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Gender Dimensions of Food Security among Households in Rural Eswatini

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Abstract:
The purpose of the paper is to examine gender inequity in food insecurity among rural households (male- and female-headed) in Eswatini (Swaziland). Promoting gender equality to improve food security in developing countries is important for inclusive development. However, studies focusing on gender issues in Eswatini are very few, hence the need for this study. The paper used data from the Eswatini Household Income and Expenditure Survey (EHIES) of 2016 and 2017 with a sample of 2543 rural households. Descriptive statistics and binary logistic regression analysis were employed as analytical methods to generate results on households' socioeconomic characteristics and the determinants of food security. Findings indicate that some socioeconomic differences exist between female and male-headed households. While more men are employed in the formal sector, women are more self-employed than men. Women head of households are relatively older and have larger families than men head of households. These gender differences expose women more to food insecurity than men. About 65% of these households were food insecure, with 55% of them being female-headed. Some of the determinants of food insecurity among male-headed households include marital status, household size, and non-food expenditure, while those for female-headed households are household size and non-food expenditure. The implication of the findings is that women are generally more vulnerable and poorer than men in the study area. In order to reduce food insecurity among female-headed households, women need to be more empowered through education and income-earning opportunities to feed their large families and meet other non-food obligations. This paper unravels the importance of gender and how this should be considered in designing welfare programs as men and women will be impacted differently. Thus, more studies need to be conducted on key drivers of food security outside the demographic characteristics of respondents.

Keywords: Eswatini, food security, gender, rural household, welfare.

斯威士兰农村家庭粮食安全的性别层面

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摘要：
本文的目的是调查斯威士兰（斯威士兰）农村家庭（男户主和女户主）粮食不安全方面的性别不平等。促进性别平等以改善发展中国家的粮食安全对于包容性发展非常重要。然而，针对斯威士兰性别问题的研究很少，因此有必要进行这项研究。该论文使用了 2016 年和 2017 年斯威士兰家庭收入和支出调查的数据，样本包括 2543 个农村家庭。采用描述性统计和二元逻辑回归分析作为分析方法，得出家庭社会经济特征和粮食安全决定因素的结果。调查结果表明，女性家庭和男性家庭之间存在着一些社会经济差异。虽然更多男性在正规部门就业，但女性比男性更多地从事自营职业。女性户主比男性户主年龄相对较大，家庭规模也更大。这些性别差异使女性比男性更容易受到粮食不安全的影响。其中约 65%的家庭粮食不安全，其中 55%的户主为女性。男户主家庭粮食不安全的一些决定因素包括婚姻状况、家庭规模和非粮食支出，而女户主家庭的粮食不安全决定因素包括家庭规模和非粮食支出。研究结果表明，研究地区的女性普遍比男性更脆弱、更贫困。为了减少女性户主家庭的粮食不安全状况，需要通过教育和创收机会赋予妇女更多权力，以养活大家庭并履行其他非粮食义务。本文揭示了性别的重要性，以及在设计福利计划时应如何考虑这一点，因为男性和女性会受到不同的影响。因此，需要对受访者人口特征之外的粮食安全关键关键关键关键因素进行更多研究。

关键词：斯威士兰、粮食安全、性别、农村家庭、福利。

1. Introduction

Food is a basic necessity for all human beings, and without food it is hard to stay alive, be active, move and work, grow, prevent and fight infections (FAO, 2018; Wilson, 2020). Therefore, regardless of nationality, ethnicity, tribe, or gender, all human beings have a right to access and acquire acceptable amounts of food, safe and nutritious to humans. Food needs to be available at all times for easy access in a sustainable manner, and this can be achieved through the formulation and implementation of agricultural policies and food systems (Savary et al., 2020). Despite the developed and implemented agricultural policies and food system regulatory institutions, in 2018, global projections were that 820 million people are hungry and about a quarter of the world's population faces moderate to severe food insecurity (Fan and Swinnen, 2020). Among factors reported to be responsible for failed agricultural policies and food systems programs for improved food security in developing countries include less consideration of existing gender inequality in accessibility and control of productive resources.

