Home gardening as a strategy for food security and poverty alleviation in low income households in South Africa

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ABSTRACT

In South Africa, home gardens are an important source of food and nutrition. Home gardens have established a traditional way of providing food and offer great potential for improving household food security as well as alleviating poverty. In a province like the Eastern Cape which is characterized by poverty and having high rate of unemployment, home gardening can help enhance household food security through direct access to nutritionally-rich fresh vegetables. This study was conducted to determine the manner that home gardens can be used as a strategy for poverty alleviation with the aim of addressing household food security in low income households (rural and urban areas) of Nkonkobe Local Municipality of Eastern Cape-South Africa. The assessment of food insecurity was done in both urban and rural areas of Nkonkobe Municipality with the aim of getting rural area's food security status. This was done by identifying the factors affecting food security in rural households. In an effort to identify the factors influencing food security, data was collected from 160 households from both rural and urban areas of the Nkonkobe Municipality. These households were selected using stratified random sampling. A questionnaire was administered to get primary data. The factors that influence food security among the sampled households were determined using a binary logistic regression model. The results showed that the statistically significant variables, at 5% level. Two variables were identified to be significant to food security and they are total income and home garden ownership.

Keywords: home gardens, food security and poverty, rural home garden owners (RHGO), rural non-home garden owners (RNHGO), urban home garden owners (UHGO) and urban non-home garden owners (UNHGO).

1 Introduction

1.1 Background of the Study Area

Today the world faces the fundamental challenge of ensuring that millions of households living in poverty have access to enough food to maintain a healthy life. Over the years, Africa has been looking for ways to solve the food insecurity problem (Omotesho *et al.* 2007). According to Fabiya *et al. (*2007), in most developing countries, agriculture is an essential sector considered as the backbone of rural areas as many people rely upon it for survival (Todaro and Smith, 2000).

Mkwambisi *et al.* (2007) state that "despite persistent economic growth around the world, food insecurity and unemployment remains as a pressing problem in many parts of Africa". According to Musotsi *et al.* (2008), malnutrition has been identified as primarily being caused by food insecurity while poverty has been shown to be one of the underlying causes of food insecurity. In South Africa, hunger and malnutrition are not caused by insufficient food; instead, it is because certain categories of individuals and households in the population do not have adequate access to food.

FANRPAN (2006) also argued that there is a strong bond between vulnerability to food security and chronic poverty. This means that "poverty undermines the ability of people to develop livelihood strategies, adaptive behaviours and coping strategies which help to ensure long-term food security". Those that are at risk of food insecurity are found in two marginalized groups which have been broadly defined as: (a) the economically bounded group such as those lacking land, tools and capital, livestock, literacy as well as other formal skills (FANPAN, 2006). This group of people make up the under-employed or the working poor; (b) the other group is the socially bounded group of people vulnerable to food insecurity due to age (children and elderly), gender (women and girls) or as a result of illness or disability.

Food insecurity affects both rural and urban households and thus becomes a problem since rural households are characterised by having a larger number of members than urban households (FAO, 2010). One would usually think that cities and towns (urban areas) are not places where home gardens should be undertaken, but urban agriculture (home gardening) has come to life due to urbanization which leads the majority of people residing in urban areas to be poverty stricken (Enviropaedia, 2007). Thus, throughout the years the practice of

agricultural activities in rural areas only has changed due to people migrating to the urban areas in search of better standards of livings (looking for employment) which resulted to agricultural activities being practiced in urban and Peri-urban areas as well due to the problem of food insecurity (Drennan, 2009).

There are different strategies which are adopted by different households in acquiring food to feed their household members. These include strategies such as own food production, purchasing food using money attained through employment, self-employment or social transfers (Bonti-Ankomah, 2001). In this regard, there exists a significant dependency on direct or indirect access to cash, since the vast majority of South Africans buy their staple foods from commercial suppliers, rather than growing it themselves (FANRPAN, 2006). Baiphethi and Jacobs (2009) have mentioned that in the past, rural inhabitants used to be dependent on own produced food and other farm activities which dominated their livelihoods, while urban inhabitants were characterised by purchasing their food from the markets. Therefore, home gardening can be an important method that can be used by a household for food production.

