

## Determinants of Poverty in a South African Township

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**ABSTRACT** Strategies aimed at reducing poverty need to identify factors that are strongly associated with poverty and that could be influenced by policy changes. The study reported here used household level data to analyze determinants of household poverty in a South Africa Township of Bophelong. A Logistic regression was estimated based on this data with the economic status (that is poor and non-poor) as the dependent variable and a set of demographic variables as the explanatory variables. The results show that household size, age and the employment status of the household head significantly explain the variations in the likelihood of being poor. The age and employment status of the household head reduces the probability of being poor, whereas household size is associated with an increased probability of being poor. The strongest predictor of poverty status is the employment status of the household head.

### INTRODUCTION

Poverty is a debated concept and a human phenomenon that does not seem to go away. Arguments over how poverty should be conceptualised, defined and measured go beyond semantics and academic debates. Poverty is differently seen as a big phenomenon or a small phenomenon, as a growing issue or a declining issue, and as an individual problem or a social problem (Alcock 1997). Many works on the subject of poverty become so technical that it is very difficult to draw conclusions from them or to employ them in policy-making endeavours. The important factor with definitions of poverty is that definitions drive policies. How poverty is defined and measured tends to determine the types and directions of policies aimed at reducing it. An understanding of the cause of poverty and devising strategies to reduce it is a central component of the definition of poverty. Recognition thereof reinforces appreciation of the difficulties of the problem and serves as a reminder that a search for strategies and an understanding of poverty draws on the wider body of knowledge accumulated in the general field of development. Insights from development theory can thus be useful when considering the specific instance of poverty. The possibility of reducing poverty through effective redistribution policy is the ultimate objective of efforts made in its understanding. It is important for each society to amass all in order to eliminate poverty

and its associated scourges. Streeten (1998: 2-3) gives the following reasons for the desire to eliminate poverty from society: firstly, the elimination of poverty leads to increased productivity. Increases in health, skills, education and mental alertness, which the poor are normally deprived of, make for a healthy workforce; secondly, the elimination of poverty would lead to desirably lower family sizes. People will be empowered to make decisions about their lives; and thirdly, poverty reduction leads to a healthier environment, healthy civil society, democracy and greater social stability.

For these and other reasons, it is desirable that poverty is eradicated or at least alleviated. There are a number of different approaches to understanding the causes of poverty. Different views about the causes of poverty can impact on the types of policies that are used to reduce the levels of poverty. Identifying the causes of poverty can be complex exercise. The following are the main basic causes of poverty: inadequate access to employment opportunities, physical assets such as land and capital, and markets for goods and services which the poor can sell; inadequate participation of the poor in the design of programs earmarked for their upliftment; and low endowment of human capital as a result of inadequate access to social services (World Bank 1997).

From an empirical point of view, there has been number of studies (for instance, Amuedo-Dorantes (2004) for Chile; Geda et al. (2005) for

Kenya; Glewwe (1990) for Cote d'Ivoire) shed light on the factors that can contribute to one's poverty status. These studies either look at the characteristics of the household as a whole or that of the household head as possible determinants of poverty. Household level determinants of poverty generally rely on the household level data. Age, gender of the household head and educational level are generally found to be some of the most important determinants of poverty. A study by Malik (1996) concluded that households whose heads are in higher age group have a lower possibility of remaining poor households. Moreover, years of schooling of the head of the household also significantly reduce the probability of remaining in the poor group (Minot and Baulch 2005). Households headed by males are found to have a lower probability of being poor (Geda et al. 2005). Family size and dependency ratio are positively related with the level of poverty (Malik 1996; Minot and Baulch 2005). The other factors like the gender of the household head and the occupation or industry also influence the poverty level.