The limited access and control over productive resources is because of gender inequality that has compromised Agriculture and rural development in developing countries, yet women have a serious role in the four pillars of food security, namely stability, accessibility, availability and use (Stavi, 2021). Besides, women are key in overcoming food challenges as they play critical roles by being preservation of biodiversity, providers of food to families, food producers and keepers of traditional knowledge and as well as food processors (Mapiye, 2020). Food insecurity is a worst case scenario of poverty. Poverty is characterized by insufficient source of income, hunger, malnutrition, high mortality rate, poor health, poor educational level, and lack of assets (UNICEF, 2019). Poverty in Africa, particularly in the sub-Saharan region, has remained unabated over the past two decades. Economic shocks, food insecurity, and climate change threaten to deprive the poor population of their hard-won gains and force them back into poverty (Firdaus, Gunaratne, Rahmat & Samsinar, 2019). According to Oluwatayo and Ojo (2018), reducing food insecurity in Africa is still a challenge because of the different factors that keep changing, including climate change

In Eswatini, the percentage of the population categorized as poor declined from 69.0% in 2000/1 to 63.0% in 2009/10, a population surviving on less than South African Rand 461(equivalent of about USA Dollars $31) per month. The food insecurity situation in the country has worsened by increasing poverty among female-headed households. Furthermore, agricultural production in recent years has been low due to long droughts and erratic rainfall (WFP, 2019). Eswatini grow corn as its cereal crop and corn farming is divided into subsistence farming on Swazi Nation Land and commercial farming on Title Deed Land. Even though almost all the households in Swazi Nation Land produce maize, the country has never been independent in corn production (Mabuza et al., 2016). To close the gap of food deficit, the country imports most of its food from South Africa, making it more expensive amongst the poor including rural women who can hardly access better paying formal employment opportunities (Ministry of Economic Planning and Development, 2016). There is therefore a need to develop alternative and sustainable responses to this problem, especially from the gender dimensions as men and women suffer from the pang of food insecurity.

In the literature search, there are a few studies that have been conducted on gender dimensions of food insecurity and most results obtained show that female-headed households are more food insecure and food

insecure households are mostly situated in rural areas. Oluwatayo et al. (2020) conducted a study titled, "Food Security in South Africa: Are correlates the same for rural and urban households. The results of the study revealed that food insecurity is rooted in rural households. Moreover, in Eswatini, research conducted in relation to food security is the vulnerability assessment, which is conducted annually. Recently, a study was conducted by Mabuza and Mamba (2022) investigating the levels of food insecurity in the low-income households of Msunduza in Mbabane and the coping strategies employed by Msunduza residents to deal with food shortages. The results of the study revealed that most of the households in Msunduza are food insecure, with a larger proportion of vulnerable households being female-headed.

2. Conceptual Framework

Hwalla (2016) defined the four dimensions of food security that need to be fulfilled all the time to achieve food security. The four dimensions of food security include food availability, food accessibility, food use to meet human dietary and nutritional needs, and food stability: reasonable amount of food supplies throughout the year to the next year. All the mentioned dimensions of food security require money for production, processing, and distribution.

Food availability is a situation whereby there are adequate quantities of physical food available whenever needed in a certain environment, which could be provided by being produced by the people of that area, by being sold countrywide, by being imported, and also through food aid. Food should be available in stocks and quantities that will be able to sustain the entire population (Burchi & De Muro, 2016). Most women in developing countries are engaged in subsistence farming or unpaid family work and represent about 60% of agriculture labor (Fan and Swinnen, 2020). Women therefore face discrimination in accessing most of the resources needed for food production, such as land, access to credit, and technologies; hence, it is still hard to close the gender gap on agricultural productivity, thus affecting the amount of food available in the economy (Aragon & Miller, 2018). Availability of food encompasses availability of land and property rights, markets and credit, access to technology, education, and information for food production. Women in rural areas spend more time doing domestic work, which includes caring for children and the sick, gathering fuel and water, and weeding post-harvest processing food, all of which contribute to food availability (Pathak, 2022).

