

A COMPARATIVE ASSESSMENT OF THE POVERTY AND FOOD INSECURITY EXPERIENCE BETWEEN FOOD ENTREPRENEURS AND SMALLHOLDER FARMERS IN RURAL ZAMBIA

Collins Mudenda[✉], Isaac N. Simate, Mwape Chileshe

University of Zambia, Zambia

Abstract. The study was carried out to ascertain the poverty and food insecurity experience between food entrepreneurs and smallholder farmers in selected rural communities in Zambia. The study followed a mixed research design in which qualitative and quantitative data were collected through the use of a structured questionnaire. The Food Insecurity Experience Scale (FIES) was adopted in the design of the data collection questionnaire. Data were collected from 112 smallholder farmers in Chipapa, Shalubala, and Musomali villages and from 120 food entrepreneurs from Chisamba and Chibombo. Data were analysed using descriptive statistics through the use of means and frequencies, Levene's test, independent samples t-test, factor analysis, as well as arithmetic calculations. The results revealed that both the food entrepreneurs and smallholder farmers live in extreme poverty – US \$0.74 per person per day at most. In addition, food access, availability, stability, and utilisation were the main challenges constraining the food intake for both smallholder farmers and food entrepreneurs. Therefore, both smallholder farmers and food entrepreneurs experience food stress equivalent to Integrated Food Security Phase Classification (IPC) 2.

Keywords: poverty, food security, entrepreneur, farmer, availability

INTRODUCTION

The predicament of poverty and hunger is commonplace in Africa, and Zambia is no exception. Therefore,

the United Nations systems crafted the Millennium Development Goals (MDGs) and placed hunger at the top of the agenda. Despite hunger being given enough consideration, the targets were not achieved by the end of the programme in 2015 (United Nations, 2015). As at completion stage of the MDGs in 2015, Zambia was still poor, with a prevalence rate of 54.4% nationwide and worse in the rural areas, where the prevalence rate stood above an average of 76% (Central Statistics Office, 2016). Varghese et al. (2021) conducted a telephone-based survey on the effects of COVID-19 on poverty and the response to the social safety net in Zambia. They found that poverty soared from 54.4% in 2015 to 55.8% in 2019. Against this predicament, rural poverty soared from 76.5% in 2015 to 79.4% in 2019, while urban poverty declined from 23.3% to 22.8%. Castaneda et al. (2022) reported that Zambia's nationwide poverty rate is considerably above the Southern Africa region of 42%.

Castaneda et al. (2022) reported that the poverty milestone in the MDGs had not been met because over one billion people worldwide still live in extreme poverty. The predicament was worse in Africa and South Asia. Therefore, this development resulted in the prioritization of responses to poverty through the Sustainable Development Goals, with Goal number 1 aimed at eradicating poverty and Goal number 2 aimed at achieving zero hunger by 2030 (United Nations, 2015).

[✉]Collins Mudenda, Department of Agricultural Engineering, School of Engineering, University of Zambia, Lusaka, Zambia, e-mail: collinsmudenda@gmail.com, <https://orcid.org/0000-0001-8016-5953>

Despite rural areas reporting high poverty levels, the 2017/2018 Livestock and Aquaculture Census reported that about 2.3 million people in Zambia were involved in agriculture, of which 76.3% were male and 23.7% were female and that most of them were based in rural areas, while 1.5 million were non-agriculture households. Out of the population involved in agriculture, 72% were involved in livestock, poultry, fish, and bee keeping, while 28% were involved in crop production only. The household size of the majority of the population involved in agriculture was 4 to 6, followed by 7 to 9, and in third place was the group above 10. However, Phiri and Mwaanga (2020) conducted desk research in Zambia in which government policy documents were reviewed and analysed. They found that women participation in agriculture stood at 35% in 2019 after a decline from 36.7% in 2018 and 38.8% in 2017. These results make it difficult to comprehend why many Zambians are food stressed and their food security is threatened despite heavy involvement in agricultural activities.

The Global Report on Food Crises (2021) argued that many countries are food threatened, and the World Food Programme (2021) placed Zambia at the Integrated Food Security Phase Classification (IPC) 2 state of food stress. The IPC is the internationally accepted method of measuring the level of food insecurity or food stress (Global Report on Food Crises, 2021). The World Food Programme (2021a) described IPC Phase 2 as a state where 5% to 10% of the population is malnourished acutely and have unstable income, thereby consuming less than 2,100 calories per day per person. People experiencing this level of food stress eat minimal, inadequate diets against the recommended level of IPC 1. This is because at IPC 1, a larger population has access to enough nutritious food without facing difficulties in acquiring it. The other characteristic at IPC 1 includes stable income and intake above 2,100 calories per person per day, with only less than 5% of the population being malnourished (World Food Programme, 2021a).

The measure for food security includes food availability, access, quality, safety, and affordability. Therefore, Alexander et al. (2018) supported the Global Food Security Index for 2015, which indicates that Sub-Saharan Africa had about 45% food availability, about 38% food quality and safety, and 80% food affordability. In comparison to the Southern and Central African countries, Zambia stood at 24% food stressed and the Food and Agriculture Organisation (2014) equally reiterated

that food insecurity was worsening in many countries, Zambia included, and the IFPRI (2015) found that Zambia's hunger index was 41%, which implies limited availability and access to food.

A snapshot of the 2019 to 2021 analysis on food security in Zambia by the Global Report on Food Crises (2021) revealed that 4.2% of children under 5 years were wasted and 34.6% were stunted. In terms of dietary diversity, only 23.2% of children between 6 and 23 months received the minimum dietary diversity, while 31.1% of the reproductive age women and 58.1% of children under five were anemic. These statistics are worrisome and call for urgent mitigation measures.

Study objective

The main objective of this study was to establish the extent of poverty and food insecurity experience among food entrepreneurs and smallholder farmers and whether they experience the two conditions in like manner or not. The specific objective was to establish the most vulnerable group between food entrepreneurs and smallholder farmers as regards to food stress and poverty, as well as key variables that may affect food security. This is because food entrepreneurs are expected to have access to income which can be used to purchase additional food stuff. On the other hand, smallholder farmers are expected to sell their produce to food traders in order to obtain income and purchase the needed additional food stuff.