Musotsi *et al.* (2008) argues that for the majority of people in the developing world, home gardening remains the most important method of food production. The daily nutrition and healthy food required by household members can be obtained from home garden production. Home gardens, therefore, play a significant role to household food security. According to Koyenikan (2007) home gardens enhances households food security directly by enabling families to have a diversity of nutritionally rich food, increased purchasing power from savings on food bills and income from sales of garden products as well as fall-back food provision during seasonal lean periods (FAO, 2010). According to Koyenikan (2007), households instituted home gardens since there are benefits attained such as an increase in household food production, improved health status of the household, income generation and nutrition (Finerman and Sackett, 2003).

Therefore, home gardens may make a significant contribution towards enhancing household food security by supplementing household food baskets, providing income, employment and the other benefits attained from home gardening (Gautam *et al.*, 2004). Home garden ownership is vital to both urban and rural households since both locations encounter the issue of food insecurity as well as poverty. Therefore, the role of home gardens in enhancing

food security needs investigation in both urban and rural areas of Nkonkobe Municipality since location influences the food security status of the area (Nkonkobe IDP, 2010/11).

1.2 Purpose and Objectives

The purpose of this study is to investigate the role of home gardening as a strategy that is used for food security and poverty alleviation from low income households at both urban and rural areas of Nkonkobe Municipality of South African. The specific objectives of the study were:

I. Assess the food security state of low income households in Nkonkobe Municipality.
II. Investigate the factors affecting food security in low income households of Nkonkobe Municipality.

2. Study area, data and Methods

2.1 Description of the Study Area

The study was conducted in the Eastern Cape Province within South Africa, whereby four villages were visited namely: Perksdale, Melani, Ncera and Kwezana. These locations were selected because some households from these areas are involved in home gardens, and have access to water harvesting techniques (Monde *et al.,* 2006). These locations are under the Nkonkobe Local Municipality which was established the year 2000. This local municipality is the second largest local municipality which covers 3 725 km^2 and makes up the R63 road of the surface areas of the Amatole District Municipality.

Nkonkobe Local Municipality is located in the Eastern Cape Province which is the second largest province of South Africa and is regarded as the poorest province within the country (Seti, 2003). The major towns of Nkonkobe municipality are: Alice, Fort Beaufort, Hogsback, Balfour, Middledrift and Seymour. The municipality has a predominantly rural population and has a total of twenty-one wards with forty-one municipal councils (Hule, 2009).

2.2 Sampling technique

A multi-stage sampling was used in which the first stage involved selecting respondents from both urban and rural areas of Nkonkobe Municipality. This was done through stratification by separating rural and urban communities. This was followed by employing quota sampling through the census statistics to determine households that owned home gardens and those

without home gardens. Lastly random sampling was used to get the sample size for the study. Based on the census statistics the majority of people reside in rural areas than urban. As noted by the Nkonkobe IDP (2010/11) that 72% of the people reside in rural areas while 28% is in the urban areas. Therefore 100 respondents were from rural areas then the 100 was divided to home garden owners and non-home garden owners. The 60 respondent were from urban areas and the 60 was divided to home garden owners and non-home garden owners, meaning that 30 respondents from each group were used.

2.3 Data collection

2.3.1 Primary data

Respondents were selected based on home garden and non-home garden ownership. Their willingness to participate in the research was also given high priority in selecting respondents. Respondents were told the objective of the study as well as the confidentiality of the study during the data collection process before being interviewed. Interviews were done at farmers' homesteads. Household heads were interviewed individually. Primary data on the food security status of the households was collected through interviews.

The questionnaire consisted of both open-ended and closed questions. Open-ended questions suited well and also gave the respondents greater freedom of expression as they offered respondents an opportunity to qualify their answers, thus reducing bias due to unlimited response ranges (Kvale, 1996). Because of time constraints and the fear of researcher/interviewee bias that could arise from open-ended questions, the questionnaire was balanced with closed-ended questions that were quick to answer. The study was conducted using the local language (isiXhosa). The use of the local language was an advantage for the researcher, because it is assumed that people feel comfortable speaking to people in their own language thereby giving the survey better reliability.

2.3.2 Secondary data

In addition, secondary data was collected from municipal officials and the internet. Secondary data on food security and the role of home gardens in the Eastern Cape Province was also obtained from books, journals and the internet.

2.4 Data analysis

The dietary diversity measure was adopted to differentiate households with the aim of getting households that are food secure from those that are food insecure both in the rural and urban areas of Nkonkobe Municipality. The dietary diversity measure was used in this study, by using 12 food groups namely: Cereals, roots and tubers, vegetables, fruits, Meat/ poultry/ offals, eggs, fish and seafood, pulses/legumes/nuts, milk and milk products, oil/fats, sugar/honey, and miscellaneous (FAO, 2007; Razes, 2010). This has been regarded as a standardized tool for measuring household food availability and access by Kennedy, Razes, Ballard and Claude Dop, (2010), citing FAO (2008), and it can be administered at either the household or individual level through the use of a questionnaire.