In common with many countries, the inability of a great deal of people to satisfy their needs, while a minority enjoys extreme prosperity, stems from various sources. The specificity of this situation in South Africa has been, among others, the results of institutionalised discrimination (Padayachee 2005). Colonial and Union government policies directed at the extraction of cheap labour, were built upon by apartheid legislation. The result was a process of state-driven underdevelopment that encompassed dispossession and exclusion for the majority of South Africans. An outcome brought about by these policies was the loss of assets, such as land, livestock, and simultaneously the denial of opportunities to develop these assets through limiting access to markets, infrastructure and education (Aliber 2001). Although South Africa has undergone a dramatic economic, social and political transition in the last two decades, many of the distortions and dynamics introduced by apartheid continue to produce poverty and perpetuate inequality. Despite an improvement in access to basic services like housing, water and electricity, there remain many households living in conditions of squalor. South Africa still experiences high levels of poverty and extreme disparities in income, wealth and opportunities. This brings to mind the question of what the con-

straints for poverty alleviation have been. The correct identification of these constraints and the introduction of remedial policies have been identified as priorities by both government and civil society. The importance of reducing poverty and inequality has been a consistent theme of the post-apartheid government. Statements made by government have recognized that planning needs to be focused on the objectives of narrowing inequality, breaking down the barriers that hamper participation in the economy and reducing poverty. The problem of poverty in South Africa is more evident in urban areas, commonly known as townships. In South Africa, the term township and location usually refers to the often underdeveloped urban living areas that, from the late 19th century until the end of apartheid, were reserved for non-whites, principally Black and Coloureds. They were usually built on the periphery of towns and cities (Estelle 2003). In the townships, households are caught in poverty trap from which they are unlikely to escape without government help. A large number of the population lives in these urban areas, which continue to grow at a rapid rate. This rapid growth is responsible for many environmental and social changes in the urban environment and its effects are strongly related to global change issues. The United Nations (1995) points that the rapid growth of cities strains their capacity to provide services such as energy, education, health care, transportation, sanitation and physical security. This then results in cities that become areas of massive sprawl, serious environmental problems and widespread poverty.

The perseverance of poverty in South Africa, despite substantial interracial economic redistribution in the past two decades, necessitates an investigation into its intricacies. The current problems could be alleviated by explicitly pro-poor developmental programmes. This study provides an analysis of the determinants of household poverty in a township of Bophelong. The study is based on a household survey using questionnaires. Poverty is defined and then measured for the sampled population. A Probit regression model is used with two dependent variables (0=non poor, 1=poor) and a set of demographic and socio-economic variables as explanatory variables. The aim is to highlight the determinants of household poverty in a typical South African Township. Bophelong is

an urban township 70km south of Johannesburg. The area is part of Emfuleni Municipality. Previous studies have found seemingly high poverty levels in the area; where 67% of the households were found to be living below their poverty lines in 2003 (Slabbert 2003). A study by Sekhampu (2004) reported that 62% of the households were poor. Furthermore, of those who were found to be poor, 45.8% had an income of less than 50% of the poverty line (Sekhampu 2004). A similar study by Slabbert (2009) revealed increasing levels of poverty where 69% of the sampled population in Bophelong was found to be poor (Slabbert 2009). This study provides an analysis of the factors which are strongly related to the poverty status of a household. The analysis presented here will enable policy makers to clearly see the effect of various household characteristics on poverty in a South African context. The next section will explain the methodology followed in the study. The results section will be discussed in section 3, followed by a discussion and conclusion of the study. The final section will provide recommendations stemming from the findings of the study.

### Research Objectives

In view of the challenges faced by many households in South African Townships, the main objectives of the study were:

- ♦ To measure the level of poverty in the township of Bophelong
- ♦ To analyse the determinants of household poverty in the area.
- ♦ To provide policy recommendations on how to alleviate poverty

### RESEARCH METHODOLOGY

The research process and the methodology followed in the measurement of poverty are explained in the subsection that follows. The section also explains the regression model adopted in the study.

#### Survey Design

The study reported here is based on a household survey using questionnaires. A random sample of households was interviewed in the township of Bophelong. Maps were obtained for Bophelong and sample stratification was

designed on account of the geographical distribution and concentration of people in the areas. A questionnaire was designed for obtaining the desired information. The questionnaire included information on demographics, respondents' income and expenditure patterns and their general view about their socio-economic status. The area was divided into the different extensions and the questionnaires were apportioned evenly among the inhabited sites. Sites at which field workers were supposed to complete questionnaires were identified individually from the map before the field workers went out. However, where people could not be obtained for an interview, or where it was impossible to trace the house, a next pre-selected household was interviewed. Information was obtained from the breadwinner or the spouse. Information obtained from the respondents was kept in strict confidence and the participants were not required to write their names on the questionnaire.