Literature review

The literature review attempts to discuss the issues around poverty and food insecurity among entrepreneurs and smallholder farmers and does not show many related studies. This is because there are scant studies on the comparison of the two discourses and the little literature which is available seeks to show how entrepreneurship affects poverty and vice versa (Naminse et al., 2019; Juma and Spielman, 2014). This view was supported by Vincent et al. (2021).

Poverty situation

Poverty continues to be a challenge with which many nations are grappling (United Nations, 2015), and Tchamyou (2019) has argued that the high poverty rate in Sub-Saharan Africa (SSA) has left millions of people without meaningful livelihood. This is evidenced by the 2019 poor comparative performance of Africa and Asia

in relation to the poverty line of each person living under \$1.9 per day (Nwani and Osuji, 2020). Therefore, Castaneda et al. (2022) profiled the moderate and extreme poor to be rural-based, young, and living in high household size—the majority of whom are more likely than the non-poor to make a living from agricultural work. Singer (2002) described poverty in terms of economics, describing it as being where one lacks the material and financial resources to meet human needs, which is the main focus in this paper. Other types of poverty relate to mental (Velasquez, 1999); moral (Beitz, 2005; Wight, 1966); spiritual (Oladipo, 2009); emotional (Aristotle, 2004); and social (De Soysa, 2001).

FAO (2018) stated that poverty can be measured using various attributes such as income, health, education status, living standards, and ownership of key assets. The current paper adopted income and expenditure poverty and measured it using the international datum line of extreme poverty of living under US \$2.15 per person per day (World Bank, 2022).

Food security and its challenging factors

Idayanti and Rejeki (2018) stated that food security was an important basic human right and is paramount in any setup to the wellbeing of the people. This viewpoint was echoed by Tvaronaviciene (2018). Following the 2015 spike in food prices, Crafton et al. (2015) observed that feeding the world population has become a challenge and that the situation was worsening in low-middle income countries (Urgell-Lahuerta, et al. 2021).

Lysons (2014) described food security as a situation in which all people at all times have access to sufficient, safe, nutritious food to maintain a healthy life, and Hulse (2007) added that food security is a state where all individuals, families, and communities enjoy consistent access to food. This implies that food security is based on agriculture, and it is an important sector in Zambia because it employs about 25% of the labor force and contributes about 3% towards the Gross Domestic Product (GDP) annually (Zambia Statistics Agency, 2021).

The Global Report on Food Crises (2021) and Integrated Food Security Phase Classification (IPC, 2021) classify food security in five classes. IPC 1 is when a household has sufficient food and non-food items and has a stable income; IPC 2 is when a household has food consumption gaps and experiences malnutrition; IPC 3 is when a household has food consumption gaps with acute malnutrition; IPC 4 is when a household has

large food gaps leading to starvation and extreme critical acute malnutrition; and IPC 5 is when a household has an extreme lack of food, experiences starvation, and experiences acute malnutrition.

Food security is threatened by many factors, such as limited ability to buy available food due to low or no income (FAO, 2017b); changing climate which bring about floods and droughts (Hanley et al., 2021); ever rising costs of food (FAO, 2015); poor public health and threats from the outbreak of pandemics such as the COVID-19 pandemic (Alesina and Giuliani, 2015); seed control and preservation (Sustainable Development Report, 2015); and food limiting conflicts, such as the Russia-Ukrainian war (Berkhout et al., 2022).

Food entrepreneurs

Food entrepreneurs can be smallholder farmers, as well as traders (Kahan, 2013; Hossain et al., 2021). Gerlach (1963) classified traders as active entrepreneurs by whom markets are stimulated, and Heuvel (2007) affirmed this view. Smallholder and food entrepreneurs face challenges such as poor access to finance (Bridges et al., 2003), and Kabukuru and Afande (2016) echoed these views. However, Dunn and Holtz-Eakin (2000) observed that access to family assets by inheritance or gifting is a driver to start-up, and the European Institute for Gender Equality (2016) reported that women are the most excluded in terms of access to finance.

Description of key variables included in the data collection instrument

Key variables which need to be included in the data collection instrument comprise of gender (sex), age, level of education, experience in occupation, household size, income, and Food Insecurity Experience Scale (FIES). The FIES is based on eight (8) questions, so the researchers added more questions in order to enrich the amount of information to collect.

Gender (Sex) is a binary nominal variable in which women are the majority food traders (Kabonga et al., 2021; Merluzzi and Burt, 2020), while a majority of smallholder farmers are male (Tamene et al., 2014; Oluwatayo and Rachoene, 2017). Kabonga et al. (2021) conducted a study in Malawi while Oluwatayo and Rachoene (2017) conducted a similar study in Nigeria.

Age is a quantitative variable with propensity to engage in food trading and farming. Bai et al. (2022) found that most entrepreneurs were aged above 40, as it is the

age range by which entrepreneurs will have acquired relevant experience. Azoulay et al. (2018) gained similar results, namely, that the mean founder age for high-speed growing ventures was 45 years. However, Afata et al. (2022) observed that the majority of smallholder farmers are aged between 21 and 40, Khoza et al. (2019) found a mean age of 48, and Owusu et al. (2017) found a mean age of 47 in Nigeria.

Level of education is a nominal variable in which the level of education influence intentions to become an entrepreneur, according to Kankwamba and Kornher (2019), whose results are based on studies in Malawi, and so the level of education is related to business success (Peters and Brijlal, 2011). Afata et al. (2022) placed the majority of smallholder farmers on primary education while Khoza et al. (2019) found that most of them reach secondary education, and this was affirmed by Ndlovu et al. (2021), who conducted studies in South Africa and Oluwatayo and Rachoene (2017).

Experience in occupation is a quantitative variable in which long experience represents propensity to succeed. Rider et al. (2018) attempted to relate experience with entrepreneurship and found that the more the experience, the higher the skills one can attain. For smallholder farmers, the majority tend to have experience between 5 and 10 years (Ndlovu et al., 2021). Alemu and Haji (2016) found that in Asia, older farmers were technically efficient because of attaining relevant experience.

Marital status is a nominal variable with propensity towards trading for single women. Uike and Maharaj (2019) proved that single people had more propensity to entrepreneurship than their married counterparts, but Ripoll et al. (2022) found that married entrepreneurs were happier than their single counterparts; hence, marital status is not very clear in terms of its effects.