In addition, it uses an open recall method to gather information on all the foods and drinks consumed by the household or individual over the previous 24 hours (Ruel, 2003). Information from the dietary diversity tool can then be analyzed in different ways in order to provide a picture of dietary patterns within the community as well as amongst vulnerable groups.

For the analysis of household food security status, the binary logistic regression model was used. The binary logistic regression model was chosen since it allows one to predict the impact of independent variables on a dependent variable. The binary logistic regression model is preferred in some cases due to its simpler mathematical structure. Therefore, for this study, the binary logistic regression represents options between food secure and insecure households.

A typical method used to solve such dichotomous variables is logistic regression (Hosmer and Lemeshow, 2000). According to Kleinbaum (1994), there are two main reasons for using logistic regression in economics research. Firstly, the logistic model imposes threshold and interaction effects and allows for the examination of social interaction (Montshwe, 2006). The logistic function is also extremely flexible and easily applicable, and the interpretation of the results is straight forward and meaningful.

Following Gujarati (2003), the cumulative logistic distribution function for factors affecting food security and factors that influence the participation of urban and rural households in participating in home gardens was specified as

$$P = \frac{1}{1+e^{-z}} \qquad (1)$$

Where P was the probability of being food secure and Z is a function of m explanatory variables (X) and was expressed as

$$Z = B_0 + B_1X_1 + B_2X_2 + \ldots\ldots\ldots\ldots B_mX_m \qquad (2)$$

The probability of being food insecure was given by

$$1 - P = \frac{1}{1-e^{z}} \qquad (3)$$

The conditional probability of the outcome variable follows a binomial distribution with probability given by the conditional means $P_{(i)}$. The logistic model in terms of logs is

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k \qquad (4)$$

Where $\log\frac{p}{1-p} = Z$

The log of odds ratio is not only linear in X but also linear in the Bi variable and, as a result, OLS is used. Taking the stochastic term μ into account, the logit econometric model to be used will be

$$Z = B_0 + B_1X_1 + B_2X_2 + \ldots\ldots\ldots\ldots B_mX_m + \mu \qquad (5)$$

This econometric (logistic regression) model was used and treated against the potential variables, which are assumed to affect food security in Nkonkobe Local Municipality (rural and urban areas), with the aim of determining which area is vulnerable to food insecurity. For the analysis, the dependent variable was food security status (Food secure =1 or food insecure =0) as explained in the above equation. Potential independent variables which may influence food security were obtained from the literature review (Omotesho *et al.,* 2007; Maxwell and Caldwell, 2008). The independent variables included in the model were garden ownership, location (rural or urban), assets and demographic characteristics.

Table 1: Variables used in the Binary logistic regression model for food security

Variable name	**Type of measurement**	**Priori expectations (+/-)**
Dependent variable		
Food security		
Independent variables		
Home garden ownership	Dummy	+
Location	Dummy	+
Gender (Who contributes more to home gardening)	Dummy	+/-
Marital status	Dummy	+
Age (number of years)	Continuous	+
Level of Education (number of years)	Continuous	+
Household Size (numbers)	Continuous	+/ -
Total Income	Continuous	+
Land ownership(yes/no)	Dummy	+
Access to Water (yes/no)	Dummy	-
Livestock ownership (yes/no)	Dummy	+

3 Results and discussion

3.1 Demographic characteristic of low income households at Nkonkobe Municipality

Table 2 shows the majority of households are female headed. This is represented by a 54% (RHGO), 52% (RNHGO), 63.3% (UHGO) and 56.7% (UNHGO). Therefore, this means that females are more dominant in home gardening than men. The youngest household head that partake in home gardening, is within the range of 41 – 50 years with a constitution of 26% (rural households with home garden), 30% (urban households with home garden), while those who not engage in home gardening are 23% (non-home garden urban households), 26% (non-do home garden rural households).

The oldest age group from the sample that partakes in home gardening is within the range of 61 to 70 years old with 60% (rural households with home garden), 55% (urban households with home garden) and 59% (non-home garden urban households), 59% (non-home garden rural households).

