www.jard.edu.pl http://dx.doi.org/10.17306/J.JARD.2022.01554

Journal of Agribusiness and Rural Development

pISSN 1899-5241
eISSN 1899-5772

2(64) 2022, 141–151
Accepted for print: 10.05.2022

THE EFFECTS OF SOCIO-ECONOMIC FACTORS ON THE FOOD SECURITY STATUS OF RURAL HOUSEHOLDS IN THE EASTERN CAPE PROVINCE: EVIDENCE FROM FARMING HOUSEHOLDS

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Abstract. Issues relating to food availability, accessibility, affordability, and utilization remain of paramount importance among rural households. In order to formulate or implement relevant food security programs in rural areas, it is essential to have a deep understanding of the food security status of rural households. This study sought to determine the prevalence of food insecurity among rural households in the Eastern Cape Province, as well as its key socioeconomic and demographic factors. A cross-sectional study was carried out on 240 households using questionnaires about food security. A convenience sampling method was used to collect data, along with a structured questionnaire. Descriptive statistics and binary logistic regression were used to analyze the data. The binary logistic regression model revealed that age of household head, education level of household head, access to credit, household income, and household size were all associated with food security status. Thus, this study recommends that the government at all levels (local, state, and federal) have an adequate budget allocated to increasing awareness of the benefits of participating in farming to improve the livelihood outcomes of households.

Keywords: household-level, food security, dietary diversity, socioeconomic characteristics, logistic regression model

INTRODUCTION

South Africa ranks among the countries with the highest rates of income inequality in the world. Compared to other middle-income countries, it has extremely high levels of absolute poverty (SSA, 2014). As a middle-income country, South Africa is characterised by large income inequalities and absolute poverty (Altman et al., 2009). The country's persistent social and economic inequalities have reduced access to food for the poor (Vella, 2012). Furthermore, almost half of the households in rural areas experience inadequate access to food compared to urban households (Ndobo, 2013). The biggest problem of food security has been identified as limited 'access to food' (Department of Agriculture, 2012). South Africa is faced with an acute nutrition problem which is mostly due to low incomes and a lack of proper education on food selection. Rural households are vulnerable to chronic food shortages, unbalanced nutrition, and poor-quality food. This leads to malnutrition, a consequence of an unbalanced diet, which in turn leads to poor physique and low energy output (Neumann et al., 2002). Despite the considerable efforts by national governments and the international community to reduce food insecurity and improve nutrition over the years, food insecurity and malnutrition still persist worldwide.

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Iduku et al. (2012) defined food insecurity as 'when individual human beings lack physical and economic access to healthy, nutritious, safe, and socially acceptable food to live a balanced and productive lifestyle'. Household socio-economic attributes like education, gender, age, and marital status also have a strong effect on food accessibility for low-income households (Masuku et al., 2017). Selepe et al. (2015) noted that the Eastern Cape province has the highest poverty level in South Africa. According to SSA (2016), in the Eastern Cape province, poverty rose from 41.9% in 2011 to 43.3% in 2016. Moreover, the Eastern Cape province has the highest population in all the provinces, with people depending solely on social grants to meet their food security (SSA, 2014).

Malnutrition and its associated health conditions in rural communities are largely caused by eating too little, eating too much, or eating an unbalanced diet that lacks the necessary nutrients (Cleaver et al., 2015). Undernutrition is a type of malnutrition which is defined as the failure to consume adequate energy, protein and/or micronutrients to meet the basic requirements of the body for maintenance, growth, and development. This is the leading nutrition problem in low-income communities and is characterised by low height (stunting), and low weight or being underweight. The second type of malnutrition is overnutrition, leading to being overweight as well as causing non-communicable ailments such as obesity, diabetes, and cardiovascular disease (heart attack, stroke). Scrimshaw (1994) discovered that nutrition insecurity not only has harmful effects on physical growth and work capacity, but also on cognitive development and physical activity in adults and children. Neumann et al. (2002) noted that decreased cognitive function and reduced learning capability affect the productivity not only of individuals, but also of societies and disadvantaged communities collectively. Eliminating hunger and malnutrition is one of the most fundamental challenges facing humanity (Lomborg, 2004). Malnutrition has a significant economic impact. The economic loss to a nation where malnutrition is prevalent can be estimated in terms of lost productivity per individual worker (Cleaver et al., 2015). However, although malnutrition is a problem of national significance for South Africa, it is especially problematic among families involved in subsistence farming (Neumann et al., 2002), thus revealing the weakness of land-based livelihoods in South Africa. Rural communities in the Eastern Cape province are characterized by food insecurity, which does not provide justice in terms of their right to food (Shisanya and Hendriks, 2011). With the same viewpoint, Masuku et al. (2017) stressed that in rural areas, household units lack the lobbying power to influence policymakers, which results in households being vulnerable to food insecurity induced by inadequate access to food. Several studies conducted in the Eastern Cape province attest that food insecurity is an issue that needs urgent attention (Dodd and Nyabvudzi, 2014; Selepe et al., 2015; Megbowon and Mushunje, 2018; Rogan and Reynolds, 2018).