Household size is a quantitative variable in which a large family composition influences entry into entrepreneurship (Kankwamba and Kornher, 2019). In addition, family is measured in Zambia based on a family size of five (5) by the Jesuit Centre for Theological Reflection in order to calculate the food basket (Jesuit Centre for Theological Reflection, 2022). However, Mfitumukiza et al. (2020) found the family size of smallholder farmers to be between 7 and 10, whereas Oluwatayo and Rachoene (2017) found an average of 4 people, which was affirmed by Kinyondo and Magashi (2017) when they conducted similar studies in Malawi.

Income is a quantitative variable that represents the amount of money made by food entrepreneurs and smallholder farmers, for which Kankwamba and Kornher (2019) argued that household income improves food choices for a family. Tamene et al. (2014) found that smallholder farmers earned a low income, below \$0.72 per day.

The FIES is composed of eight questions with which the household is assessed to be food insecure and includes (1) worried that they will not have enough to eat; (2) worried that they cannot eat nutritious food; (3) always eat the same thing; (4) skipped meals; (5) ate less than they should; (6) found nothing to eat at home; (7) were hungry but did not eat; and (8) ate nothing all day. These questions were used as they are, and more questions were added in order to collect more data. The responses were classified according to the IPC classification of food stress.

Finally, extreme poverty was measured using quantitative variable of income and expenditure and assessed against the international datum line of living under US \$2.15 per person per day.

METHODOLOGY

Study area and research design

The study was carried out in Kabwe, Chibombo, and Kafue Districts in Central and Lusaka provinces of Zambia, respectively. The participants representing food entrepreneurs and smallholder farmers were drawn at the same time from the same locations. All the sites are located within 130 kilometers radius of Lusaka, the capital city of Zambia, about 30° east of Greenwich. The survey was conducted between March and July 2023.

According to Kothari (2014), research design is the structure within which a researcher chooses research methods and approaches. The study adopted a mixed research method in which both qualitative and quantitative data were collected.

Population sampling and data collection

Data were collected using random cluster sampling of village populations from five different sites. Villages were identified based on similar characteristics of being either a smallholder farmer or food entrepreneur, as the major activity and such a village would be taken as a sample. The population in the research sites stood at 155 for smallholder farmers and 190 for food entrepreneurs (Zambia Statistics Agency, 2022).

The sample size was drawn, based on Yamane (1967) as follows:

$$n = \frac{N}{1 + N(x)^2} \quad \text{equation 1}$$

Where n = required sample

N = population from which to draw the sample

1 = constant

x = error term taken as 5%

$$\text{farmers} = \frac{155}{1 + 155(5\%)^2} = 112$$

$$\text{entrepreneurs} = \frac{190}{1 + 190(5\%)^2} = 128$$

The results do not deviate much from the Gill framework (Taherdoost, 2016), which stipulates that for a confidence level of 95% and margin of error of 5% and where the population is 150, the recommended sample size is 108. For a population of 200, the recommended sample size is 132. Therefore, the study sample for smallholder farmers involved 112 participants and 120 food entrepreneurs.

The researchers collected data using a structured questionnaire, which was based on the Food Insecurity Experience Scale (FIES) as applied by Smith (Adjogon et al., 2020). Questionnaire administration was conducted by way of door-to-door visitation of food entrepreneurs and smallholder farmers. The questionnaires were administered by four (4) trained research assistants.

Method of data analysis

The collected data were subjected to descriptive statistics using frequencies, mean, standard deviation, and arithmetic calculations. This is consistent with Boone and Boone application (Subedi, 2016), who postulated that Likert scales items are created by calculating composite scores and use parametric statistics such as mean for central tendency and standard deviation for variance. The majority of the questions were based on a 7-point Likert scale. Reliability was tested using Cronbach's alpha, where a statistic above 0.7 represents minimum acceptable reliability (Gliem and Gliem, 2003), although Nawi et al. (2020) stated that a statistic between 0.8 and 0.9 represent good reliability.

Factor analysis was also used in order to identify key factors among the food insecurity experience factors,

and its analysis was based on the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's measure of sphericity. Reddy and Kulshrestha (2019) categorised KMO values as 1 to 9 very good, 0.8 to 0.9 good, 0.7 to 0.8 medium, 0.6 to 0.7 reasonable, 0.5 to 0.6 acceptable, and less than 0.5 unacceptable. The statistics indicate whether the responses given are adequate or not and whether the partial correlations are not large in comparison to the summation of the correlations. Consequently, if there is no difference in the correlation pattern, the factor analysis is deemed good and reliable.

Determination of range for Likert scale data

The data collection instrument was made up of Likert and non-Likert scale questions. The Likert questions were based on a scale of 1 to 7, with 1 representing 'Strongly Disagree', 2 representing 'Disagree', 3 representing 'Slightly Disagree', 4 representing 'Neutral', 5 representing 'Slightly Agree', 6 representing 'Agree', and 7 representing 'Strongly Agree.'

This scaling led to the development of the range which was classified using 0.86 for classifying responses. The 0.86 was obtained by subtracting 1 from the extreme scale of 7 and dividing by the number of scales as follows:

$$\text{Constant} = \frac{\text{Upper scale} - \text{Lower scale}}{\text{Number of Scales}}$$

$$0.86 = \frac{7 - 1}{7}$$

Therefore, 0.86 was added to each scale and an additional 0.01 to each lower bound in order to distinguish each class. The resulting range is presented in Table 1.

Table 1. Ranges of the Likert scale

Scale	Lower	Upper	Category
1	1.00	1.86	Strong disagree
2	1.87	2.73	Disagree
3	2.74	3.60	Slight disagree
4	3.61	4.47	Neutral
5	4.48	5.34	Slight agree
6	5.35	6.207	Agree
7	6.217	7.077	Strong agree

In order to determine the category in which a response falls, the researchers used mean scores which were obtained from descriptive statistics and thus classified between ‘Strongly agree’ (7) and ‘Strongly disagree’ (1).

RESULTS

The research targeted a sample of 112 smallholder farmers and 120 food entrepreneurs and achieved a 100% response rate among smallholder farmers and 93% among food entrepreneurs.

Demographic characteristics

Sex

It was found that female respondents were the majority among both food entrepreneurs (61%) and smallholder farmers (54%). These results do not agree with the 2017/2018 Livestock and Aquaculture Census by the Zambia Statistics Agency (2018), which found more males in agriculture than females. However, it agrees with the results of Kabonga et al. (2021), who revealed that more women participate in trading activities compared to men but contradicts that of Tamene et al. (2014) and Oluwatayo and Rachoene (2017), who found that many smallholder practitioners were male.