Table 2: Descriptive statistics for demographic characteristic

Variables		Location			
		Rural Households {R. H.} - (100)		Urban Households {U. H} - (60)	
		Home garden owners {H.G.O} - (50) Percentages (%)	Non-home garden owners {N.H.G.O.} - (50) Percentages (%)	Home garden owners {H.G.O.} - (30) Percentages (%)	Non-home garden owners {N.H.G.O.} (30) Percentages (%)
Gender	Male	46	48	36.6	45.3
	Female	54	52	63.3	56.7
Age range (Yrs.)	41-50	26	26	30	23
	51-60	14	15	15	18
	61-70	60	59	55	59
Marital status	Singles	32	30	27	20
	Married	60	60	63	67
	Separated	4	6	7	10
	Divorced	4	4	3	3
Level of education	None	16	40	6	3
	Primary	56	42	10	43
	Secondary	12	10	36	43
	Tertiary	16	8	48	11

The marital status of households is presented in Table 1.2 and shows that the majority of households are married. This is illustrated with 60% of RHGO, 60% of RNHGO, 63% of UHGO and 67% of UNHGO. Therefore, as argued by Zenda (2002), these households are at an advantage and can own home gardens because they have partners to help them with home gardening.

Primary education is the highest level of education amongst these households with 56% (rural home garden owners) and 42% (non-home garden owners). While households in the urban areas of Nkonkobe have tertiary and primary levels of education (both home gardening and non-home gardening households), with 48% from home gardeners, 43% from non-home gardeners (tertiary education) and 43% of the non-home gardening urban households have a primary school education.

3.1.1 Descriptive results of the study

This table (Table 3) summarizes low income households in both rural and urban areas who are home garden owners and non-home garden owners in terms of their household food security status. Selected parameters are presented to show the percentages of households that are food secure and those that are food insecure. The descriptive analysis revealed that, of the 160 observed households in Nkonkobe municipality, 62% (RHGO) and 38% (UHGO) of

households are food secure. The study shows that about 31% and 18% of the interviewed food secure households owned home gardens, in the rural and urban areas respectively. The proportion of food secure households is higher for RHGO than UHGO households.

Table 3: Descriptive results of the study

Variable	N	Food secure		Food insecure	
		R.H.G.O	U.H.G.O	R.N.H.G.O	U.N.H.G.O
Food security	160	62%	38%	68%	22%
Gender of Household head					
Male	71	28%	18%	29%	9%
Female	89	34%	20%	39%	13%
Average Household size	160	4.03	4.18	4.64	5.25
Home garden size (Ha)[1]	160	0.39	5.58	0.37	4.17
Livestock ownership					
Yes	160	58%	60%	54%	20%
No		42%	40%	46%	80%
Access to water for irrigation (tap water, river/ rain) **Yes**	160	100%	100%	100%	100%
Access to land					
Yes	160	50%	53%	52%	60%
No		50%	47%	48%	40%

3.1.2 Household Size

Hayes *et al.* (1997) indicate that a larger family size also means that an increased labour capacity is available in the form of young, middle aged and elderly members. Households that partake in home gardening are smaller household's of less than 4 people with 2% (rural households with home garden), 10% (urban households with home garden), while those who do not engage in home gardening have 10% (non-home garden urban households), 10% (non-home garden rural households). The largest household range of greater/equal to twelve (> 12) in a sample of the households that partake in home gardening is 56% (rural households with

[1] Mean size of home gardens in hectares.

home garden), 56.7% (urban households with home garden) and 50% (non-home garden urban households), 54% (non-home garden rural households).

