

PERCEPTIONS OF FARMERS REGARDING HOME GARDENING IN PROMOTING HOUSEHOLD FOOD SECURITY IN SWAZILAND

Barnabas M. Dlamini

Department of Agricultural Education and Extension
Faculty of Agriculture, University of Swaziland,
Luyengo Campus, Swaziland
Fax: (268) 5283441
E-mail: bmd@africaonline.co.sz

Khetsiwe Simelane

St. Annes High School

Keregero J. Keregero

Centre for Development and Empowerment

Marietta P. Dlamini

University of Swaziland

Abstract

A descriptive-correlational type of research was conducted to determine factors related to promotion of household food security at the Malibeni area in Swaziland. The study was a census of households under the Buhle Besive Multi-purpose Cooperative Society, Sivukile Association and Intamakuphila Association. The study utilized a valid and reliable structured interview schedule. Descriptive statistics were used to describe data. Correlation coefficients were used to describe relationships. Regression analysis procedures were used to identify characteristics that explained knowledge of farmers on home gardening practices. Findings indicated that farmers regard home gardening important enterprise in household food security, and perceived themselves to be moderately knowledgeable in home gardening practices. Farmers indicated that there are constraints that impede to their ability to apply some home gardening practices, such as lack of opportunity to practice, lack of time to participate actively in home gardening, lack of access to technology, in-availability of credit to buy inputs, inadequate labour, and unaffordable costs of gardening inputs. Relationships among characteristics of farmers indicated moderate, substantial, and very high associations. Characteristics found to explain farmers' perceived knowledge on home gardening practices were involvement in application of gardening practices, educational level, and perceived importance of home gardening.

Introduction

The government of Swaziland has actively embraced rural development policies which support the promotion of building capacities and empowering people, so that they can play a more active role in their own socio-economic development, and for the creation of demand for their own household food security, nutrition improvement and starting small enterprises for income generation. Food security is the adequate supply of food and food availability. It is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs, and food preferences for an active and healthy life

(Swaziland National Food Security Policy, 2005). Empowerment of the people is a key variable towards achieving food security. Keregero, *et al.* (1999) noted that empowerment goes hand in hand with the process of unfolding the creative potential of rural people, which encompasses two inter-related aspects: self-reliance and participation. For the rural poor, empowerment reduces vulnerability; decreases dependency, prompts active, rather than passive involvement, and people becoming increasingly central, rather than peripheral actors in their own development process.

In the context of poverty alleviation, the government of Swaziland introduced the Swaziland Water and Agricultural Development Enterprise (SWADE) to reduce poverty and unemployment through commercial agricultural development, especially in rural areas (Keregero, 2004). SWADE was expected to assist in the creation of small holder farmers' associations that were to grow sugar cane and other crops, such as vegetables and grains on irrigated fields. Consequently, associations in three communities were identified to participate, in the initiative and were allocated plots to be used for home gardening, intended to promote and sustain household food security in these areas. A home garden contributes to food security by providing direct access to food that can be harvested, prepared and fed to family members (Soleri *et al.*, 1987; FAO, 2004). However, the extent to which households are actively involved in home gardening that utilizes recommended practices in order to make notable contribution to the household food security situation in Swaziland has not been ascertained.

Purpose and objectives of the Study

The study sought to determine factors related to promotion of household food security at the Malibeni area in Swaziland. The specific objectives of the study were to:

1. Describe respondents according to selected background and demographic characteristics (size of household, status, sex, age, marital status, educational level, types of vegetables grown, size of garden, labour distribution, and decision-making regarding home gardening by gender).
2. Describe respondents' perceived knowledge on recommended home gardening practices; opinions regarding the importance of home gardening in household food security; and, involvement in the application of recommended home gardening practices.
3. Describe effect sizes in perceptions of respondents, based on selected demographic characteristics, regarding: perceived knowledge of recommended home gardening practices
4. Identify perceived factors constraining respondents' application of recommended gardening practices.
5. Describe the relationship between perceived knowledge of farmers on recommended home gardening practices and their selected demographic characteristics.
6. Identify the amount of variance on perceived knowledge of farmers on recommended home gardening practices explained by the characteristics of respondents.