To access food one needs to either buy it or grow it. To buy food one needs income and on the other hand to produce food one needs to access resources like land, infrastructure and technology. Individuals must access land so that they can grow food crops. In terms of gender, food access refers to differentiated access to and control over resources, power, and decision making at the household and community levels (WFP, 2016). Global statistics reveal that women have less than 20% of agricultural land (WFP.2016). Argawal et al. (2021) argued that women do not own land, and in most cases, the land is inherited by male children or the widow after the husband's death. Women are also engaged in subsistence farming most of the time; hence, their products hardly reach market places and therefore cannot benefit from market income. Even if they grow for commercial purposes, they may not have the power to decide on the marketing and selling of the products (Del Rio & Salazar, 2017). This leads to women not being able to access income, which could help in other households' expenditures and hence leads to food insecurity.

Jost et al. (2016) noted that women lack access to technology, rural infrastructure, and agricultural training. The lack of access to technology by women makes them fail to produce goods in a given period (Bhandari, 2017). On another note, Carranza and Niles (2019) mentioned that women have limited access to credit because they do not own or have little access to assets that can be used as collateral to access credit. Women also face the challenge of being illiterate and hence unable to communicate and understand information that is communicated to them in writing when trying to access credit. Through all the factors mentioned above, we can conclude that women access to resources that could help them move from poverty is limited; hence, the attempt to be food secure is a challenge to reach.

Food use refers to the usage of food to meet dietary and nutritional needs. It includes storage and processing of food, preparation of food, feeding of infants and young children, access to safe water and sanitation, and hygiene practices (Thakur, 2016). Women tend to be the ones that eat less at household levels or be the last ones to eat and may end up not eating a well-balanced meal. Due to poverty in most female-headed households, women get tempted or are forced to buy cheaper food that is less nutritious. Hence, pregnant and young children may lack the key nutrients needed (Oxfarm, 2019).

Food stability entails having a reasonable number of food supplies throughout the year until the following one. This would also mean having satisfactory food stocks or other means of savings other than food stock, which could come in handy during times of crop failure (García-Díez, 2021). Hence, women lack the required resources to obtain food stock.

3. Methodology

A total of 2543 rural households in Eswatini were successfully interviewed, of which 46% were male headed households and 54% were female headed households. The sample was representative of all four regions (Hhohho, Manzini, Lubombo and Shiselweni) in the country. Results were obtained by analyzing using the Statistical Package of Social Sciences (SPSS) version 25 and STATA 15. Independent sample t-tests and cross tabulations were performed and presented in tables to determine the differences between household

heads' characteristics in relation to food insecurity. The estimated determinants of food security among both female- and male-headed households were achieved by employing a binary logistic regression model, where the model was used to ascertain factors influencing food security among both female- and male-headed households in Eswatini. The binary logit regression model can mathematically be presented in equation 1.

$$\text{Ln}\,[P_{ij}/(1-P_{ij})] = \beta_0 + \beta_1 X \quad (1)$$

where P_{ij} is the probability that the i^{th} women headed or the j^{th} male-headed household is faced with food insecurity, P (Household faced with food insecurity (Y) =1). Y ranges from 0 to 1. The $(P_{ij}/1-P_{ij})$ is defined as the "odds ratio", which ranges from 0 to ∞. Ln $[P_{ij} / 1-P_{ij}]$ is the log odds ratio or logit, and this ranges between -∞ to +∞. The logit forms the dependent variable (Y_{ij} = 1 if the i^{th} female-headed households or j^{th} male-headed households falls below the food insecurity line or 0 = otherwise. β_0 and β_1 are parameters to be measured. X is a vector of independent variables, including age of household head, education level of household head, household size, gender, quantity of corn produced, household income, farm size, total value of disposable assets, marital status, off-farm income, access to credit, employment, and livestock.

The binary logit regression model can therefore be presented as follows in equation 2.

$$Y_{ij} = \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Education level} + \beta_3 \text{Household size} + \beta_4 \text{maize produced} + \beta_5 \text{Household income} + \beta_6 \text{farm size} + \beta_7 \text{value of disposable assets} + \beta_8 \text{Marital status} + \beta_9 \text{Off-farm income} + \beta_{10} \text{Access to credit} + \beta_{11} \text{Employment} + \beta_{12} \text{livestock} + \beta_{13} \text{Gender} \quad (2)$$