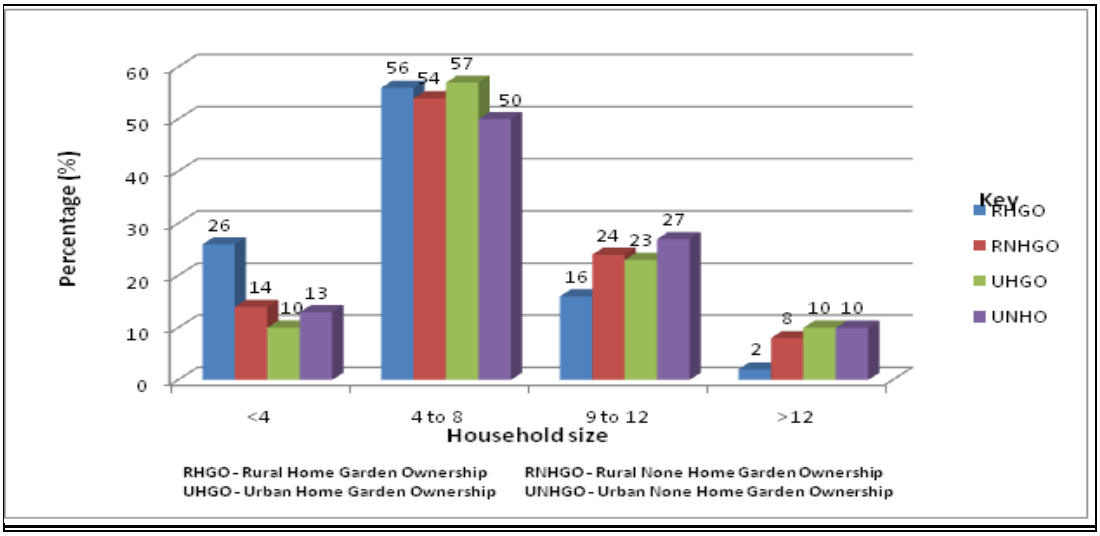

Figure 1: Distribution of respondents by household size

3.1.3 Total Household Income

The total household monthly income ranged from R501, which is the lowest income, to greater than R2000, which is the largest income that a household earns. Figure 2 shows that the majority of households in the Nkonkobe Municipality have an income range of R1001 and R2000 with 56% (RHGO), 64% (RNHGO), 64% (UHGO) and 60% (UNHGO). Overall, the results suggest that these households are characterised by low household income since they do not own many assets. Having a low total household income may suggest low purchasing power (Bonti-Ankomah, 2001).

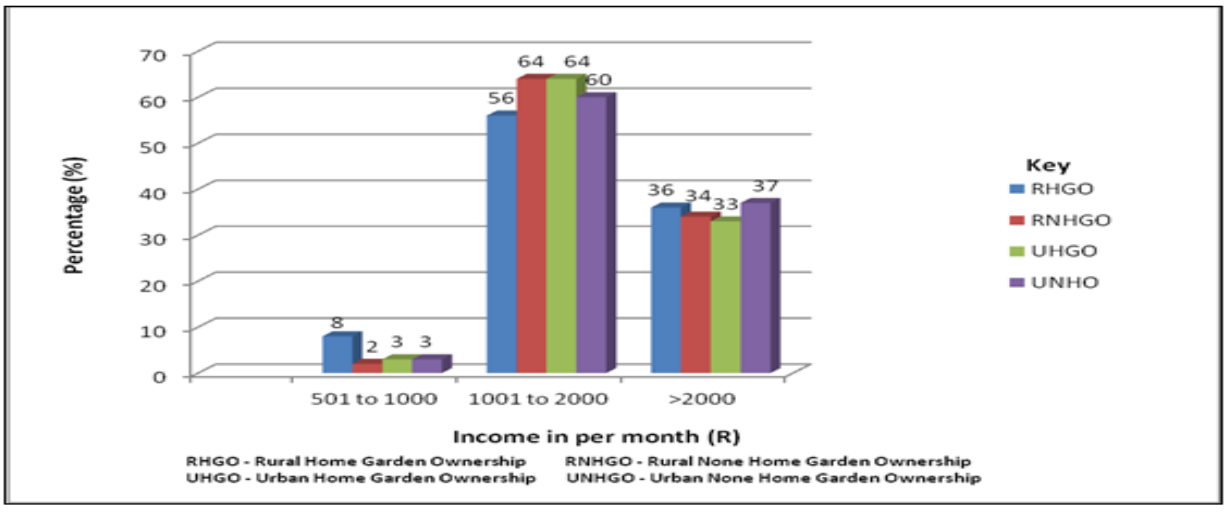

Figure 2: Distribution of total household income per month

3.1.4 Sources of Income

The results from the study reveal that there is great dependence in old age pension income by rural households as it constitutes a large portion of the household income. This is shown in Table 4, where 40% of the households in the RHGO group having pension as main income source. Therefore, income from these various sources is used to purchase food and other household essentials. Based on literature, as noted by Altman *et al.* (2009), both urban and rural areas' households' income is derived through social grants, but rural households also tend to practice agriculture to supplement their incomes.