Theoretical Base

Food security could mean sufficiency, access, security and time (Maxwell and Smith, 1992). An observation by FAO (2001) shows that many rural households do not have year-round access to adequate amounts of either fresh or processed staple foods and their fresh vegetables and fruits tends to be seasonal. Frankenberg *et al.* (1989) noted many problems associated with vegetable production, and, are explained more by lack of knowledge of appropriate cultivation

techniques rather than lack of inputs. Agricultural extension and nutrition educators can encourage diversification of local food supply and diet (Muehlhoff and Herens, 1997).

Today, more than ever, a wide range of information sources on new or innovative farming practices are available to farmers. However, there is little evidence that the increased availability of information sources has been effectively used by farmers (Riesenberg, 1989). The value of information as a commodity in today's information age cannot be overemphasized, since it has contributed immensely to stagnation or progress of many farming operations. Farmer's involvement in gardening practices makes them learn and excel in a number of gardening practices, making them to be more productive. According to Soleri and Cleverland (1987), farmers in rural areas use a traditional knowledge model in gardening to improve household well being, through the use of local knowledge and resources, without need for credit for major capital investments.

The importance of home gardens is seen through the supply of fresh fruits and vegetables and at the same time gardens give over a twenty-fold increase in the value of produce grown compared to material costs. Gardening is the key tool for improved health by providing exercise, stress reduction and relaxation (Minnie, 1992). Gardening also increases the level of family involvement. Lombard (2005) noted that the involvement of family members in home gardening brought both education and fun.

Home gardens are perceived as a place for experimenting with new crops and farming technologies (FAO, 2001). Home gardens are essential for nutritional importance (Chadha and Oluoch, 2003), and are an easy way to overcome problems of food insecurity. Rwelamira *et al.* (2000) noted that level of income and wealth in South Africa are not related. The analysis of functional distribution of income and factor shares for production has been one of the central issues in any developing economy (May, 1998).

The present study sought to explain relationships among respondents' perceptions regarding factors that have a bearing on the involvement of families in acquiring knowledge, in order to improve household food security using home gardens. Based on the theoretical model, the relationships among characteristics in the study are as shown in Figure 1.

Major characteristic

Involvement in gardening practices

Alternative characteristics

Size of household

Status

Sex

Age

Educational level

Types of vegetables grown

Size of garden

Labour distribution

Decision-making regarding home gardening by gender

Constraining factors in awareness of gardening practices

Constraining factors in application of gardening practices

Dependent characteristic:

Knowledge of farmers on gardening practices

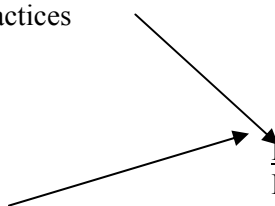


Figure 1. Relationships among and characteristics of perceived knowledge of farmers on gardening practices**Methodology and Data Sources**

A descriptive-correlational type of research was used in this study. The target population was all households under the following communities: Buhle Besive (N = 132), Sivukile (N = 42) and Intamakuphila (N = 121). An up-to-date list of all households was obtained from the Swaziland Water and Agricultural Development Enterprises (SWADE) offices in Tshaneni. This procedure controlled for frame error. The list was checked for accuracy with a view to eliminating duplications and missing entries. This procedure controlled for selection error. All accessible households were studied, and thus, the study was a census.

The study utilized a structured interview schedule. The interview schedule was developed using inputs from literature, preliminary group interviews with selected community members and consultations with extension officers and project officers. The interview schedule was made up of eight sections (A to F). Section A contained items pertaining to background and demographic characteristics of respondents: sex, size of household, status of respondents, age, marital status, educational level, types of vegetables grown, size of garden, household labour distribution in gardening by gender and age group, household decision-making. Section B consisted of a list of 16 items pertaining to home gardening in household food security and respondents were asked to rate the extent to which they considered each item to reflect an important factor in household food security situation. A six-point Likert-type scale was used to measure the extent of agreement on the level of importance of each item and it was anchored as follows: 6 = Strongly Agree; 5 = Agree; 4 = Slightly Agree; 3 = Slightly Disagree; 2 = Disagree and 1 = Strongly Disagree. Section C of the instrument measured the respondents' perceived knowledge of recommended home gardening practices. It consisted of a list of 18 items and a six-point Likert-type scale to measure level of perceived knowledge as follows: 6 = Very Great Extent; 5 = Great Extent; 4 = Moderate Extent; 3 = Some Extent; 2 = Less Extent and 1 = none.