Age range

The majority (29%) of the food entrepreneurs were aged above 40 years while the rest of the age groups obtained less than 29% individually. This result is consistent with that of Bai et al. (2022) and Azoulay et al. (2018), who found out that most food traders were aged above 40 years and 45 years, respectively.

However, the situation among smallholder farmers was the opposite to the food entrepreneurs. This is because the majority, 54%, were aged between 16 and 20 years, followed by those aged above 40 years, who were 19%. Those aged between 36 and 40 were 9% while the rest of the age groups were less than 5% each. This indicates that young people are the majority among smallholder farmers. These results are consistent with those of Afata et al. (2022), who observed that the majority of smallholder farmers are aged between 21 and 40 but contradicts results by Khoza et al. (2019) and Owusu et al. (2017), who found mean ages of 48 and 47, respectively.

Level of education

The majority (28%) of the food entrepreneurs reached Grade 7, followed by Grade 9 (27%), and Grade 12 (21%). This implies that the majority of the respondents can read and probably write and have the propensity to engage in trading as espoused by Kankwamba and Kornher (2019). In terms of smallholder farmers, the majority (61%) reached Grade 12 followed by Grade 9 (19%). This implies that the smallholder farmers are better able to read and write, compared to food entrepreneurs. These results corroborate those of Khoza et al. (2019) and Ndlovu et al. (2021), who found that most smallholder farmers attained secondary education.

Work experience

The majority (41%) of food entrepreneurs had experience between 4 and 6 years, followed (23%) by those who had 1–3. These levels of experience provide propensity to achieve business success as suggested by Rider et al. (2018), who noted that the longer the experience the higher the likelihood of succeeding. The majority (26%) of the smallholder farmers had 1–3 years’ experience, followed (21%) by those with over 19 years, and those with 4 and 6 (13%). Most studies have placed smallholder experience above 5 years (Ndlovu et al., 2021), beyond which most smallholder farmers begin to attain technical efficiency (Alemu and Haji, 2016).

Family size

The majority (43%) of the food entrepreneurs had a family size of 5–6, followed (30%) by 3–4, and 7–8 (14%). The smallholder farmers also exhibited 5–6 for the majority (38%), followed by 7–8 (30%), and 34 (12%). The two groups seem to have a similar pattern of family size. The majority family size of between 5 and 6 is within the range of measure of food basket by the Jesuit Centre for Theological Reflection (2022), which uses a family size of 5 as the basis for the measure of the family Basic Needs and Nutrition Basket (BNNB). Therefore, the average family size for food entrepreneurs is given as:

$$\text{Average family size} = \frac{\text{sum}(\text{class midpoint} \times \text{frequency})}{\text{sum of frequency}}$$

$$\text{Average family size} = \frac{(1 \times 6) + (3.5 \times 34) + (5.5 \times 48) + (7.5 \times 16) + (9.5 \times 3) + (11.5 \times 3)}{112} = 5$$

And the average family size for smallholder farmers is given as:

$$\text{Average family size} = \frac{\text{sum (class midpoint} \times \text{frequency)}}{\text{sum of frequency}}$$

$$\text{Average family size} = \frac{(1 \times 3) + (3.5 \times 14) + (5.5 \times 43) + (7.5 \times 34) + (9.5 \times 7) + (11.5 \times 6)}{110} = 6$$

These results are in agreement with those of the 2017/2018 Livestock and Aquaculture Census by Zambia Statistics Agency (2018), which reported that the majority of households in agriculture had a family size between 4 and 6.

Perception of poverty

Family food cost per day among food entrepreneurs

Poverty was measured using the 2022 datum line of living, that is, under US \$2.15 per person per day (World Bank, 2023). Therefore, average expenditure per day is given as:

$$\text{Average expenditure/day} = \frac{\text{sum (class midpoint} \times \text{frequency)}}{\text{sum of frequency}}$$

For food entrepreneurs, the average expenditure is:

$$\text{Average expenditure/day} = \frac{(60 \times 54) + (70.5 \times 22) + (90.5 \times 14) + (110.5 \times 4)}{95} = 68.4$$

$$\text{Average expenditure/ person/day} = \frac{\text{average expenditure per day}}{\text{average family size}} = x$$

$$\text{Average expenditure/ person/day} = \frac{68.4}{5} = 13.68$$

Using the Bank of Zambia foreign exchange rates between April 5th 2023 and January 1st 2021 involving

574 days, the average exchange rate was found to be K18.5 per US\$1. Using this exchange rate, it can be established that average expenditure per person is:

$$\text{Average expenditure/ person/day} = \frac{13.68}{18.5} = 0.74$$

For smallholder farmers, the average expenditure is:

$$\text{Average expenditure/ person/day} = \frac{(60 \times 52) + (70.5 \times 13) + (90.5 \times 6) + (110.5 \times 3)}{92} = 58.4$$

$$\text{Average expenditure/ person/day} = \frac{\text{average expenditure per day}}{\text{average family size}} = x$$

$$\text{Average expenditure/ person/day} = \frac{58.4}{6} = 9.7$$

In United States dollars, the expenditure is given as:

$$\text{Average expenditure/ person/day} = \frac{9.7}{18.5} = 0.524$$

These results indicate that food entrepreneurs live on US\$0.74 per person per day, and smallholder farmers live on US \$0.524 per person per day, which is significantly below the datum line of \$2.15 per person per day. This implies that both food entrepreneurs and smallholder farmers in the research areas experience extreme poverty, and the result is consistent with results by Castaneda et al. (2022) and Tamene et al. (2014).

Perception of food security

Data test

The data were arranged according to food entrepreneurs and smallholder farmers and then subjected to descriptive statistics in order to determine the levels of skewness and kurtosis. Skewness and kurtosis that is within +1.96 and –1.96 implies that such data does not deviate much from normality.

Therefore, the skewness and kurtosis of all the variables in Table 2 are between +1.05 to –1.05, which indicates that the data does not deviate much from normality.