Table 4: Distribution of household by income sources and location

Variables	**RHGO (50)**		**RNHGO (50)**		**UHGO (30)**		**UNHGO (30)**	
Sources of income	**Frequency**	**Percentage %**	**Frequency**	**Percentage %**	**Frequency**	**Percentage %**	**Frequency**	**Percentage %**
Salary & Wages	0	0%	3	6%	11	36%	10	33%
Income from farming	11	22%	0	0%	5	17%	0	0%
Retirement Pension	20	40%	22	44%	7	23%	9	30%
Remittances	9	18%	10	20%	2	7%	5	17%
Child Grant	5	10%	15	30%	0	0%	2	7
Old age pension	5	10%	0	0%	5	17%	4	13

3.1.5 Food Expenditure

Engaging in home gardening cushions households from price shocks and improves the household food security status since they do not have to rely on purchasing food (Baiphethi and Jacobs, 2009). Figure 3 below shows that both urban and rural households spend between R501.00 to R1000.00 on food. Therefore, based on the review by the Nkonkobe Municipality Spatial Development Framework Review (2010/11 – 2012/13), the poverty line at Nkonkobe Municipality is estimated to be R1500 per adult equivalent per month. The income levels are known to be extremely low at Nkonkobe Municipality. These results therefore indicate that in Nkonkobe Municipality, households are food insecure since they spend less than the poverty line measure. The results attained agree with the literature in regards to the conclusion that this municipality is food insecure.

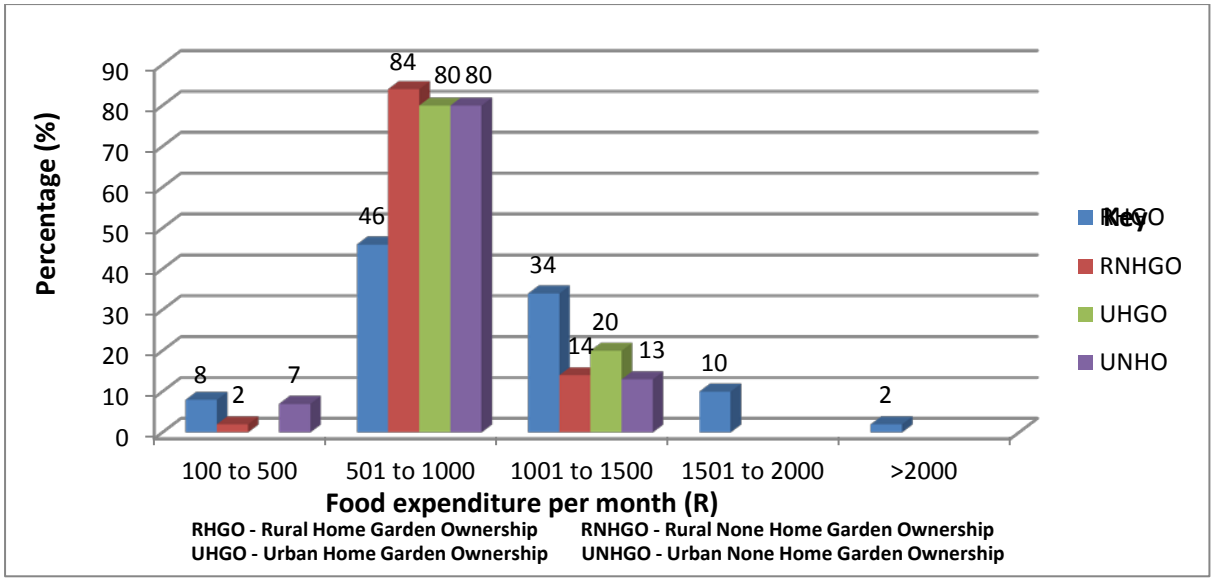

Figure 3: Food expenditure

3.1.6 Respondents' distribution by food sources and location

The most used source of food is the urban market. These households acquire food through urban markets; this is presented with 65% of RHGO households, 90% of RNHGO households, while 85% of UHGO and 100% of UNHGO.