Section D consisted of 18 selected recommended home gardening practices. Respondents were asked to rate the extent to which they had been involved in applying these practices. A six-point Likert-type scale was used to measure level of application of garden practices and was anchored as follows: 6 = Very Great Extent; 5 = Great Extent; 4 = Moderate Extent; 3 = Some Extent; 2 = Less Extent and 1 = none. Section E was made up of 15 perceived factors constraining awareness of recommended gardening practices. Respondents were requested to rate the extent to which they agreed that the factors constrained their awareness of recommended home gardening practices. A six-point Likert-type scale was used and was anchored as follows: 6 = Strongly Agree; 5 = Agree; 4 = Slightly Agree; 3 = Slightly Disagree; 2 = Disagree and 1 = Strongly Disagree. Section F measured the level of agreement by farmers with respect to perceived factors constraining their application of recommended gardening practices. This section consisted of 18 selected constraining factors and a six-point Likert-type of scale was used for measurement. The scale was anchored as follows: 6 = Strongly Agree; 5 = Agree; 4 = Slightly Agree; 3 = Slightly Disagree; 2 = Disagree and 1 = Strongly Disagree.

The instrument was reviewed for content validity by a panel of nine experts in household food security: two in government agricultural extension, two in horticulture, and five in agricultural extension in the SWADE project. A pilot test was conducted involving members (N = 29) of Bambanani Farmers' Association to determine reliability of the instrument. These farmers had home gardens and were generally similar to the population used in the study, but

were not part of the study population. Cronbach's alpha was used to measure internal reliability coefficients for the instrument. These were found to be .89, .93, .95, .71 and .48 for the importance of gardening, knowledge of farmers of gardening practices, involvement in application of garden practices, constraints in awareness of garden practices and constraints in application of garden practices, respectively.

Permission to collect data from the farmers was sought on the 12 /06/2005 through an Extension Officer who was in-charge of the associations and who, in turn, alerted the farmers about the study. A prior visit by the researcher and a research assistant to the area was made to arrange for accommodation, since the research assistant had to reside in the area during data collection period. A research assistant and the researcher administered the instrument as an interview. A structured interview schedule was used since a number of the respondents were not literate and could not respond to a questionnaire satisfactorily. The interview process also provided opportunity for the researcher and research assistant to observe the home gardens and relevant aspect under study.

Research Assistants were trained prior to data collection process. Interviews were conducted from as early as 6.00 am to 5.00 pm, with a two-hour break for lunch. The data collection process took three weeks to complete. The response rate was 94 % (278), the 6% (17) were farmers who had gardens but at the time of data collection did not have anything planted in their gardens. All farmers with gardens were expected to have planted vegetables in their plots, but the 17 did not plant anything for the season when data collection was conducted.

Data from the interview schedules were coded and analyzed using the Statistical Package for Social Sciences (SPSS, v10) in the Faculty of Agriculture, University of Swaziland. Descriptive statistics and correlations were used to describe data. Cohen's (1988) descriptors of effect size were used to assess the importance or practical value of differences. Multiple regression analysis was used to identify characteristics of farmers that explained their perceptions regarding the importance of home gardening in household food security.

Findings and Conclusions

Findings of the study present the description of study population, perceptions of farmers regarding home gardening in promoting household food security in Swaziland, relationships among characteristics of farmers regarding home gardening in promoting household food security in Swaziland, and regression analysis of perceived knowledge of farmers on home gardening practices.

Description of study population

Respondents' background and demographic characteristics constituted relatively more female than male, had a mean age of 48 years, with slightly more than half of them being married and slightly more than half of them having formal education. Majority of respondents were heads of households and had gardens with the stipulated size of 35m x 35m, in which the most commonly grown crops were onions, cabbages and tomatoes. The average size of a household was six people and more women than men made decisions and participated in all home gardening practices.