A total of 300 households were interviewed by four fieldworkers. Almost all the households approached were willing to partake in the survey and 283 questionnaires were completed in May 2011. Experience in previous surveys has shown that samples of this size with a low refusal rate supply statistically reliable data within reasonable limits.

#### Measurement of Poverty

Following the guidelines of the World Bank (2005), a poor household is defined as a household of which the combined income of all its members is less than the Household Subsistence Level (HSL) as determined for the specific household. If the combined income of a household is described by  $y_i$  and the poverty line (HSL) of the same household is described by  $z_i$ , the extent of poverty,  $P_i$ , of this household is described by  $P_i(y_i; z_i)$  (Slabbert 2004).

The headcount index is defined as the fraction of the population below the poverty line. In this report the headcount index is adapted to indicate the fraction of households that fall below their individual poverty lines, and is described by means of the equation (Ravallion 1998):

$$H(y; z) = M/N \quad (1)$$

Where:  $H$  = the fraction of households below the poverty line;

$y$  = household income;

- $z$  = the poverty line of households;  
 $M$  = the number of households with incomes less than  $z$ ;  
 $N$  = the total number of households.

The poverty gap usually measures the average shortfall of the incomes of the poor from the poverty line while the poverty gap index measures the extent of the shortfall of incomes below the poverty line. In this report the poverty gap index is adapted to be a measure of a specific household, described by the equation (Borooah and McGregor 1991):

$$R_i(y; z) = (z_i - y_i)/z_i \quad (2)$$

Where:  $R_i$  = the income shortfall of a household expressed as a proportion of the household's poverty line;

- $y_i$  = the income of a specific household; and  
 $z_i$  = the poverty line of a specific household.

The poverty gap of an individual household (in monetary terms) can therefore be expressed by the equation:

$$G_i(y; z) = z_i - y_i \quad (3)$$

Where:  $G_i$  = the income shortfall of a household;

- $y_i$  = the income of a specific household; and  
 $z_i$  = the poverty line of a specific household.

### Poverty Line Calculation

When calculating national poverty lines as a statistical measure, the most common approach is to estimate the cost of a minimum basket of goods that would satisfy the necessary daily energy requirement per person over a period of a month. The daily energy requirement, as recommended by the South African Medical Research Council (MRC) is 2261 kilocalories per person. Using the 2000 Income and Expenditure Survey data, Statistics South Africa estimated that when consuming the kinds of foodstuff commonly available to low-income South Africans, it costs R 211 (\$26.37) per person every month to satisfy a daily energy requirement of 2261 kilocalories. This means that R211 (\$26.37) is the amount necessary to purchase enough food to meet the basic daily food-energy requirements for the average person over one month. Another consideration is the need by households for other goods and services beyond food in order to meet basic needs. This includes accommodation, electricity, clothing, and schooling for children, transport and medical services, amongst other things. The cost of such essential non-food items were estimated at R111 (\$13.88) per capita per month. Adding these fig-

ures together (R 211 and R111) gives an estimate of the minimum cost of essential food and non-food consumption per capita per month. It gives a poverty line of R322 per capita per month in 2000 prices (Statistics South Africa 2007). When increased with inflation, the threshold amount to R570 in 2010 prices (Statistics South Africa 2011). For this study the poverty rate was adjusted for inflation and calculated at R593 (\$74) per capita per month.

### Regression Model

The study used a logistic regression with two different dependent variables of dichotomous nature. The households are classified as either poor or non-poor based on their per capita income (as per methodology explained above). Predictor variables are a set of demographic and socioeconomic variables. The logistic regression model can be explained through the equation:

$$Y_i = f(X_{1i}, X_{2i}, \dots, X_{ki}) \quad (4)$$

$Y_i$  is the dependent variable representing the Households' level of poverty and  $X_s$  are the various household level socioeconomic and demographic indicators that determine the household level poverty determinants. Let's suppose that the response variable  $y^*$  captures a true status of the household either as poor or non-poor, the regression equation can be estimated as follows

$$y_i^* = \sum_{j=0}^k X_{ij} \beta_j + \varepsilon_i \quad (5)$$

$y^*$  is not observable and is a latent variable.  $x$  is observed as a dummy variable that takes the value 1 if  $y^* > 0$  and takes the value 0 otherwise. The  $\varepsilon$  is the vector of parameters and error terms are denoted with  $\varepsilon$ . The error terms entail the common assumption of zero mean but the underlying distribution is different. Let  $P_i$  denotes the probability that the  $i^{\text{th}}$  household is below the poverty line and its distribution depends on the vector of predictors  $X$ , so that