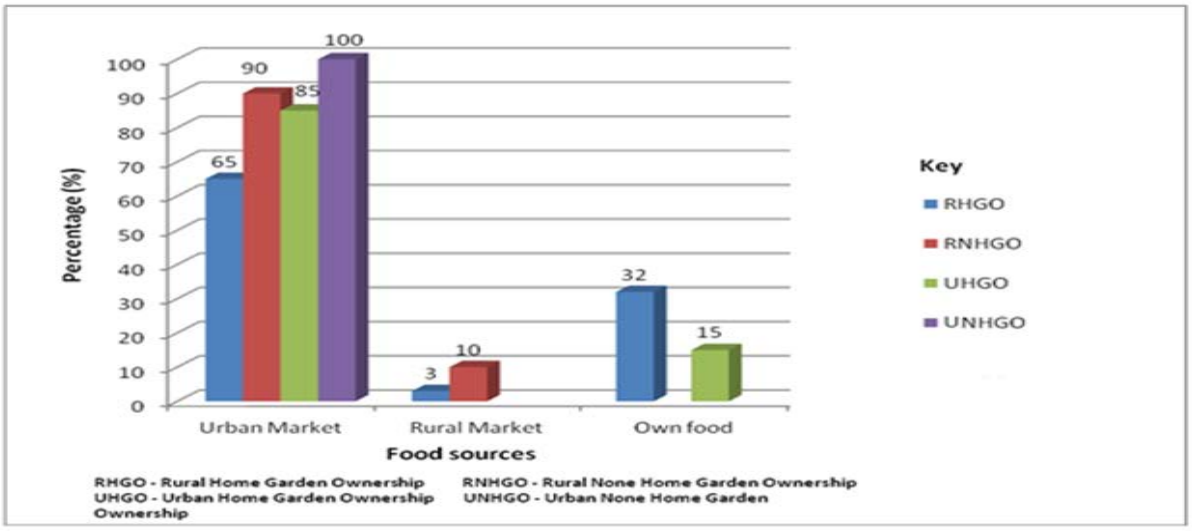

Figure 4: Food sources

3.1.6 Land ownership

The majority of households from both urban and rural owned the land. About 50% of the rural households that participate in home gardening owned the land. The majority, about 52%, of non-home gardening households did not own the land. In urban households, about 53% of home gardening households owned the land while the majority, about 60%, of urban non-home garden owning households did not own land. This means that those who have

access to land have a better chance of producing crops unlike those without land. Those who were practising home gardening in both the urban and rural areas but did not own the land indicated that they were renting it from those who owned land, but not utilising it. Therefore people with access to land are likely to be food secure than those without land since they can partake in home gardening.

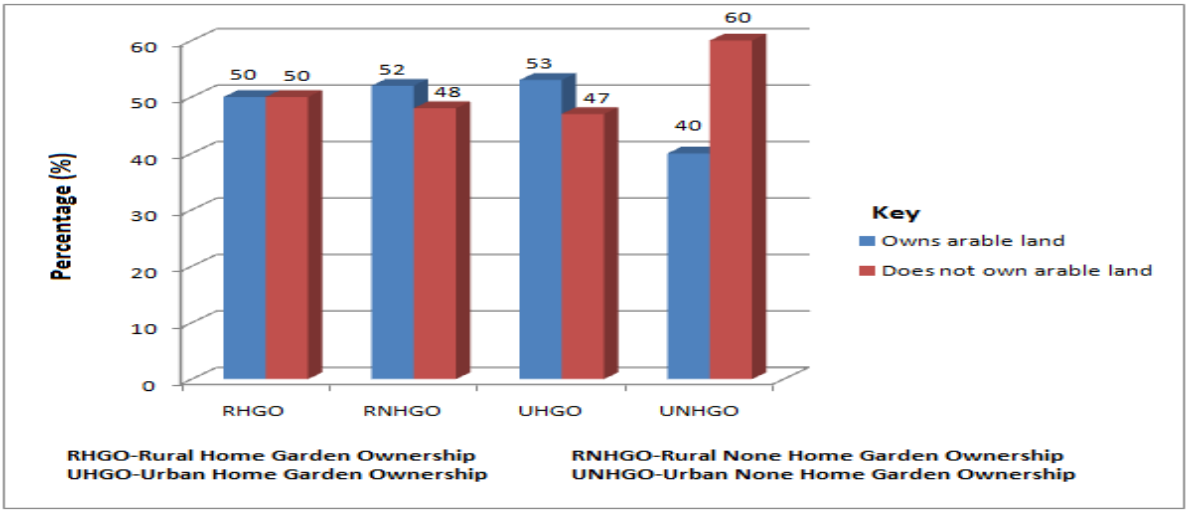

Figure 5: Land ownership

3.2 Binary logistic regression model results

For the study eleven variables were used and only two variables significantly affected food security, namely: total income and home garden ownership. The logistic results are presented in the tables (Table 5). The table shows the β values which are the estimated coefficient values and significance values of the predictor or independent variables in the model.

According to Gujarati (1988), the coefficient values measure the expected change in the logit for a unit change in each independent variable, all other independent variables being equal. The positive or negative (+/-) sign of the coefficient shows the direction of influence of the variable on the logit.

