosts household purchasing power additional expenditures such as education, savings and other services.

The results also reveal a strong negative correlation (coefficient = -0.617; p = 0.00) between household income and household food insecurity access score. These findings suggest that as household income increases, there is a considerable decrease in households' food insecurity access score. Therefore, this means household income addresses food security through purchasing household foods and indirectly financing other income-generating activities. Consequently, it can be argued that promoting home gardens for cash crops has a better food security premise than promoting home gardens for household food availability from the study area. These findings support Puett *et al.* (2014), who argue that income is the principal determinant of household food security in contemporary South Africa. Several conclusions can be drawn from the above results, as summarised below:

(a) Home gardens generate income for rural households (estimated to be 10.4% of total household income) but fall short of addressing household food security. Therefore, home

gardening participation may be better promoted to address household food security through the income effect, not food availability.

(b) The observed weak association between home gardening participation and household income suggest home gardens are designed for subsistence purposes (stock feed, home consumption and sale of surplus), of which, unfortunately, the diversity and quantities of food groups grown fall short of addressing household food security as suggested by empirical evidence from the study area.

(c) Interestingly, the observed significant negative association of household income and household food insecurity access score, as read with the observed significant positive association of participation in home gardens and household income, suggests a new dimension of home gardens. It can be argued that promoting home gardens for cash crops may address household food security through the income effect much better than promoting home gardens for household food availability.

5. CONCLUSION AND RECOMMENDATIONS

The study concludes that participation in home gardening is more likely to improve household income. However, the results also highlight that the association is weak, suggesting that participating in home gardening to household income, though positive, might not be as high as popularly believed. The study revealed that income from home garden sales might be insufficient to address household food insecurity. Therefore, the study concludes that participation in home gardening may be better promoted to manage household food security through the income effect than food availability. The weak association between home gardening participation and household income suggests that home gardens are designed for subsistence purposes (home consumption and sale of surplus). Unfortunately, the diversity and quantities of food groups grown fall short of addressing household food security. In addition, the observed significant negative association of household income and household food insecurity access score, as read with the observed significant positive association of participation in home gardens and household income, suggests that promoting home gardens for cash crops may address household food security through the income effect much better than promoting home gardens for household food availability.

Thus far, the message for rural households and policymakers is that: Home gardens in their current designs (<1ha and dominated by the production of yellow maize and vegetables) may

be promoted to address household food security through the income effect as opposed to food availability. Therefore, rural households should grow more cash crops in their small gardens that can be traded locally to boost their household income, which has a better promise to address household food security.

The following home garden designs are suggested to promote household food security and income: Empirical findings revealed that home gardens have a more positive impact on household income than household food security. In contrast, household income has a strong positive association with food security. Against this background, home gardens designed to produce cash crops may have a better impact on household food security (through the income effect) than home gardens designed to produce household food crops for consumption and sale of surplus (the current status quo).

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