Table 2. Descriptive statistics of data for food entrepreneurs

Variables	N	Mean	Std. deviation	Skewness		Kurtosis	
	statistic	statistic	statistic	statistic	std. error	statistic	std. error
FE – food availability	112	3.53	1.512	.067	.228	–.960	.453
FE – reasons for non-availability of food	112	3.36	1.114	.567	.228	.666	.453
FE – food access	112	3.73	1.266	.358	.228	.208	.453
FE – perception of limited food intake	112	4.94	1.324	–.927	.228	.891	.453
FE – food stability	112	5.33	1.436	–1.047	.228	.213	.453
FE – food utilization	112	5.46	1.237	–.891	.228	.420	.453
Valid N (listwise)	112						

Source: own elaboration.

Table 3. Descriptive statistics of data for smallholder farmers

Variables	N	Mean	Std. deviation	Skewness		Kurtosis	
	statistic	statistic	statistic	statistic	std. error	statistic	std. error
SHF – food availability	112	4.63	1.519	–.802	.228	.519	.453
SHF – reasons for non-availability of food	112	3.04	1.237	.513	.228	.660	.453
SHF – food access	112	3.50	1.245	.171	.228	–.584	.453
SHF – perception of limited food intake	112	3.84	1.591	.296	.228	–.823	.453
SHF – food stability	111	4.71	1.364	–.118	.229	–.618	.455
SHF – food utilization	111	4.16	1.570	–.044	.229	–.840	.455
Valid N (listwise)	111						

Source: own elaboration.

The skewness and kurtosis of all the variables in Table 3 are between +1 to -1, which is close to 0. Therefore, the data does not show any deviation from normality.

Reliability test

The reliability test using Cronbach’s alpha obtained 0.703 (Table 4) and 0.710 (Table 5) for food entrepreneurs and smallholder farmers, respectively.

Meanwhile the Cronbach alpha based on standard variables obtained statistics of 0.819 and 0.827, respectively. This implies that the data can be relied upon to have internal consistency.

Table 4. Reliability for food entrepreneurs

Cronbach’s Alpha	Cronbach’s Alpha based on standardized items	No of items
.703	.819	102

Table 5. Reliability for smallholder farmers

Cronbach’s Alpha	Cronbach’s Alpha based on standardized items	No of items
.710	.827	109

Differences in food insecurity experience between food entrepreneurs and smallholder farmers

Levene’s test for equality of variances or homogeneity was used to test whether the variances of food entrepreneurs and the smallholder farmers are approximately equal. The assumption of equal variances is what the independent samples *t*-test bases its test on so that the variances of the same groups are approximately equal or that the samples have homogeneity of variance. Homogeneity means the same nature of the groups, and variance means deviation from the mean. Therefore, Levene’s test is concerned with whether the variances of two samples are almost equal. It starts by hypothesizing that there is no difference between the variance of the two groups under consideration. This is contradictory to the *t*-test, because it tries to measure whether the mean of the two groups is different.

Therefore, with Levene’s test, the variances need to be same, and so the test should be non-significant, because the variances should not be different. The basis of the assumption of the *t*-test is that the group variances are the same. Therefore, Levene’s test is an *F*-test, and if the significance is greater than *p*-value of 0.05, then equal variances are assumed since they are not statistically significant, which means that the assumption of homogeneity has been met. In this circumstance, the *t*-test is interpreted using the top line, which shows the equal variances assumed and the bottom line, where equal variance is not assumed.

The data was subjected to Levene’s test for homogeneity, and output statistics indicate that variables FE 1 – food availability, FE 3 – food access, FE 4 – perception

of limited food, and FE 5 – food stability were not statistically significant. This implies that the assumption of homogeneity was not violated and will be interpreted from the top line of the *t*-statistics, where equal variances are assumed, as shown in Table 6. However, variables FE 2 (reasons for non-availability of food) and FE 6 (food utilization) were statistically significant, and so homogeneity was not assumed and will be read from the bottom line of the *t*-test, where equal variance is not assumed.

The mean difference of food availability between food entrepreneurs (FE 1) and smallholder farmers (SHF 1) is 1.1, which is large in proportional comparison to the actual means of 3.53 and 4.63, respectively. The *t*-statistic of –5.776 is statistically significant, as shown in Table 7. Therefore, the null hypothesis that there is no mean difference between the two groups is rejected, and it can be concluded that there is a difference between the mean of food entrepreneurs and smallholder farmers regarding food availability. This result is logical because the two groups are expected to experience food availability in different ways.

The mean difference of FE 2 and SHF 2 – reason for non-availability of food – is 0.32, which is low. The *t*-statistic of 1.931 is not statistically significant, since the *p*-value is 0.056, which is greater than 0.05. Therefore, there is no sufficient evidence to support the alternative hypothesis that the means are different. It can be concluded that the means are the same.

The mean difference for FE 3 and SHF 3 – food access – is 0.23, which is low. The *t*-statistic of 1.25 obtained a *p*-value of 0.202, which is larger than 0.05,

Table 6. Levene’s statistics of the comparative analysis of food entrepreneurs and smallholder farmers

Variable	F	df1	df2	Sig.	Intercept
FE 1 – food availability	0.399	7	104	0.901	SHF 1
FE 2 – reason for non-food availability	3.196	7	104	0.004	SHF 2
FE 3 – food access	0.172	5	106	0.972	SHF 3
FE 4 – perception of limited food	0.53	6	105	0.784	SHF 4
FE 5 – food instability	0.605	5	105	0.696	SHF 5
FE 6 – food utilisation	3.978	6	104	0.001	SHF 6

Source: own elaboration.

Table 7. Means and *t*-statistics of the comparative analysis of the food entrepreneurs and smallholder farmers

Variable	Variable description	Mean	N	Mean difference	Std. deviation	Std. error mean	t	df	Sig. (2-tailed)
FE 1	FE – food availability	3.53	112	1.1	1.512	0.143	-5.776	111	0.000
SHF 1	SHF – food availability	4.63	112		1.519	0.143			
FE 2	FE – reasons for non-availability of food	3.36	112	0.32	1.114	0.105	1.931	111	0.056
SHF 2	SHF – reasons for non-availability of food	3.04	112		1.237	0.117			
FE 3	FE – food access	3.73	112	0.23	1.266	0.12	1.285	111	0.202
SHF 3	SHF – food access	3.5	112		1.245	0.118			
FE 4	FE – perception of limited food intake	4.94	112	1.1	1.324	0.125	5.933	111	0.0000
SHF 4	SHF – perception of limited food intake	3.84	112		1.591	0.15			
FE 5	FE – food instability	5.35	111	0.64	1.425	0.135	3.379	110	0.001
SHF 5	SHF – food instability	4.71	111		1.364	0.13			
FE 6	FE – food utilization	5.47	111	1.31	1.242	0.118	7.239	110	0.0000
SHF 6	SHF – food utilization	4.16	111		1.57	0.149			

Source: own elaboration.

hence statistically not significant. Therefore, it can be concluded that the means of the two groups are the same.