4. Results and Discussion

4.1. Socioeconomic Characteristics of the Respondents

The results from data analysis reveal that there was a significant difference between some of the characteristics of male- and female-headed households in the rural areas of Eswatini. The findings show that most male heads of households (57.69%) in the rural areas were employed among the surveyed population. Of the 57.69%, 17.5% were employed in the private sector, 15.37% were self-employed, 9.6% were employed in the Central government, 9.35% were employed in private households, 3.31% had farms, 1.02% were employed by Non-Government Organizations, 0.51% were employed in the parastatal sector, 0.42% were engaged in unpaid family work, and only 0.08% were employed in the Municipality Government. There was an observed difference in the number of respondents employed, where only about 49% females were employed compared to their 58% male counterparts. About 50.59% of the rural women in the study area were unemployed, and the employed women reported that a higher percentage of them (21.08%) were self-employed, 9.01% were employed in the Central government, 8.64% in private sector, 7.73% in private households, 3.44% were having farms, 1.10% were employed by Non-Governmental Organisations, 0.59% were engaged in unpaid family work, 0.17% were employed in Municipality Government, and 0.15% were employed in parastatal sector (Table 1).

Table 1. Frequency for employment status of rural household heads (n = 2543; Freq = frequency; % = percentage)

Variable		**Sex**				**Total**
		Male (n = 1177)		**Female (n = 1366)**		
		Freq	**%**	**Freq**	**%**	
Employment	Own Farm	39	3.32	47	3.44	86
	Central Government	113	9.60	106	7.75	219
	Self-employed	181	15.37	288	21.08	569
	Municipality Government	1	0.08	2	0.15	3
	NGO	12	1.02	13	0.95	25
	Parastatal sector	6	0.51	2	0.15	8
	Private Household	110	9.36	91	6.66	201
	Private sector	206	17.50	118	8.64	324
	Unpaid family work	5	0.42	8	0.59	13
	Other	2	0.17	0	0	2
Unemployed		502	42.65	691	50.59	1193
Total	p-value = 0.000***	1177	100	1366	100	2543
	Pearson chi-square values = 107.87					

A large share of the sampled households consisted of 44.9% of household heads who were married through monogamy, followed by 23.8% widowed, 19.8% never got married, 6.4% were married through polygamy, 9% divorced, 3.1 % reported that they were cohabitating, and 1.8% were in separation from their partners. Based on the results, the overall sampled households indicate that there were more married household heads in the survey among both males and females, and therefore, no assumption could be made based on the observation in relation to food insecurity in terms of gender differences. The dominance of married household heads can be attributed to early marriages or the common cultural Swazi norm of issuing land property rights to married couples. Marriage in the African context is regarded to be more responsible and important in decision making, especially when planning and implementing ideas, as compared with a single

respondent who may solely depend on his/her own ideas during decision making (Kane, et al., 2016). Activities carried out by married couples may generate incomes directly or indirectly (reduced food expenditure through farming) and this improves food accessibility of the family. Marital status increases the probability of being poor as the married have more responsibilities.

The findings further indicate that of the male-household heads, 56.58% were monogamously married, 6.54% were polygamous married, 4.42% were cohabitating, 2.38% had separated from their partners, 1.7% had divorced, 8.5% were widowed, and 19.88% had never been married. Among the female-headed households, 34.33% were monogamously married, 6.22 were polygamous married, 1.90% were cohabitating, 1.32% had separated from their partners, 2.05% had divorced, 36.97% were widowed, and 17.20% had never been married (Table 2).

Table 2. Frequency for marital status of household heads (n = 2543)

	Frequency (n = 2543)	Percentage (%)
Married monogamy	1141	44.9
Married polygamy	162	6.4
Living together	78	3.1
Separated	46	1.8
Divorced	22	0.9
Widow/Widowed	604	23.8
Never married	490	19.3
Total	2543	100

The chi-square results indicate a significant difference in the marital status between male- and female-headed households at the 1% level. The significant difference is attributed to more women being widows (approximately 37% of the female sample) compared to only about 9% widowers among the male samples. The results imply that these widows may be more vulnerable to food insecurity because they are left with children with limited incomes to satisfy all the needs of the family.