3.2.1 Factors affecting food security

Table 4 shows that home garden ownership was a significant factor affecting the food security status of households in the study areas. It had a positive coefficient (1.245). Ownership of a home garden increases the household's food status since it supplements the household food basket (Bonti-Ankomah, 2001). Home gardening promotes a healthy lifestyle by having access to fresh vegetables daily. Home gardens not only increase household food

security but they also reduce household expenditure (money is saved), and create employment. Home gardens cushion households during harsh times. Therefore, it can act as a principal source of income and employment.

According to Seti (2003), older people residing in urban areas partake in home gardening as a hobby which relieves them of sitting at home and becoming bored; it also serves as an exercise to ill people who have illnesses such as high blood pressure (Bp) or diabetics. Since most non-home garden owners in rural areas (68 %) are food insecure as compared to non-home garden owners in urban areas (22%), as indicated previously, partaking in home gardening can help improve their household food security status as they can supplement their food requirements and they can generate an income from selling their surplus produce.

Table 5: Variables that affect household food security

Variable	**ß**	**S.E**	**Wald**	**Sig.**
Constant	-0.969	0.177	29.978	0.000
Home garden ownership	1.245**	0.475	6.862	0.009
Location	0.598	0.443	1.820	0.177
Gender	0.517	0.428	1.459	0.227
Marital status	-0.298	0.334	0.794	0.373
Age	0.000	0.491	0.007	0.999
Level of education	0.020	0.238	0.007	0.934
Household size	-0.726	0.614	1.398	0.934
Total income	0.145**	0.000	5.422	0.020
Land access	-0.586	0.473	1.537	0.215
Access to water	0.477	0.456	1.098	0.295
Livestock ownership	0.171	0.445	0.148	0.701

** Statistically significant at 5% significance level, Nagelkerke R Square = 0.265, Cox & Snell R Square =0 .183

Log likelihood value = 155.885

Total household income was a significant variable with a significance value of 0.020. This variable has a positive coefficient of 0.145. This suggests that an increase in income by a unit would result in an increase in household food security by 0.14%. This shows a positive correlation between the total income that a household has and their household food security. These results are in line with Bonti-Ankomah (2001) who stated that the greater the household income, the more food secure the household is. Bonti-Ankomah (2001) also

supports this when he stated that, for the poor, a larger share of household income is spent on food, contributing to the food security status of the household. Total household income affects food security since it determines household expenditure. The demand for income, due to the fact that there is significant dependence on purchased food rather than one's own production, becomes a problem, especially for poor households, due to the high unemployment rate in both urban and rural areas (Baiphethi and Jacobs, 2009).

3 Conclusion

Food insecurity in the Nkonkobe Municipality of the Eastern Cape, according to the results of this study, is significantly affected by income and home garden ownership. Therefore, improving household income and making use of home gardens will yield a large improvement in agricultural production and reduce household food insecurity. In that manner poverty can be alleviated. Strategies that enhance household income and the practise of home gardening need more attention when it comes to reducing household food insecurity. Therefore, through home gardening the problem of food insecurity and poverty can be addressed since households can participate in home gardening in order to alleviate poverty while supplementing their household's food baskets. However, this can only happen if home gardens can be accepted and implemented as a strategy to alleviate poverty and help with the food insecurity problem amongst low income households (rural and urban inhabitants). If households that partake in home gardening could have access to extension services then they could strengthen their productivity and go commercial by being able to produce for their own consumption. This means that people would produce more which would in turn reduce their expenditure costs since they will be buying less food from markets.

4 Recommendations

As a recommendation, it is worthwhile for the government to invest in home gardens since home gardens can form part of the long term solution to food aid. This means that if people can be given tools to feed themselves in a healthy, nutritionally-rich way, the increase in the dependency on food aid can decline. The government can provide extension officers to assist households in maintaining their home gardens more effectively. Programmes like Massive Food Projects, Siyanzondla, Siyakhula and other related home gardening initiatives - that the government has provided. However, the government faces a challenge of better monitoring and evaluation of these initiatives. These initiatives can be better established that fit all households that are of low income both in urban as well as rural since most government initiatives focuses on rural areas only. Thus, both rural and urban people should be educated

on these programs to help address the issue of food insecurity which has a greater effect on rural people than urban people. Household income can be improved by providing skills development initiatives for household to generate an income from as agricultural projects like sheep keeping, goat keeping, bee keeping, cattle and crop farming though the use of water harvesting technologies.

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