The mean difference of FE 4 and SHF 4 – perception of limited food intake – is 1.1, which is large in proportional comparison with the means of 4.94 and 3.4, respectively. The *t*-statistic of 5.933 is statistically significant, as shown by the *p*-value of less than 0.001 which is less than the threshold of 0.05. Therefore, the means of the two groups are different.

The mean difference of FE 5 and SHF 5 – food stability – is 0.64, which is low; however, the *t*-statistic of 3.379 is statistically significant, with a *p*-value of 0.001, which is less than 0.05. Therefore, it can be concluded that the means of the two groups are different.

The mean difference between FE 6 and SHF 6 – food utilization – is 1.31, which is large, and the *t*-statistic of 7.239 is statistically significant after obtaining a *p*-value which is less than 0.001. Therefore, it can be concluded that the means of the two groups are different.

Food insecurity experience classification

In order to classify the food insecurity experience of the food entrepreneurs and smallholder farmers, the range table is used, and each mean is compared to the mean range, as shown in Table 8.

After placing the *t*-statistics results in Table 8, range table, the aspect of different, and same means was consistent for all the variables with the exception of FE 3 and SHF 3, which got placed in two different categories. The rest of the variable categories are shown in Table 9 as follows:

The results show that food entrepreneurs (FE 1) did not experience food availability, while smallholder farmers (SHF 1) experienced food availability.

The food entrepreneurs (FE 2) and the smallholder farmers (SHF 2) did not agree with the reasons put forward for non-availability of food, such as lack of money, far-off market, being on diet, lack of cooking facilities, and health problems.

The food entrepreneurs (FE 3) could neither agree nor disagree regarding ease of food access hence were neutral.

The smallholder farmers (SHF 3) slightly disagreed with the reason put forward regarding constraining access to food; hence, they experience better access to food compared to food entrepreneurs.

The food entrepreneurs (FE 4) slightly agreed that they experienced limited food intake, while the smallholder farmers (SHF 4) could neither agree nor disagree.

Food entrepreneurs (FE 5) agreed, while smallholder farmers (SHF 5) slightly agreed that they experienced

Table 8. Categorisation of scores based on range

Scale	Lower	Upper	Category	Food Entrepreneurs	Smallholder Farmers
1	1.00	1.86	Strongly Disagree		
2	1.87	2.73	Disagree		
3	2.74	3.60	Slightly Disagree	FE 1/FE 2	SHF 2/SHF 3
4	3.61	4.47	Neutral	FE 3	SHF 4/SHF 6
5	4.48	5.34	Slightly Agree	FE 4	SHF 1/SHF 5
6	5.35	6.207	Agree	FE 5/FE 6	
7	6.217	7.077	Strongly Agree		

Source: own elaboration.

Table 9. Categorisation of the variables

Food entrepreneur		Smallholder farmer	
variable	category	variable	category
FE 1 – food availability	Slightly disagree	SHF 1 – food availability	Slightly agree
FE 2 – reason for non-availability of food	Slightly disagree	SHF 2 – reason for non-availability of food	Slightly disagree
FE 3 – food access	Neutral	SHF 3 – food access	Slightly disagree
FE 4 – perception of limited food intake	Slightly agree	SHF 4 – perception of limited food intake	Neutral
FE 5 – food instability	Agree	SHF 5 – food instability	Slightly agree
FE 6 – food utilisation	Agree	SHF 6 – food utilisation	Neutral

Source: own elaboration.

food instability, as food did not last and runs out, adults starve in order to spare food for children, and sometimes they are hungry but there is no food to eat.

The food entrepreneurs (FE 6) agreed that food is not well utilized because it is usually not available and in preferred types; hence, they reduce portions and eat the same type of food.

The smallholder farmers (SHF 6) could neither agree nor disagree on the utilization of food.

Factor analysis

The FIES variables and the additional variables were subjected to factor analysis in order to determine the factors with significant loadings. The results are presented separately between the two groups in the section that follows.

Smallholder farmers

The food security factors based on FIES and additional ones for smallholder farmers were subjected to factor analysis as a dimension reduction tool, and a good KMO statistic of 0.825 was obtained with a corresponding Chi of 1694.6, which is statistically significant, as shown in Table 10a. Therefore, the KMO statistic of 0.825 indicates that factor analysis was the correct tool to use (Reddy and Kulshrestha, 2019).

The scree plot, which indicates well loaded factors above the Eigen value of 1, revealed that seven (7) factors were critical, as they lay just above the elbow of the plot above 1 Eigen value, as shown in Figure 1.

The seven (7) components with their loadings were identified from the rotated matrix, which indicates that smallholder farmers reduce portions to save food

Table 10a. KMO and Bartlett’s test statistics of the food insecurity experience for smallholder farmers

Kaiser-Meyer-Olkin measure of sampling adequacy		.825
Bartlett’s test of sphericity	Approx. chi-square	1694.567
	df	435
	Sig.	.000

Table 10b. KMO and Bartlett’s test statistics of the food insecurity experience for food entrepreneurs

Kaiser-Meyer-Olkin measure of sampling adequacy		.852
Bartlett’s test of sphericity	Approx. chi-square	2405.261
	df	435
	Sig.	.000

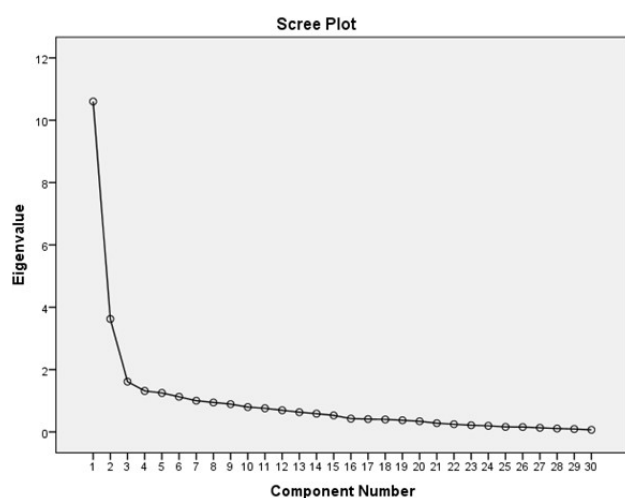


Fig. 1. Scree plot of food insecurity experience factors among smallholder farmers