Table 3. Frequency for marital status of household heads (n = 2543; Freq = frequency; % = percentage)

Variable		Sex				Total
		Male		Female		
		Freq	%	Freq	%	
Marital Status	Married monogamy	666	56.58	469	34.33	1135
	Married polygamy	77	6.54	85	6.22	162
	Living together	52	4.42	26	1.90	78
	Separated	28	2.38	18	1.32	46
	Divorced	20	1.70	28	2.05	48
	Widow/Widower	100	8.50	505	36.97	605
	Never married	234	19.88	235	17.20	469
Total p-value 0.000***	1177	100		1366	100	2543
Pearson chi-squared 141. 265						

The overall results related to education level indicate that most heads of households in the rural areas had no formal education (48.3%), 22.1% attained a Primary certificate, 10.5% had attained Junior certificate, 11% had attained an O level certificate, 5.2 % had a college certificate, 1.8% had attained a Bachelor degree, 0.6% had a Vocational certificate, 0.3% had attained a Masters' degree, 0.2% had an A level certificate and 0.1% had other certificates.

Considering the results in Table 4, approximately 49.05% of the female-headed household had not achieved any education certificate. This is slightly higher than the male heads of households (47.32%) who had not achieved any certificate. At least 25.33% of female -headed households had a primary certificate while 18.35% of male-headed households had acquired a primary certificate, 11.38% of both male- and female-headed households had a Junior certificate. Furthermore, 8.27% of female-headed households had an Ordinary Level certificate, approximately 6% lower than the male-headed households (14.10%) who attained the same certificate, 4.76% of female-headed households had a college certificate, while 5.69% of male-headed households had the same certificate. 1.83% and 1.78 % of males and female-headed households, respectively, had a Bachelor's degree.

Table 4. Descriptive statistics for education status of household heads

	Frequency (n = 2543)	Percentage (%)
No certificate	1227	48.3
Primary certificate	562	22.1
Junior certificate	268	10.5
O level	279	11
A level	4	2
Vocational certificate	16	6
College	132	5.2
Bachelor's degree	46	1.8
Masters' degree	7	3
Other	2	1
Total	2543	100

0.51% of female-headed households had a vocational certificate, while 0.76% of male-headed households had the same degree. About 0.15% of female-headed households had attained an Advanced level certificate and the same percentage had a Masters' certificate and other certificates. About 0.17% of the male -headed households had attained an Advanced level certificate and only 0.42% had a master's degree certificate.

The chi-square test indicates a significant difference in the education level between female and male household heads at 1% level. This significant difference is attributed to many female household heads that were primary school graduates compared to males who were

only 18%. Further differences were observed whereby more males attain junior certificates, ordinary level certificates and master's degrees compared to their female counterparts. This indicates that males are more educated than females and therefore have more likelihoods of being employed in the formal sector. This increases the chance for males to earn more incomes and thus more access to food compared to the female-headed household. In 2006, the world food summit emphasized the need to increase access to education for the poor, especially the rural people to achieve poverty eradication, food security, durable peace and sustainable development (Table 5).

Table 5. Descriptive statistics for education status of household heads

Variable		Sex				Total
		Male (n = 1177)		Female (n = 1366)		
		Freq	%	Freq	%	
Education Certificate	None	557	47.32	670	49.05	1227 562
	Primary Certificate	216	18.35	346	25.33	
	Junior Certificate	134	11.38	134	9.81	268
	O level	166	14.10	113	8.27	279
	A level	2	0.17	2	0.15	4
	Vocational certificate	9	0.76	7	0.51	16
	College	67	5.69	65	4.76	132
	Bachelor's degree	21	1.78	25	1.83	46
	Masters' degree	5	0.42	2	0.15	7
	Other	0	0	2	0.15	2
Total 1177		100		1366	100	2543
p-value 0.000***						
Pearson chi-squared 40.687						

The results in Table 5 indicate that the average household sizes for the sampled male and female-headed households were 4.6 and 4.8 members, respectively. This finding matches with that of the Eswatini Vulnerability Assessment Committee (VAC) (2014) as cited by Tevera and Simelane (2016), who reported that the average rural household size in Eswatini was about 4.4 people. Generally, household size effects overall household consumption. The household size can be linked with total food expenditure because it has been observed that the larger the household the more food it will require to feed the members and the smaller the household the lesser the food expenditure. Thus, food supplies in the household increase with the number of people staying in that household. However, it is more likely for larger families to have less disposable income for additional quality, especially if the dependency ratio is proportional to the household size. Although the difference in real terms is small, the independent t test indicated a significant difference in the household size between the male and female-headed households at 5% level.