MATERIALS AND METHODS

Study area

The study was conducted in the Eastern Cape (EC), which comprises the former homelands Ciskei and Transkei. Eastern Cape Province (ECP) is the second-largest province in South Africa in terms of land size area but has a population of just 6,562,053 (12.7% of the nation), while Gauteng and KwaZulu Natal provinces have smaller areas but are estimated to have populations of 12,272,263 million (23.7%) and 10,267,300 (10.8%), respectively (Mdoda and Obi, 2019). ECP is considered one of the poorest provinces in South Africa. It consists of six district municipalities, namely, O.R. Tambo, Chris Hani, Amathole, Alfred Nzo, Cacadu, and Ukhahlamba (Lavrakas, 2008), with two metropolitan areas called Nelson Mandela Bay and Buffalo City, and Bisho as the provincial capital (Lavrakas, 2008; UNDP, 2012). Social and cultural contexts that drive poverty are predominant in the EC. The province is characterized as a developing province that is entirely dependent on the automotive sector, through companies such as Mercedes Benz South Africa (East London), Volks Wagen, and Ford (Port Elizabeth), with two special economic zones (SEZs) (Coega in Port Elizabeth and East London), and agricultural productivity. Agricultural productivity is practiced by commercial and small-scale farmers, but small-scale farming dominates amongst agricultural activity. The province has a good health system, but poor implementation is a major challenge despite the existence of National Health Insurance, which is implemented by the province for the benefit of its citizens, both rural and urban, who are not covered by medical aid. The majority of citizens live in abject poverty, and the

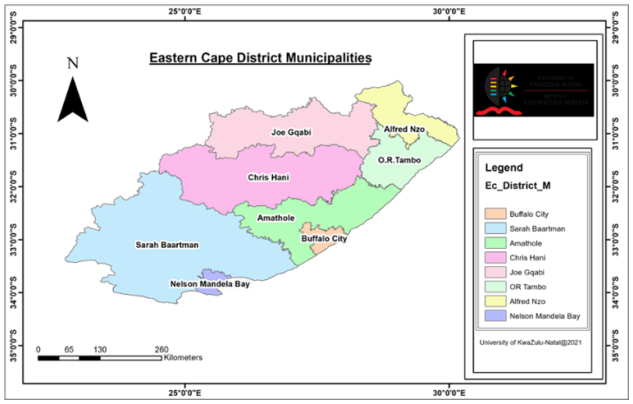

Fig. 1. Map of Eastern Cape Province

province is also bedeviled by high unemployment rates and hunger. The province is dominated by rural communities that rely mostly on agriculture for a living. It is shown diagrammatically in Fig. 1 with all its district municipalities. It is the poorest province in South Africa as the majority of the population (88%) live below the country's minimum poverty line (DAFF, 2017). As a result, unemployment is very high, resulting in people depending on social security from the government and agriculture for a living.