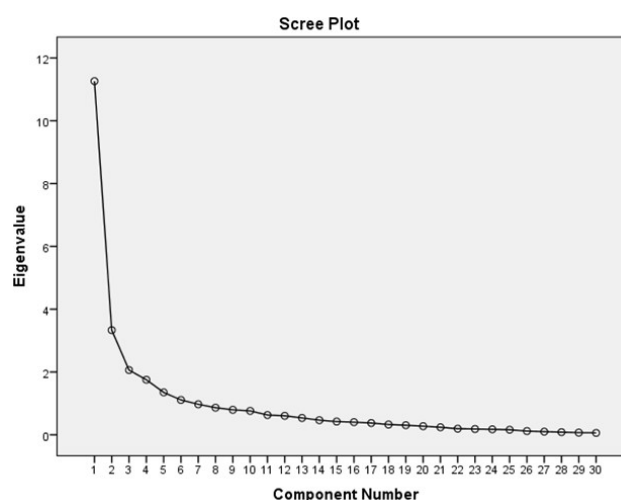


Fig. 2. Scree plot of food insecurity experience factors among food entrepreneurs

(0.796), do not eat nutritious food (0.806), do not eat what they want (0.814), eat same type of food (0.731), markets are far (0.658), do not have health problems to limit their food intake (0.822), and spare food for children (0.736), as shown in Table 11a.

Food entrepreneurs

The food security factors based on FIES and additional ones for food entrepreneurs were also subjected to factor analysis as a dimension reduction tool. A good KMO statistic of 0.852 was obtained with a corresponding Chi of 2405.3, which is statistically significant, with a *p*-value less than 0.001, as shown in Table 10b. Therefore, the KMO statistic of 0.852 indicates that factor analysis was the correct tool to use (Reddy and Kulshrestha, 2019).

The scree plot revealed that six (6) factors were critical, as they lay just above the elbow of the plot above 1 Eigen value, as shown in Figure 2.

The six (6) components with their loadings were identified from the rotated matrix, which indicates that food entrepreneurs get hungry but find no food to eat (0.876), experience food access constraint due to far off market (0.859), the food stuff they want is never available (0.771), they skip meals (0.78), and do not experience health problems that could limit their food intake (0.539), as shown in Table 11b.

DISCUSSION

Sex

It was found that female respondents for both food entrepreneurs and smallholder farmers dominated the study, which is consistent with some researchers such as Kabonga et al. (2021) but not consistent with Tamene et al. (2014) and Oluwatayo and Rachoene (2017), who

Table 11a. Rotated component matrix of food insecurity experience variables for smallholder farmers

	Component						
	1	2	3	4	5	6	7
Alwayeat1.1	-.309	.180	.752	.049	.143	-.126	.100
Eatwant1.2	-.214	-.095	.814	-.218	.006	.053	.018
Atevailfood1.3	-.255	-.032	.575	.038	.429	.219	-.102
Ateaccess1.4	-.500	.057	.411	-.377	.227	-.049	.043
Lackofmoney2.1	.725	-.149	-.193	.241	.027	.195	.185
Farmarket2.2	.079	.480	.115	-.295	.658	.082	.033
Ondiet2.3	-.187	.352	.314	-.474	-.048	.219	-.153
Lackcookfacility2.4	-.039	.699	.028	.239	-.029	.192	.179
Healthproblem2.5	.118	.254	.044	-.177	.066	.822	.125
Nomoney3.1	.758	-.112	-.160	.048	.101	.092	.003
Farmarket3.2	-.112	.592	.120	-.210	.572	-.087	-.046
Dieting3.3	-.081	.325	.470	-.555	-.098	.090	-.090
Wantunavailable3.4	-.040	.760	-.003	-.197	.121	-.052	.146
Nutriunavailable3.5	.099	.806	.011	-.102	.026	.140	-.103
Adultnoeat4.1	.725	-.277	-.203	-.061	.021	.107	.048
Reducedportion4.2	.741	.075	-.078	-.006	.006	.134	.160
Childrenskipmeal4.3	.687	.179	-.172	.178	-.410	.179	.145
Skipmealoften4.4	.620	.004	-.144	-.126	-.473	-.240	.119
Childrennoeatallday4.5	.714	.079	-.140	-.063	-.382	-.046	-.020
Foodrunout5.1	.597	-.140	-.383	.097	.104	-.108	.339
Foodnolast5.2	.581	-.140	.030	-.057	.025	-.172	-.323
Eatsamefood5.3	.294	-.080	.069	.731	-.208	-.105	-.100
Relyonlowcostfood5.4	.783	-.036	-.137	.178	-.002	-.033	-.049
Sparefood4children5.5	.301	.129	.079	-.006	-.036	.139	.736
Nobalanceddiet4child5.6	.570	.120	-.236	.516	-.151	.062	.038
Limitedfood4children5.7	.756	.042	-.182	.232	-.132	.106	.117
Reduceportiontosave5.8	.796	.159	-.048	.179	-.079	.022	.209
Eatless4limitation5.9	.752	.021	-.069	.278	-.106	-.091	.069
Hungrybutnofood5.10	.739	.087	-.194	.268	-.042	-.223	.135
Hungrybutfindnofood5.11	.596	.016	-.141	-.053	-.114	-.307	.438

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser normalization.
 Rotation converged in 7 iterations.