Further, the findings in Table 6 indicate that the mean age of household heads in the study area was 47.87 years for males and 49.70 years for females. This also indicates that the households were headed by an aging group on an average.

Table 6. Descriptive statistics for continuous variables of the rural household heads

Variable	Male		Female				
	Mean	SD	Mean	SD	t-value	Mean-diff	P value
Household size (number of Household Members)	4.61	3.171	4.86	2.872	-2.103	-0.252	0.036**
Age (years)	47.87	17.16	49.70	17.034	-2.693	-1.831	0.007***
Education (Years in School)	8.14	3.615	7.7	3.533	3.067	0.436	0.002***
Corn (E)	840.55	3795.72	940.86	4758.1	-0.581	-100.30	0.562
Livestock (E)	15490.78	38519.83	11496.13	1.774	3.073	3994.66	0.002***
Farm income (E)	158.92	1310.04	107.67	601.10	1.296	51.25	0.195
Off-farm income (E)	5218.92	29027.78	4079.67	17304.89	1.221	1139.25	0.222
Total income (E)	5377.84	29064.12	4187.34	17330.17	1.274	1190.50	0.203
Food expenditure (E)	571.10	844.92	579.74	1097.94	1.317	214.28	0.188
Non-food expenditure (E)	2413.30	4236.09	2199.02	3964.73	-0.219	-8.63	0.826

Although older household heads are usually declining in terms of health and strength, the accumulated experience can be effective in smoothing consumption and escaping food insecurity. Based on the results presented, there was a significant difference between the ages of the male and female headed households at 1% level.

The results indicate that male-headed households had more years of formal education than female-headed households. The general observation though, was that most heads of household never completed primary school. Education is an essential human capital for improving the productivity of individuals as it helps them become aware of opportunities for generating or increasing their incomes. According to Obayelu and

Osho (2020), high educational attainment provides better chances for high paying jobs, thereby reducing the likelihood of falling into poverty and hence reducing food insecurity. The t test proved that there is a significant difference in the mean years of formal education between the male and female-headed households with a p-value of 0.002. This means that the education of rural households is a factor that must be considered in poverty reduction policies.

The average value of livestock for male headed households was E15490.78. This was way above the value of female-headed households' livestock, which was E11496.13. The results showed a significant difference at a p-value of 0.002. Culturally, in most parts of Africa, women are not allowed to own many cattle (Ndlovu and Mjimba 2021). Therefore, most cattle are owned by men in the household, yet they have a higher value compared to other types of livestock. Women mostly own small ruminants and chicken attached to lower value compared to cattle. This may explain the difference in the livestock value between female and male households. In an agrarian economy, livestock is a major component of livelihood and therefore an increase in the value of the livestock owned is assumed to be sufficient in eliminating poverty, because they can be exchanged for cash, provide insurance against food insecurity and a form of saving and investment.

The mean farm income for female-headed households was E107.67, while that for male-headed households was E158.55. These results showed no significant difference between the farm incomes of both male- and female-headed households. This could be because most of the farmers were engaged in subsistence farming, especially women. On the other hand, the average off-farm income for male- and female-headed households was E5218.92 and E4079.67 respectively. The total monthly income of the household heads in Emalangeni was 5377.84 for male-headed households and 4187.34 for female-headed households. The independent t test showed that there was no significant difference between the incomes of the household heads in relation to gender. The results of the study carried out by Mabuza, Ortmann, Wale, and Mutenje (2020) on the effect of main income sources on rural household food insecurity in Eswatini recommended that off-farm-income-dependent households were less likely to be food insecure when compared with on-farm-income-dependent households. However, on-farm income-dependent households had better food security status than their counterparts because they depended mostly on remittances.

The monthly food expenditure as presented in Table below shows that the mean value of the monthly food expenditure for female-headed households was E 579.74 and E 571.10 for male-headed households. This is an indication that female-headed households consume more than their male counterparts. The t test analysis showed that there was no significant difference between the means of the male and female headed-households in terms of monthly food expenditure. In terms of the average non-food expenditure, the male- and female-headed households spent E2413.30 and E 2199.02, respectively.