Perceptions of farmers regarding home gardening in promoting household food security in Swaziland

Respondents were asked to indicate their level of perceptions regarding home gardening in household food security. Based on a six-point Likert-type rating scale, means and standard deviation values on each statement were determined by group as presented in Table 1. For interpretation purposes, mean values below 3.5 were considered indicating disagreement and those from 3.5 and above were considered indicating agreement. Farmers indicated that home gardening was important in household food security as shown by a mean of 4.67 and a standard deviation of .77. Further more, the opinions of respondents regarding the importance of home gardening to household food security were closely similar as shown by overall standard deviation value of .77. These findings are generally in line with observations by FAO (2001) that well developed home gardens produce a variety of crops, including roots, tubers, legumes, vegetables and fruits. Home gardens have an important safety net function during the lean season, when the staple foods have been depleted and before new harvests are ready, and home garden foods can augment or replenish family food supplies. Besides, the sale of home garden produce can make a substantial contribution to household income, especially during seasons when other sources of employment and income are limited or harvests are reduced by natural disasters.

Table 1. Perceptions of farmers regarding home gardening in promoting household food security in Swaziland.

Factor	Buhle Besive	Intamakuphila	Sivukile	Total	Effect size (d)
	μ σ	μ σ	μ σ	μ σ	
	N = 132	N = 121	N = 42	N = 295	
1. Importance of gardening	4.70 .46	4.62 .58	4.60 .55	4.64 .46	.05a .02b .04c
2. Knowledge of farmers of gardening practices	4.44 .98	4.28 1.09	4.36 .95	4.34 .98	.08a .08b .06c
3. Involvement in application of garden practices	4.19 .84	4.10 1.02	4.18 1.09	4.14 .98	.07a .02b .05c
4. Constraints in application of garden practices	3.65 .99	3.60 .94	4.01 .94	3.66 .98	.42a .36b .45c
5. Constraints in awareness of garden practices	3.54 .95	3.65 .94	4.08 .94	3.71 .96	.47a .58b .49c

Note: Cohen's descriptors of effect size: Small effect size (d=.49 and less), Medium, effect size: (d = .50-.79), Large effect size (.80 and above). Comparison: a = Intamakuphila / Sivukile; b = Intamakuphila/Buhle Besive; and c = Sivukile/Buhle Besive.

Home gardening in household food security could be looked at in the context of the provision of nutritional quality to meet household members' needs. For instance, Chadha and Oluoch (2003) observed that, many nutritionists and social scientists believe that the integration of food rich in micronutrients in the diet is the only sustainable way to improve micronutrients status in the body. In this context, home gardens provide crops that are an important source of most micronutrients and offer the only practical and sustainable way to ensure that micronutrients are supplied through the diet. Chadha and Oluoch also observed that vegetables are the most affordable and sustainable dietary sources of vitamins, trace elements and other bioactive compounds. The diversity of vegetables permits year-round production, and forms the basis of a more balanced diet.

Farmers were moderately knowledgeable of perceived home gardening practices ($\mu = 4.31$, $\sigma = 1.05$), were applying ($\mu = 4.17$, $\sigma = 1.04$) home garden practices, and were not aware ($\mu = 3.69$, $\sigma = 1.25$) of some recommended home gardening practices. Farmers rated constraints that impede their ability to apply some home gardening practices. Constraints included: lack of opportunity to practice, lack of time to participate actively in home gardening, lack of access to technology, unavailability of credit to buy inputs, inadequate labour, and unaffordable costs of gardening inputs.

Effect size analysis was also conducted to determine practical value of differences of the respondents' perceptions of the characteristics within the three communities. The rationale for effect size was to determine the magnitude of differences on the communities. The higher the effect size, the greater the practical difference in the respondents' perceptions within communities. The effect size of $d = .80$ and above and considered to be large and the differences were of practical value or importance. Results in Table 1 revealed medium effect size between perceived constraints in application of garden practices are Intamakuphila and Sivukile ($d = .42$), Sivukile and Buhle Besive ($d = .36$). Perceived constraints in awareness of garden practices between Intamakuphila and Sivukile ($d = .47$) Sivukile and Buhle Besive ($d = .58$) and the rest of the compared groupings showed low effect sizes. The conclusion drawn was that farmers had similar perceptions.