$$P_i(X) = \frac{e^{\beta X}}{1 + e^{\beta X}} \quad (6)$$

Where  $\beta$  is a row vector. The logit function to be estimated is then written as

$$\ln \frac{P_i}{1 - P_i} = \sum_{j=1}^k \beta_j X_{ij} \quad (7)$$

$$\ln \frac{P_j}{1 - P_j}$$

is the natural log of the odds in favor of the household falling below the poverty line where-

$$\frac{\partial \log(\text{oddratio})}{\partial x_j} = -\beta_j \quad (8)$$

as  $\beta_j$  is the measure of change in the logarithm of the odds ratio of the chance of the poor to non-poor household and can also be written as

Table 1 shows the socio-economic and demographic characteristics which are hypothesized to influence household poverty: age, education attainment, employment status, gender, marital status of household head, and the number of people in a household.

**Table 1: List of the variables and their description**

<i>Dependent</i>	<i>Variable</i>
<i>POV</i>	<i>Household income based poverty measure (0 = Non Poor, 1 = Poor)</i>
<i>Explanatory Variables</i>	
<i>AGE_Head</i>	Age of the Head of the Household in Years
<i>EDUC_Head</i>	Years of Schooling Head of the Household
<i>ES_Head</i>	Head of Household Employment Status (1 = Employed, 0 =No)
<i>G_Head</i>	Head of Household Gender (1 =Female, 0 =Male)
<i>MS_Head</i>	Head of Household Marital Status (1 =Married, 0 =Not married)
<i>Lab_Force</i>	No. of Potential Income Earners in the Household
<i>NP</i>	Family size measured by the number of people in the household

## EMPIRICAL FINDINGS

This section presents the findings of the study. The information obtained is at household level and is meant to show trends among township dwellers in a South African set up.

### Demographic Information

The demographic information affords an understanding of the household structures of the sample population. The classification of the population from different angles could be a reflective measure of the area's resources and of the availability and distribution of such resources. These demographics form an important part of the government's development mandate since households provide the labour for the production of goods and services, and also consume the final output of production. In addition, the size of a particular population is an important determinant of the socio-economic needs of the population. There were more female headed

households (53.4%) for the total sample, in comparison to 48% female gender ratio for the poor households. The mean age of the poor was calculated at 24, compared to 26 for the total sample population. The mean age for the household heads was 46, with the average household size of 3 members. The average number of years of schooling was 5.7; this means that on average a household head has primary school education.

### Poverty in Bophelong Township

The headcount index for the sample population is calculated at 0.69. This means that 69% of the sampled households' income was found to be below their respective poverty line when using R593 (\$74) per capita poverty line. The average household size for the poor from the sample population was calculated at 4. This is in comparison to a household size of 3 for the total sample population. The severity of poverty depends on the distribution of the poor below the poverty line. Figure 1 shows the distribution of poor households below the poverty line. The figure shows that poverty is deep rooted in the area. Of the poor population 52% are earning income less than 50% of the poverty line. The figure also shows that 6% of the poor are earning income between 0 and 10% of their poverty line. As an example, if a particular household's poverty line is calculated at R1000 (\$125), this would mean that the particular household's income is between R0 and R100 (\$12.50) (0 - 10% of the poverty line).

The poverty gap is the mean shortfall of the total population from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line; it adds up the extent to which individuals on average fall below the poverty line, and expresses it as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence. The poverty gap can also be interpreted as an indicator of the potential for eliminating poverty by targeting transfers to the poor. The minimum cost of eliminating poverty using targeted transfers then becomes the sum of all the poverty gaps in a population; every poverty gap is filled up to the poverty line (Ravallion 1992). The poverty gap index for Bophelong Township is calculated at 0.52 using the survey data. This means that on average, poor households have an income shortage of 52% of their poverty line, when using the lower bound pov-