4.2. Determinants of Food Security among Female and Male-Headed Households

To estimate food insecurity among rural households in Eswatini, the Foster-Greer-Thorbecke (FGT) (1984) food poverty model was employed. The Food Poverty Line (PL) was estimated as E129.84 and the headcount index suggested that 65.3% of the population under study lived below the food poverty line. Results further indicate that 45% of male-headed households lived below the food poverty line while 55% of the female-headed households lived below the food poverty line. The binary logistic regression model was employed to identify the key determinants of household food insecurity in the study area. Table 7 presents the results of the binary logit regression model. The findings revealed that for the combined data of male and female headed households, the size of household, farm income, non-food expenditure, and employment were statistically and significantly related to food insecurity.

4.2.1. Household Size

The findings reveal that the size of the household was statistically significant at 1% with a p-value of 0.000 related to food insecurity. The findings further revealed that there was a positive association between the size of the household and food insecurity. A unit increase in household size increased the probability of the households falling below the food poverty line by 7.5%. Sisha (2020) mentioned that an increase in household size increased the probability of a household falling below food insecurity. This implies that with an increase in family size the household budget becomes strained.

4.2.2. Farm Income

Farm income had a negative effect in determining the food insecurity status of the household and was statistically significant at 10%. This finding matches with the *a priori* expectation. Economically, this means that the higher the income of the household head, the lesser the probability of the household being food insecure. An increase in farm income by 1 Lilangeni decreased the probability of the household being food insecure by 8.4%. Nkegbe et al. (2017) initiated that with an increase in the household income, the probability of falling below the level of food insecurity decreases. Income plays a vital role in improving the purchasing power, which in turn increases per capita expenditure.

4.2.3. Non-Food Expenditure

The results of the study further indicate that non-food expenditure had a negative effect on the food insecurity of rural households. The results were significant at a p-value of 0.000. This means that an

increase in non-food expenditure by one lilangeni decreased the probability of the household falling below the food poverty line. Thapa and Acharya (2017) proposed that an increase in non-food expenditure inequality among households is related to the increased weight in different spending of households in terms of durables, education, healthcare, and other household expenditures. Especially education and health that are indirectly related to access to employment, increased income therefore, increased food accessibility.

Table 7. Determinants of food insecurity among male- and female-headed households (dy/dx = marginal effect; values in parentheses are standard errors values; (E) = Emalangeni currency; *, *** = significant at 10% and 1% levels, respectively)

Variable	Combined		Male headed household		Female headed	
	dy/dx	P > (z)	dy/dx	P > (z)	dy/dx	P > (z)
Sex (1 = female, 0 = male)	0.004 (0.020)	0.835				
Age (years)	0.000 (0.000)	0.496	-0.001 (0.001)	0.634	0.000 (0.001)	0.572
Marital Status (1=married, 0=otherwise)	-0.005 (0.004)	0.178	-0.011 (0.006)	0.088*	-0.002 (0 .005)	0.776
Household size (number of people)	0.075 (0.004)	0.000***	0.081 (0.007)	0.000***	0.069 (0.006)	0.000***
Education (years in school)	-0.001 (0.003)	0.757	0.005 (0.006)	0.409	-0.005 (0.005)	0.285
Employment (1 = employed, 0 = otherwise)	-0.041 (0.021)	0.048*	-0.046 (0.033)	0.160	-0.038 (0.028)	0.173
Corn value (E)	-7.80e-07 (0.000)	0.728	6.81e-06 (0.000)	0.150	-3.52e-06 (0.000)	0.184
Livestock (E)	-8.40e-08 (0.000)	0.805	1.82e-07 (0.390)	0.695	-3.53e-07 (0.000)	0.488
Access to credit (1 = access, 0 = otherwise)	-0.020 (0.023)	0.390	-0.029 (0.031)	0.343	-0.021 (0.037)	0.592
Farm income (E)	-0.000 (0.000)	0.084*	0.000 (0.000)	0.150	7.25e-06 (0.000)	0.722
Off-farm income (E)	7.29e-07 (0.000)	0.119	-4.39e-08 (0.000)	0.973	1.66e-06 (0.000)	0.118
Non-food expenditure (E)	-.0.000 (0.000)	0.000***	-0.000 `(0.000)	0.000***	-0.000 (0.000)	0.000***
	LR chi2(14) = 509.37		LR chi2(13) = 295.22		LR chi2(13) = 226.72	
	Log likelihood = -1379.9418		Log likelihood = -622.63178		Log likelihood = -749.2651	
	Pseudo R2 = 0.1558		Pseudo R2 = 0.1916		Pseudo R2 = 0.1314	