The province is richly endowed with natural resources ranging from luscious grazing lands and pastures to forests; from marine life to rich farming soils; and from water to wilderness. It has all seven of South Africa's ecological zones and its climate is favorable for agricultural production. The province has high rainfall with over 850 mm annually, which encourages agricultural activities. As a result, these areas are characterized by a range of farming activities, from crop production, to vegetable, citrus, and livestock farming. The agriculture in the province is dominated by subsistence farmers residing in rural communities (Chiteni et al., 2020). The crop and vegetable production currently practiced in the province includes the production of cabbage, spinach, potatoes, chicory, maize, tomatoes, and pineapples, which are all successfully cultivated, while livestock farming includes cattle, sheep, goats, pigs, and chickens. The province has abundant water supplies from numerous rivers that run from the mountains to the sea. This makes the area ideal for investigating food security and its determinants.

Sampling procedure, frame, and sample size

The approach of this paper is an inquiry that involves the descriptive approach. This study adopted a cross-section research design to capture detailed information regarding the socio and demographic aspects of the food security status of rural households in the Eastern Cape Province. The data were collected on several variables, such as demographics and household socioeconomic factors, their production, food security status, and challenges faced.

The study made use of a multi-stage sampling procedure. This procedure was used because it allows the researcher to sub-divide the study area into sections, allowing a large sample to be pooled. The first stage of the multi-stage procedure was to select the district municipalities in the province. The district municipalities were O.R Tambo district, Chris Hani, and Amatole. These were selected because their climate conditions favour agricultural production, and there is water available for irrigation purposes as there are irrigation schemes situated in these districts. The second stage involved selecting three local municipalities and 4 villages per municipality where these farmers were situated which produce vegetables. Within these three district municipalities, nine local municipalities and 16 villages were considered in this study. The last stage was to select farmers randomly to make up the sample size of 240 smallholder farmers. The unit of analysis was smallholder potato farmers. The list of smallholder vegetables was used as a sampling frame and was obtained from the Department of Agriculture, farm organizations, and extension officers working in these areas.

The study implemented a systematic and multi-pronged data collection procedure. Data was collected through a single-visit farmer survey and a household survey using a semi-structured questionnaire. The questionnaire was self-administered during single-visit interviews

Table 1. Sample size

District municipality	Sample size
OR Tambo	80
Chris Hani	80
Amatole	80
Total	240

Source: own elaboration.

with respondents and was used as the primary data collection tool using the local language, IsiXhosa. The questionnaires were arranged and administered on a farmer-to-farmer basis. The questionnaire was pretested before it was finalized. Pretesting was done to improve the questionnaire and check on essential aspects such as the time taken to complete the questionnaire and the suitability and appropriateness of the questions. Time considerations were essential in the administration of the questionnaire given the level of farmer tiredness in the study area. Pretesting was done in the same community with a few farmers who did not participate in the main survey. Data collection was conducted by six well-trained enumerators.

The respondents were questioned on farm characteristics, farm production, contribution to household well-being, and challenges encountered. The information varied from farmer to farmer. The questionnaire was structured in such a way that the first part covered socioeconomic variables such as the age of the household head, household size, off-farm income, gender, etc. The second part dealt with productive inputs, dietary factors of the rural indigent households, contribution to household livelihoods, and challenges faced. Data was collected in 2019 during the months of May and September. The unit of analysis was smallholder farmers and farming households.

Data

Table 2 below presents the collected data.

Foster-Greer and Thorbecke (FGT) food security analysis

The study made use of Foster–Greer–Thorbecke (FGT) indices to assess the food security status of the household heads. Omotayo and Aremu (2020) specified that FGT is a class of decomposable poverty measure that is used to show the various food security statuses of households. This approach is the most appropriate to estimate food security as the it involves the setting of a poverty line based on the cost (at current prices) of gaining minimum nutritional intake (Ogunniyi et al., 2021; Ozughalu and Ogwu, 2015). It combines information on the extent of food security (as measured by the head count ratio), the intensity of food security (as measured by the total food security gap), and inequality among the poor (as measured by the Gini and the coefficient of variation ratios). The household food security line was defined as two-thirds of the mean per capita household food expenditure (ZAR), and the statuses of the households were stated to be either food secure or food insecure. The households whose ZAR was above the line were categorized as food secure, while those below were food insecure. The model is shown below:

Table 2. Hypothesized influential factors of food security

Independent variable	Description	Expected relationship (+/–)
Gender of farmer	Dummy, 1 = male, 0 = otherwise	+/–
Age of farmer	Actual years	+/–
Years spent in school by the farmer	Actual years spent in school	+
Marital status of the farmers	Dummy, 1 = married, 0 = otherwise	+
Total monthly income	Actual amount	+
Size of the family	Actual number	+
Availibility of arable land	Dummy, 1 = arable land, 0 = otherwise	+
Membership in the farm organization	Dummy, 1 = member of an organization, 0 = otherwise	+
Farming experience	Actual years	+
Extension services	Dummy, 1 = access to extension services, 0 = otherwise	+
Farm size	Actual hectares	+

Source: own elaboration.

$$P\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right] \alpha 1 \ (y_i \leq z) \quad (1)$$

where:

1 ($y_i \leq z$) denotes that the food insecurity gap does not exist for households with mean per capita expenditure above the food security line,

$P\alpha$ – is the FGT food security index,

n – is the number of sample households,

y_i – is consumption expenditure per adult equivalent of ith household

z – represents the cut-off food security line,

q – is the number of households below the poverty line

α – is the food security aversion parameter, which takes a value of 0, 1, or 2.

Head count index (P0), poverty gap index (P1), and severity index (P2).

HeadCount Index: If $\alpha = 0$, then the FGT measure corresponds to the headcount index, in which no concern for the depth of the shortfall is given. In other words, it is the share of sampled households whose food expenditure per adult equivalent falls below the food poverty line.

Food Security Gap: If $\alpha = 1$, then FGT is equal to the mean distance that separates the food insecure household from the food poverty line (i.e., the measure of the depth of food insecurity). In other words, the food insecurity gap index offers information concerning the detachment between the food poverty line and each household's food expenditure per adult equivalent. It captures the mean aggregate consumption shortfall relative to the food poverty line across the sample. It is, therefore, a much more influential measure than the headcount ratio because it considers the distribution of the food below the poverty line. That is, it reflects the per capita cost of eradicating food insecurity.

Food Insecurity Severity Index: if $\alpha = 2$, then FGT measures the severity of food insecurity. It is sensitive to inequality among the food insecure households. It considers not only the distance separating the food insecure from the food poverty line but also inequality among the food insecure.

The FGT poverty measures were calculated using the Distributive Analysis Stata Package (DASP) version 2.3 (Maziya et al., 2020; Araar and Duclos, 2013). Food security restriction is a non-negative parameter indicating the degree of sensitivity of the food security measure to inequality among the poor. The incidence of food insecurity (headcount index), estimated when $\alpha = 0$, measures the share of households below the poverty line. The food security depth index (food security gap), estimated when $\alpha = 1$, captures information regarding how far households are from the poverty line. The food insecurity index (food security gap square), estimated when $\alpha = 2$, considers not only the distance separating the poor from the poverty line (the poverty gap) but also the inequality among the poor. TGT estimated food insecurity incidence, gap, and severity, and many previous studies have used this model, such as Sani and Kemaw, 2019; Omotayo, 2016; Obayelu and Orosile, 2015.

Modelling the probability of a household being poor

The study made use of the minimum per capita calorie adult equivalent caloric intake. In South Africa, an amount of R714 per adult equivalent per month was used as the poverty line, as recommended by Statistics South Africa in their 2016 prices (SSA, 2017). This study uses the Lower-Bound Poverty Line (LBPL) as it has emerged as the preferred threshold that is commonly used in South Africa's poverty reduction targets outlined in the Medium-Term Strategic Framework, National Development Plan, and Sustainable Development Goals. This study is in line with Maziya et al. (2020), who made use of this model to estimate household food security.

The R714 value was estimated to have a daily energy requirement of 2200 kcal per capita, as endorsed by the South African Medical Research Council for a healthy and active life. Measuring food security status using consumption expenditure is very common and is a better indicator than income for measuring household food security status. A household is considered to be poor when the household expenditure is inadequate to meet the food and other basic needs of household members.