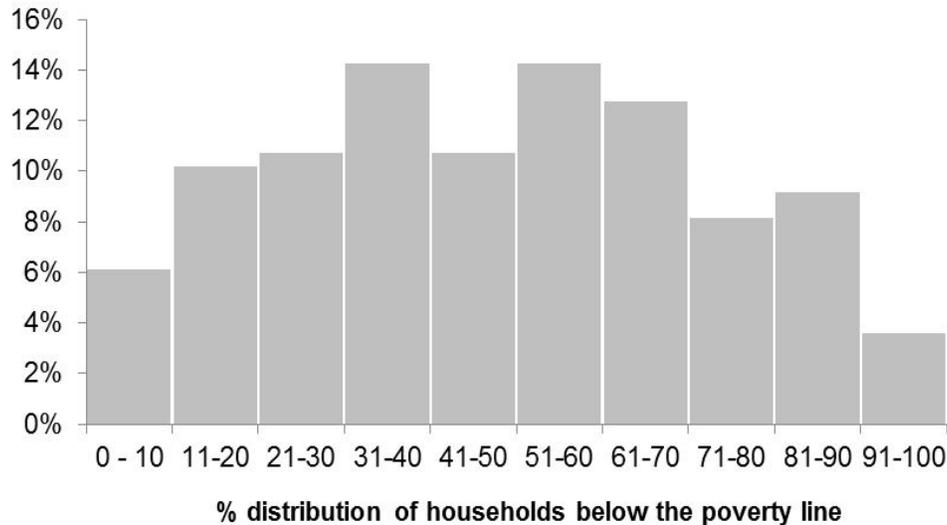


Fig. 1. Distribution of the poor below the poverty line

erty line. The average monetary shortfall per poor household was calculated at R1397.63 (\$174.70). This represents the average amount needed by a poor household to make up the difference between average household income and the poverty line.

### Logistic Regression Analysis

The results of the logistic regression on the determinants of poverty are shown in Table 2, showing the Wald test statistic and the odd ratio for each of the explanatory variable. The results show that the employment status of the head of the household (ES Head;  $p=0.000$ ) significantly explains the poverty status of household. The negative sign of the coefficient ( $B = -1.947$ ) show that the employment status of the household head negatively affect the probabili-

ty of being poor. The variable is significant at 1%. Household size (NP;  $p=0.001$ ) and age of the household head (AGE\_Head;  $p=0.002$ ) are other important determinants of poverty in the area. Results suggest that an increase in the age of the household head is negatively related to the probability of being a poor household. The coefficient for age ( $B = -.047$ ) is negative and significant at the 1%. Furthermore, larger households were found to have a higher probability of being poor; indicated by a significant positive coefficient ( $B = 0.364$ ) for the variable, with degree of freedom of 1.

The gender of the household is not found to be significant in explaining the poverty status of the household. This might be explained by the fact that females in need and with children under the age of 18 are eligible for the government's child support grant. This can contribute

Table 2: Logistic regression results on poverty determinants

	B	S.E.	Wald	p	Odd ratio	95% C.I. for Odds ratio	
						Lower	Upper
G_Head	.597	.40	2.22	.136	1.82	0.83	3.99
AGE_Head	-.047	.02	9.50	.002	.95	0.93	0.98
MS_Head	-.219	.40	.30	.585	.80	0.37	1.76
EDUC_Head	-.047	.04	1.13	.288	.95	0.88	1.04
ES_Head	-1.947	.36	29.18	.000	.14	0.07	0.29
NP	.364	.11	10.26	.001	1.44	1.15	1.80
Lab_Force	-.094	.17	.33	.567	.91	0.66	1.26
Constant	2.977	1.04	8.18	.004	19.63		

to household income and thereby lower the probability of being poor. Education is one of the determinants of the human capital in any country. Quality of education can be assessed by the number of people having higher level of education and training. The data provided through this study is on years of schooling of the household head. The average number of years of schooling was calculated at 5.7 years; equating to primary school education. The education level of the head of the household (EDUC\_Head) is negatively related to the poverty status but not significant. This suggests that the years of schooling might not fully explain the poverty status of a household. The marital status of the household head (MS\_Head) and the number of people in the household who can work (Lab\_Force) are also not significant in explaining the probability of being poor.

For selecting a good model, a number of tools for model adequacy can be employed. The Hosmer and Lemeshow (H-L) goodness-of-fit statistic involves comparing observed variables with expected or predicted values. It essentially shows the possible deviation from the underlying fitted distribution. That is, well-fitting models show non-significance on the goodness-of-fit test, indicating model prediction that is not significantly different from observed values. The percentage of correct predictions made after fitting the model on the observed data is another way to assess its applicability. Moreover, the high McFadden  $R^2$  and high percentage of correct predictions leads to the selection of the model. The model containing all explanatory variables was significant  $\chi^2 (5 N= 283) = 68.66 P < 0.001$ , indicating that the model was able to distinguish between the non-poor and poor.