Determinants of food insecurity among male-headed households include marital status, household size, and non-food expenditure. Marital status had a negative and significant influence on household food insecurity headed by males; this indicates that the probability of being food insecure reduces with household head being married. Supposedly, married couples are thought to consolidate their efforts to earn more incomes and hence more purchasing power to buy food. About 65% of the sampled rural households were food insecure, and 55% of the food insecure households were female headed. The probability of a male-headed household being food insecure increases with an increase in the number of household members, whereas the probability of the same male-headed household being food insecure decreases with an increase in non-food expenditure. More household members may result in increased demand for food, which may not be easily accessible, and investing in non-food items and services may result in increased alternative sources of income, including businesses and collateral to access credit to purchase food. Determinants of food insecurity among female-headed households were household size and non-food expenditure. Household size had a positive and significant relationship with female-headed household food insecurity, thus, an increased number of household members in the female-headed households increases the probability of that household being food insecure. The probability of female-headed households being food insecure reduces with an increase in non-food expenditure. To reduce food insecurity among female-headed household women need more income for non-food expenditure and more income to feed the large household size.

5. Conclusion and Recommendations

The study adopted a quantitative approach using secondary cross-sectional data collected during the Eswatini Household Income and Expenditure Survey (EHIES) between 2016 and 2017. The survey qualified only people present in the household at the time of the data collection. A total of 288 Enumeration Areas (EAs) were chosen in the first step. The total number of households in the final sample was 3456, hence 2543 were successfully interviewed. The sampled population in Eswatini indicates a significant difference in some socioeconomic characteristics between women and men-headed households. More men are employed in the formal sector compared with their female counterparts. More women are self-employed compared to men. The results indicate that most women were widowed and had not completed any formal education. This means

that they have fewer chances of being employed in the formal sector. Women are averagely older than men in terms of age and have larger families compared to men. Probably, these widows are left with children after the death of their husbands. Women own livestock with less monetary value, which might not be enough for access to formal credit, or even if livestock is sold, it cannot meet immediate household needs such as hunger. Policies related to access to employment and the creation of jobs should consider promoting equal opportunities regardless of gender to ease access to jobs by the rural community for improved incomes enough to cater for the food needs and non-food expenditures of households. The government should make an effort in terms of promoting policies and creating an environment that attracts investment, thereby creating jobs for the unemployed. It should create more opportunities for income generation so that people can have a diet that meets the country's recommendations. Among strategies for increased employment include the promotion and support of agribusiness and agro-industrial sectors in rural Eswatini in addition to infrastructure development. Income is positively correlated with food insecurity; hence, an increment in household income improves household welfare. More emphasis should be put on widowed families with the burden of large household size. Policies targeting vulnerable female- and male-headed households can also be described using the results obtained from this study. This can help in the better resource allocation, prioritisation of gender-mainstreamed food security initiatives of government at both national and local levels in the Eswatini. This will contribute toward achieving the goal of poverty reduction and zero hunger as outlined in the Sustainable Development Goals (SDGs). The limitation of the study was that the cross-sectional dataset used for the analysis could not capture changes across observations over time. Another limitation was that there was no funder for the research; hence, validation of the data could not be done and the research was conducted during the time of COVID-19 when almost everything was put to standstill.

Authors' Contributions

Qondile Nolwazi Sibiya and Isaac Busayo Oluwatayo introduced the idea and created the framework of the study. The literature review, the interpretation of the results and the reading of the draft were performed by Qondile Nolwazi Sibiya and Isaac Busayo Oluwatayo. Data acquisition from Eswatini was done by Qondile Nolwazi Sibiya, while both Isaac Busayo Oluwatayo and Qondile Nolwazi Sibiya did the data analysis and preparation of the paper. The final review and editorial work was conducted by Isaac Busayo Oluwatayo.

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