Effect size comparisons on the perceived knowledge of recommended garden practices by selected demographic characteristics of respondents

Respondents' perceptions on knowledge of recommended garden practices by selected demographic characteristics were compared using effect size analysis procedures (Table 2). The higher the effect size the greater the rating of inconsistency in the perceptions of respondents. Cohen's descriptors were used to describe effect sizes. Effect size of $d = .80$ and above were considered to be large. The findings in the study revealed small effect sizes of $d = .07$ for head and not head of household, $d = .03$ for male and female, $d = .02$, and for garden size of 35m x 35m and less than 35m x 35m. The conclusion drawn was there is consistency in the perceptions of respondents according to selected demographic characteristics.

Table 2. Effect size comparisons on the perceived knowledge of recommended garden practices by selected demographic characteristics of respondents.

<i>Characteristics</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Effect Size (d)</i>
1. Status				
Head of household	216	4.33	1.02	

Not head of household	61	4.25	1.17	.07
2. Sex				
Male	186	4.30	1.05	
Female	91	4.33	1.03	.03
3. Size of garden				
35m x 35m	166	4.30	1.05	
Less than 35m x 35m	111	4.32	1.05	.02
4. Marital status				
Single	129	4.45	1.18	
Married	147	4.60	1.02	.43

Note: Cohen's descriptors of effect size: Small effect size ($d = .49$ and less), Medium, effect size: ($d = .50-.79$), Large effect size ($.80$ and above).

Perceived factors constraining respondents' application of recommended gardening practices

Respondents were asked to rate their agreement to items constraining their application of recommended gardening practices. Responses were assigned number values from one (strongly disagree) to six (strongly agree). Means and standard deviation values for each statement and overall (domain) were then determined by overall group responses. Items that received mean values of 3.5 and above were found, and were considered constraining the application of recommended gardening practices. Farmers perceived themselves to have been constrained, in rank order, by lack of opportunity to practice, lack of access to technology, lack of time to participate actively in gardening, unavailability of credit to buy inputs, lack of rewards from applying recommended practices, irrelevance of recommended practices, inadequate labour for carrying out garden practices, lack of time for carrying out recommended practices, unaffordable costs of gardening inputs, unavailability of gardening input, unavailability of gardening input, lack of extension advice, lack of role models in the community, lack of extension demonstration plots in community, lack of storage facilities for harvested produce, unavailability of recommended garden practices, lack of knowledge of gardening practices, complexity of recommended practices and lack of tools and equipment.

Relationship among characteristics of farmers regarding home gardening in promoting household food security in Swaziland

Correlation coefficients between demographic characteristics of respondents and ratings of their perceptions were generated to answer the research questions relating to the relationship among characteristics of farmers regarding home gardening in promoting household food security in Swaziland. For interval characteristics, the Pearson Product moment correlation, ρ , was used to measure associations. While, ordinal characteristics correlated with interval characteristics, Spearman rank-order, ρ_s , was used. Interval characteristics correlated with nominal characteristics, Point biserial coefficients, ρ_{pb} , were used. Nominal characteristics correlated with nominal characteristics, phi coefficients were used. Nominal characteristics correlated with ordinal characteristics, rank biserial coefficients were used, and ordinal characteristics correlated with ordinal characteristics, spearman rank-order coefficients, ρ_s , were used.

The magnitude of correlations ranges between +1 and -1. Findings indicated negative and positive correlations. Davis conventions (Davis, 1971) were used to describe the magnitude of relationships. The correlations between the characteristics, perceived knowledge of farmers on gardening practices, and involvement in the application of garden practices were strong ($\rho = .72$).

The relationship between perceived knowledge of farmers on garden practices and perceived importance of home gardening was .30, and the correlation was regarded moderate. The rest of the characteristics were negligibly associated with perceived knowledge of farmers on garden practices. Correlations among the other characteristics other than perceived knowledge of farmers on garden practices were as follows: Moderate associations were observed between sex and household headship, $\phi = .59$; education level and age, $\rho_s = .30$), perceived importance of home gardening and the size of garden, $\rho_s = .30$. The rest of the characteristics showed low and negligible associations as indicated in Table 3.