Binary logistic regression

The study made use of a binary logistic regression model to estimate the determinants of food security in the study area. Studies such as Abdullah et al. (2019), Anyaeji and Arene (2010), Cheteni et al. (2019), Felker-Kantor and Wood (2012) used this model to estimate the factors influencing household food security status. This means that household food security status was taken as a dependent variable and regressed against 13 hypothesized

explanatory variables as indicated in the table of variables above. The logistic function is known to be flexible and applicable. This method was chosen because it is a standard analysis method when the outcome variable is dichotomously measured as having a value of 1 or 0. Household food security in this study is dichotomous as farmers and households are either affected or not affected by socioeconomic and demographic factors. Since the dependent variable, food security status of households (food secure, food insecure), is dichotomous (binary), the binary logistic regression model was used as a tool to estimate the determinant factors of food security among households. The binary logistic model empowers one to select the predictive model for dichotomous dependent variables (Ayele, 2020). It describes the relationship between a dichotomous response variable and a set of explanatory variables.

The binary logistic regression model is widely used to analyze data with dichotomous dependent variables. Hence, it was considered a suitable model to use for this study because the dependent variable was dichotomous in nature. In addition, it was essential to generate dummy variables to use the selected socioeconomic knowledge about food security status. The independent variables used in the analysis are shown in Table 2 above. Binary logistic regression is advantageous because it estimates the dichotomous outcome variables, which are more straightforward and flexible, to make the results more meaningful for interpretation (Sigigaba et al., 2021). This model was employed because it accommodates two categories in the dependent variable. It can resolve the heteroscedasticity problem, and it satisfies the cumulative normal probability distribution. Hence, the binary logistic model was selected for this study.

The model was selected because of its capacity to better answer our main research questions and because of our data and sample characteristics (the association between the variables and the slope shows how the log odds ratio in favor of food security status changes as the independent variable changes). Additionally, the significant explanatory variables do not have the same level of impact on the food security status of farmers. The relative effects of a given quantitative explanatory variable on household food security status was measured by examining food security elasticity, which is why Logit is the most suitable model to be used. The variables that were assumed to influence the household food security status were tested for multicollinearity. The Logit model was used as it offers the possibility to save the predicted variables used to estimate household food security status automatically. The binary logistic model fits this type of study due to the cumulative nature of the variables used in the study since they assume a cumulative normal distribution, which leads to efficient estimators. This model characterizes adoption by the sample farmers so that it allows maximum likelihood estimation. The model is stated thus:

$$In = \frac{[(p(y = 1/x)]}{[(1 - p(y = 1/x)]} = \alpha + \beta_1 X_1 + \ldots + \beta_n X_n \qquad (2)$$

where:

p – predicted probability of being food secure,
$1 - p$ – predicted probability of not being food secure,
α – the constant of the equation,
β – the coefficient of the independent variables,
X – independent/explanatory variables.

It must be kept in mind that the estimated coefficients do not simply affect the change in corresponding explanatory variables on the probability of the outcome. Relatively, the coefficients replicate the effects of individual explanatory variables on their log of odds. The positive coefficient displays that the odds ratio increases as the explanatory variables increase, and conversely, the odds ratio decreases as the explanatory variables decrease. The binary logistic regression coefficients were estimated by utilizing the maximum likelihood estimation methodology. As we know that the dependent variable, food security, is a dummy variable in its nature, we hypothesized that the following demographic, socioeconomic, and other factors influenced household food security status, accounting for the specific locality as shown in Table 2, because the literature suggests that food security varied considerably from one community to another, and even within the same region.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 3 below shows the socioeconomic characteristics of the households in the study area. The descriptive results revealed that the mean age of household respondents was 45.67. 65% of the households were female and 35% male, with the majority of household members having spent about 10 years in school. The mean household size was 4.53 people with 24% employed household

Table 3. Socioeconomic characteristics of households

Variables	Mean	SD
Age	45.67	20.45
Household income	5 345.65	43.87
Household size	4.53	2.35
Years spent in school	10.23	5.32
	Frequency	Percentage
Sex		
Male	77	35
Female	143	65
Access to credit		
Yes	66	30
No	154	70
Married		
Married	119	54
Single	101	46
Occupation		
Farmer	117	53
Employed	52	24
Unemployed	51	23

Source: own elaboration.

heads and 23% unemployed household heads. About 54% of households were married and 46% were single, with a mean household income of R5 345.65. 30% of households had access to credit. However, the majority of households had no access to credit (70%).