Table 11b. Rotated component matrix of food insecurity experience variables for food entrepreneurs

	Component					
	1	2	3	4	5	6
Alwayeat1.1	-.732	.175	-.044	-.061	-.069	-.161
Eatwant1.2	-.447	.358	.001	-.237	-.507	-.256
Atevailfood1.3	-.670	.283	-.076	.191	-.377	-.131
Ateaccess1.4	-.547	-.061	.180	.112	-.146	-.512
Nomoney2.1	.652	.063	.053	.032	.074	-.001
Farmarket2.2	.140	.859	-.093	-.011	.181	-.122
Ondiet2.3	.006	.782	.001	.141	-.229	.079
Lackcookfacility2.4	.599	.152	.412	.049	.289	-.284
Healthproblem2.5	.179	.431	.017	.236	-.198	.539
Nomoney3.1	.340	-.018	.491	.082	.191	.527
Farmarket3.2	-.015	.763	.219	-.194	.185	-.009
Dieting3.3	-.135	.687	.251	-.148	.041	.346
Wantunavailable3.4	.419	.066	.771	.142	.063	.041
Nutriunavailable3.5	.452	.207	.731	.019	.180	-.012
Adultnoeat4.1	.597	.016	.296	.158	.277	.380
Reducedportion4.2	-.013	-.121	-.012	.635	.567	.097
Childrenskipmeal4.3	.332	.108	.274	.071	.673	.028
Skipmealoften4.4	.123	.053	.038	.117	.780	-.058
Childrennoeatallday4.5	.316	.202	.428	-.114	.515	.112
Foodrunout5.1	.715	.126	.339	.282	.146	.143
Foodnolast5.2	.454	-.007	.312	.532	.097	-.069
Eatsamefood5.3	.763	-.044	.301	.143	.070	.001
Relyonlowcostfood5.4	.718	.072	.222	.243	.108	.170
Sparefood4children5.5	.029	-.053	.135	.766	-.101	.006
Nobalanceddiet4child5.6	.636	-.021	.289	.244	.181	.242
Limitedfood4children5.7	.532	.120	.092	.589	.158	.072
Reduceportiontosave5.8	.358	-.082	-.286	.701	.306	.114
Eatless4limitation5.9	.764	.020	.002	.271	.185	-.124
Hungrybutnofood5.10	.794	.123	.343	.126	.067	.229
Hungrybutfindnofood5.11	.876	.066	.260	.033	.102	.103

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser normalization. Rotation converged in 9 iterations.

found that many smallholder practitioners were male. The reason could be that the Zambian population is 51% female and 49% male; therefore, it becomes likely to find a ratio of more women than men in most economic situations, especially trading and agriculture which are labor intensive.

Age

In terms of age, the results that the majority of the food entrepreneurs were aged above 40 years is consistent with that of Bai et al. (2022) and Azoulay et al. (2018) for food entrepreneurs. The majority of the smallholder farmers were found to be younger (between 16 and 20 years), which is in deviation with many researchers, such as Khoza et al. (2019) and Owusu et al. (2017) except Afata et al. (2022), whose results did not deviate much from the current study. Again, the population of Zambia is mostly youthful, and youth unemployment between 1991 and 2022 stood at 22%, although for 2022 it closed at 11% (International Labor Organisation, 2023). Therefore, more youth could be engaging in agriculture for livelihood.

Education

The majority of food entrepreneurs reached Grade 7, which is consistent with Kankwamba and Kornher (2019), while the majority of smallholder farmers reached Grade 12, which agrees with Khoza et al. (2019) and Ndlovu et al. (2021). Many researchers found a positive correlation between a high level of education and business success. Therefore, this may explain why many food entrepreneurs do not graduate from their level of operations to a level up.

Work experience

The majority of food entrepreneurs had between 4 and 6 years of experience, while the majority of the smallholder farmers had 1–3 years of practical experience. Most studies have placed smallholder experience above 5 years (Ndlovu et al., 2021), beyond which most smallholder farmers begin to attain technical efficiency (Alamu and Haji, 2016). Therefore, both the food entrepreneurs and smallholder farmers did not exhibit good sufficient experience to attain technical efficiency.

Family size

The average family size for food entrepreneurs was found to be 5 and 6 for smallholder farmers. These

family sizes do not deviate much from many studies and are within the measure of the food basket by the Jesuit Centre for Theological Reflection (2022), which uses a family of 5 as the basis for the measure of the family Basic Needs and Nutrition Basket (BNNB).

Poverty

This study has shown that poverty and food insecurity continue to be challenges with which food entrepreneurs and smallholder farmers grapple. Poverty tends to limit expenditure on food per day per person, thus leading to food insecurity (Namulondo and Bashaasha, 2021). Food insecurity tends to limit food intake, thus leading to failure to meet dietary intake of up to 2,100 calories per person per day, as stated by the World Food Programme (2021a).

Food insecurity experience

The results show that smallholder farmers experience more food straining factors such as reduced portions, lack of nutritious food, wanted food is not available as a result eat same type of food, living far from markets, and spare food for children. In addition, the results show that they do not experience health problems that can constrain food intake. These results are consistent with those by Hulse (2007) and FAO (2017b).

The results for food entrepreneurs indicate that they are constrained by few factors, including food unavailability, far off markets, wanted food is unavailable, reduced portions, and skipping meals. In terms of health issues, they also do not have health complications which can constrain food intake. These results are supported by Afande (2016) and Lysons (2014).

Therefore, these results imply that even if government and cooperating partners have been deploying various poverty reduction and food security interventions, people in rural areas continue to live in extreme poverty and their food security is constrained, consistent with Phiri and Mwaanga (2020), who found similar results in Zambia.

CONCLUSION

The study has shown that the food entrepreneurs are aged the same as their counterparts in various parts of Africa, while smallholder farmers are somewhat younger than their counterparts in other parts of Africa. However, for both groups, most of them are female. Their level

of education is slightly lower than their counterparts in other parts of the world, and they are slightly less experienced. These issues negatively affect their ability to graduate from one level of operation to the next.

This study has demonstrated that poverty and food insecurity are the key challenges affecting development in rural areas and impede the ability of people to improve their livelihood. Using average scores from Likert responses, the researchers calculated the poverty levels of both food entrepreneurs and smallholder farmers, both of whom are living in extreme poverty below the poverty datum line of living on less than \$2.15 per person per day.

Therefore, smallholder farmers seem to be food stressed to the level of IPC 2, which is the same level of food stress experienced by food entrepreneurs.

RECOMMENDATIONS

Based on the results, it is recommended that governments in Africa provide a conducive environment for people in rural areas to attain higher levels of education, as it will contribute to improving their efficiency. Empowering both food entrepreneurs and smallholder farmers with small grants and soft loans will improve their financial inclusion and support efforts associated with accessing inputs to their business activities. Finally, the food supply chain for rural areas needs to be enhanced in order to improve food availability.

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