Table 3. Relationship among characteristics of farmers regarding home gardening in promoting household food security in Swaziland.

	Y	X ¹	X ²	X ³	X ⁴	X ⁵	X ⁶	X ⁷	X ⁸
X ¹ =Size of household	.05								
X ² =Status of respondent	-.03	.02							
X ³ =Sex	.01	.06	.59						
X ⁴ =Age	-.05	.20	-.09	.11					
X ⁵ =Educational level	-.05	-.01	.08	-.13	-.30				
X ⁶ =Size of garden	.01	-.02	.05	.11	-.09	.03			
X ⁷ =Importance of gardening	.30	.00	-.05	.10	-.06	-.14	.30		
X ⁸ =Involvement in gardening	.72	.10	-.05	-.09	-.01	.11	-.01	.20	
X ⁹ = Constraints in gardening	-.06	.04	.20	.07	-.20	.05	-.14	.06	-.06

Coding: Characteristic Y = Knowledge of garden practices (Interval); X¹ = Size of household (Interval), X² = Status of respondents (Nominal: 0 = Head of household, 1 = Not head), X³ = Sex (Nominal: 0 = male, 1 = female); X⁴ = Age (Interval); X⁵ = Educational level (Ordinal: 0 = No formal education, 1 = Adult education, 2 = Primary education, 3 = Secondary education, 4 = High school education, 5 = Tertiary education); X⁶ = Size of garden (Nominal: 0 = 35m x 35m, 1 = Less than 35m x 35m); X⁷ = Opinions regarding importance of home gardening (Interval); X⁸ = Involvement in application of garden practices (Interval); X⁹ = Constraints in application of garden practices (Interval).

Regression analysis of knowledge of farmers on home gardening practices

Prior to running regression analysis, inter - correlations were run to check for multicollinearity among characteristics. The expectation in running multicollinearity was to expect high correlations between perceived knowledge in garden practices and the rest of the characteristics, but low correlations among characteristics other than knowledge in garden practices. Multicollinearity is shown by very strong correlations between characteristics indicated by coefficients of .80 or above (Dlamini, 2004). Thus, estimation of the relationship between the characteristics was conducted using stepwise regression analysis procedures to determine which characteristic explained the variance, on the characteristic “perceived knowledge on home gardening practices.” Squared multiple correlation (R^2) values were calculated to determine the amount of cumulative variance the characteristics accounted for. The semi-partial correlation (R^2 change) values were used to explain the unique amount of variance accounted for by each important characteristic. Findings for the regression analysis of farmers’ knowledge on home gardening practices are presented in Table 4.

Three characteristics were found to explain farmers’ knowledge on home garden practices. The characteristics explained 55% of the cumulative variance, R^2 , in perceived knowledge of farmers on garden practices. Involvement in application of garden practices explained the greatest variance (53%), while educational level explained 1%, and importance of home gardening explained another 1%. The estimated value of perceived knowledge of garden

practices by farmers when each characteristic was zero (intercept or constant) was found to be .23. Shrinkage or adjusted R^2 was found to be 54%.

The conclusion was that, farmers' perceived knowledge of home gardening practices was explained by involvement of farmers in application of garden practices, educational level, and perceived importance of home gardening in food security situation.

Table 4. Regression analysis of farmers' knowledge on home garden practices with their characteristics

Characteristic	R	R^2	R^2_{Change}
Involvement in application of garden Practices	.73	.53	.53
Educational level	.74	.54	.01
Importance of home gardening	.74	.55	.01
Constant (.23)			

Adjusted $R^2 = .54$, Standard error = .68

Educational Importance and Implications

The findings of the study may be used to sensitize community members about the importance, knowledge needed, and constraints with regard home gardening in addressing food security concerns. Findings imply that emphasis should be placed to community-centered approaches for improving nutrition and empowering smallholder farmers. Findings also suggest strengthening and developing legislations, strategies, action plans and policies impacting upon food security to ensure an increased in agricultural productivity, which translates into better diets and, higher farm income, thus meet the needs of the undernourished and food insecure.

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