Food security status

Household food security is conceptualized as a complex phenomenon with various aspects and differing trajectories. This study estimated food security status to understand the concept that the predicament of households facing food shortages differs depending on the scarcity households suffer, which is often unequally dispersed from one household to another. Table 4 below shows the FGT results for food security among farming households.

The measure of household food security made use of Foster–Greer–Thorbecke (FGT) Food Security analysis,

Table 4. Food insecurity levels among farm households

Food insecurity indices	FGT Value
Food insecurity incidence (headcount)	0.553
Food security gap	0.10
Food insecurity severity index	0.22
Mean per capita household food expenditure (ZAR) R714	

Source: own elaboration.

which involves a consumption expenditure threshold level below which a household or individual is considered poor. In this study, a monthly food expenditure of ZAR 714 was considered an absolute poverty level for a household, as stated by Stats SA (2017). This means that farmers and households that were unable to earn at least ZAR714 of financial resources a month to meet their consumption needs remained moderately poor. The extent of household food security status across the EC province was estimated using the FGT poverty indices. The food insecurity parameters used were measured using α parameter, which takes a value of 0, 1, or 2. The food insecurity incidence (headcount)) ($\alpha = 0$), food security gap (depth food insecurity) ($\alpha = 1$), and food insecurity severity index ($\alpha = 2$) are shown in Table 4. The results indicate that the majority of the farmers and households in the study area were poor as they fall below the poverty line. The percentage of poor households was measured in absolute headcount (0.553) as it varies between the districts. This implies that 55.3% of the sampled farmers and farming households are unable to meet the daily recommended food security threshold. The incidence of food insecurity in the province is the result of poor education, limited economic opportunities, and households that remain trapped in unproductive subsistence agriculture, as well as disadvantages entrenched in social, cultural, and political inequalities. These results were in line with Omotayo et al. (2022) and Muzah (2018), who found that rural communities are living below the poverty line, resulting in a high incidence of food insecurity. The food security gap was 0.10 (10%), which implies that if resources could be organized to meet 10% of the caloric requirement of every food-insecure household, it could reduce food insecurity by making resources available to households. The food insecurity severity index was 0.22 (22%), which

represented the severity of food insecurity of the farmers and farming households.

Estimation of the Logit regression model of determinants of food security status

A logit model was estimated to elicit the factors influencing the current food security status of households. The socioeconomic variables listed in Chapter Three in Table 3.4, were considered for the model and tested for their significance at 10%, 5%, and 1% significance levels. Five explanatory variables were identified to be possible determinants of food security in the study. These were age of household head, education, income level, access to credit, and household size. The binary logistic specification is suited to models where the endogenous variable is dichotomous, which in this case are the households who are food secure and those who are food insecure. Logistic regression provides a model for observing the probability of a household being food secure or food insecure.

Table 5 presents the results of the binary regression model and the measures of goodness-of-fit. The chi-square is (33.049; $p < 0.01$). The results show that the model was suitable for explaining the determinants of the food security status of households. Variables included in the model were significant in explaining the variation in the food security situation of the households in the study areas. These variables are age, education level, income, household size, and access to credit.

Table 5. Logistic regression analysis determining the factors affecting household food insecurity

Independent variable	Estimated coefficient	Standard error	P-value
Age	–0.017	0.008	0.022**
AnyEdu	0.800	0.283	0.005***
Income	0.00029	0.000	0.002***
Household size	–0.095	0.057	0.045**
Access to credit	0.938	0.519	0.007***
Constant	–1.243	0.567	0.028
Chi-square		35.049	
2 Log likelihood		334.207	
Cox & Snell R square		0.121	
Nagelkerke R square		0.163	
Correctly predicted		68.4%	

and * indicates significant at the 5% and 1% level respectively.
Source: own elaboration.

Estimation of the Logit regression model of determinants of food security status

A logit model was estimated to elicit the factors influencing the current food security status of households.