## DISCUSSION

The results of the regression analysis on the factors influencing household poverty status shows that household size, employment status and age of the household head are significant predictors of poverty in Bophelong. The age of the head of household was negatively associated with the probability of being poor. The result is consistent with that of Khalid et al. (2005) but does not coincide with the findings of Baulch and McCulloch (1998) who report that no significant effect on the poverty status is made by the age of the head of the household. It is worth

noting that for the model, the coefficient of age of the head of the household is highly significant.

Other important explanatory variables are the employment status of the household head and household size. Household size is an important factor and can play a role in bringing down the incidence of poverty by reducing the probability of remaining in the poor household category. The increasing family size implies a larger number of dependents on fewer earners and this might lead to fewer earning and lesser per capita consumption. The results of the study show that higher household size increases the probability of being poor. Poor households were found to have larger households than the sample mean. An important question is whether households are poor because they have a larger size or rather, they have a larger size because they are poor. On the other hand, the age of the household lowers the probability of being poor. A study Bogale et al. (2005) concluded that the probability of a household being poor tends to diminish as age of the household head increases. This can be explained by an increase in asset ownership as people get older. Secondly, the composition of the family changes in time as children grow up and contribute to household income or leave the household.

The employment status of the head of household is another important explanatory variable and was negatively associated with probability of being a poor household. Ramon et al. (2004) concluded that the employment status of the head of household is important as it determines household income. With every addition of a household member in the employment line, per capita income (as a ratio of the poverty line) was found to increase by 32% for the case of Philippines. The employment status of the head of household was found to be the strongest predictor of poverty status of households in Bophelong. Furthermore, and in contrast to a well held view that the gender of the household head is important in determining the poverty status of a household, the results show that this is not significant for the case of Bophelong. The results also indicated that the level of education of the head of the household measured in actual years of schooling does not impact on the probability of being poor. A study by Achai et al. (2010) concluded that increases in educational attainment of the household head have an im-

portant impact on reducing the probability that a household is poor. A study by Geda et al. (2005) in Kenya, concluded that lack of education is a factor that accounts for a higher probability of being poor. Most of the residents in Bophelong are older (average age of respondents is 46) and might have missed the opportunity to improve their educational attainment.

### CONCLUSION

The aim of the study reported here was to analyse the determinants of poverty in a South African Township. Data from a random sample of 283 households in Bophelong was analysed, with the poverty status (0=non-poor and 1=poor) as the dependent variable and a number of socio-economic characteristics as explanatory variables. The results of the study show that the employment status, age of the head of the household and household size are significant predictors of poverty in Bophelong Township. The age and employment status of the head of household reduce the probability of being poor, while larger households were associated with a higher chance of being poor. The analysis presented above enables policy makers to clearly see the effect of various household characteristics on poverty in a South African context. Moreover, the study provides the factors which are strongly related to the poverty status of a household. Strategies aimed at reducing poverty can be directed at these factors.

### RECOMMENATIONS

The results and analyses above suggest that policy interventions are necessary to reduce poverty in Bophelong and South African Townships in general. Given that the probability of being a poor household increases with the number of household members, there is a need to intensify family planning services so as to improve knowledge of family planning. Most of the households are headed by female, thus making targeted programs for female important. Knowledge about fertility could have an impact on household size, which is an important determinant of poverty.

Training programs for the unemployed could be established in to improve their employability. Findings of the study suggest that the employment status of the head of household signifi-

cantly lower the probability of being a poor household. From a general perspective, reducing poverty could therefore be more effective if there is an understanding of the geographic location of the poor. The study reported here identified factors that are strongly related to the poverty status of households in the township of Bophelong. This study can help improve the design of poverty alleviation programs and determine the ways in which resources can be distributed so as to maximise poverty reduction. Similarly, this study can help with information for targeting programs within communities in view of the fact that the poorest of the poor need to be identified and specifically supported. Future research can be made focusing on severity of poverty by looking at household structures of poor households by comparing male and female-headed households.

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