Income

The results suggest that household income levels were positively related to food security and significant at the 1% level. This indicates that the higher the household income, the higher the probability that the household will be food secure. An R1 increase in household income is associated with an increase in the probability of a household being food secure of 0.029%, ceteris paribus, which seems very little, but of course this is only in relation to an R1 increase. This was to be expected because increased income, other things being equal, means increased access to food. These results are supported by the research of Babatunde et al. (2007). Household income is important as it determines how much can be spent on various household needs. The quantity and quality of a household's expenditure patterns are highly correlated with the purchasing power of the household. These findings are consistent with similar studies on food security. Bashir et al. (2012) also found a positive impact of income on food security.

Age

The results show that the age of the household head has a positive estimated slope coefficient that was significant at a 5% level. This indicates that the older the household head, the higher the probability that the household will be food secure. A unit increase in the age of the household head will increase the probability that the household is food secure by 0.0041. This could be attributed to the fact that the productivity of old household heads will increase as they get older. The study also considered the possibility that there was a non-linear relationship between the dependent variable and age. This was discovered by including the square of the age variable in one of the regressions so that in every other respect it was the same as the previous logic regression and no other age variables were significant in any conventional way, meaning very few other variables were significant.

These results contradict the findings of Babatunde et al.(2007), who claimed that an increase in age decreases food security.

Household size

The results indicate that household size has a negative estimated slope coefficient which was significant at a 10% level. A unit increase in household size will reduce the probability of a household being food secure by 0.0229. These results were expected because an increase in the members of a household means more people are eating or putting pressure on limited resources. The results are in line with the findings of Oluyole et al. (2009).

Education level

According to Garrett and Ruel (1999), literate household heads are more likely to adopt new skills and ideas which in turn have positive effects on food security. The results suggest that households whose heads have at least some education are more likely to be food secure, at a 1% significance level. By contrast, Garrett and Ruel (1999) found a negative and significant association between educational level of a household head and food security.

Access to credit

The results suggest that a household's access to credit was positively related to food security and significant at a 1% level. This indicates that the higher the household's access to credit, the higher the probability that the household will be food secure. Credit, if acquired at the right time, can increase the likelihood of a household procuring production necessities such as seeds, chemicals, and fertiliser, among other inputs (Kuwornu et al., 2012), which could improve production and thus the household food situation (Iftikhar et al., 2017). It was therefore anticipated that household access to credit would positively correlate with household food security status.

CONCLUSIONS

Household food security is conceptualized as a complex phenomenon with various aspects and differing trajectories. The study estimated food security status to understand the concept that the predicament of households facing food shortages differs depending on the scarcity households suffer, which is often unequally dispersed from one household to another. The measure of household food security made use of Foster–Greer–Thorbecke (FGT) Food Security analysis, which involves a consumption expenditure threshold level below which a household or individual is considered poor. The extent of household food security status across the EC province was estimated using the FGT poverty indices. The food insecurity parameters used were measured using α parameter, which takes a value of 0, 1, or 2. The food insecurity incidence (headcount)) ($\alpha = 0$), food security gap (depth food insecurity) ($\alpha = 1$), and food insecurity severity index ($\alpha = 2$) are shown in Table 4. The results indicate that the majority of the farmers and households in the study area were poor as they fall below the poverty line. The percentage of poor households was measured in absolute headcount (0.553) as it varies between the districts. This implies that 55.3% of the sampled farmers and farming households are unable to meet the daily recommended food security threshold. A logit model was estimated to elicit the factors influencing the current food security status of households. The logistic regression model was chosen as a method of analysis because it can estimate the probability of a particular event occurring and accommodate both discrete and continuous explanatory variables. The results show that the model was suitable for explaining the determinants of the food security status of the households. The variables included in the model were significant in explaining the variation in the food security situation of households in the study areas. These variables are age, education level, income household size, and access to credit. Age, education level, and income significantly influenced household food security in the study, which is consistent with expectations from the findings of previous studies. However, household size was found to negatively influence household food security, seemingly because large family size can imply poverty with limited income and resources. Generally, the level of education of household heads was quite low in the study area. However, the education of household heads tended to be a significant determinant of household food security.

ACKNOWLEDGEMENTS

The authors' sincere thanks go to the Eastern Cape household heads who participated in this study and made this piece of work possible. The authors are grateful to the enumerators who assisted in data collection.

SOURCE OF FINANCING

This research was funded by the Department of Agriculture, Forestry and Fisheries.

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