A socio-ecological and post growth rural households' food security and sovereignty status in rural areas of Mpumalanga, South Africa

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Abstract: The aim of the study is to assess rural household food security and sovereignty status at Nkomazi Local Municipality. The study is informed by the post-growth theory, with careful consideration of the social-ecological embedment and politically engaged market activity informed by peasant modes of production and distribution. The significance of both theory and action, translating theory into action and subjecting activity to critical-theoretical scrutiny must be highlighted in the search for post-growth futures. Food Sovereignty Movements are a great illustration of this type of activity. The data was collected from 383 households, 4 key informants from Mpumalanga Department of Agriculture, Land Reform and Rural Development and 3 key informant from Nkomazi Local Municipality, using a mixed-method research approach, namely convergent parallel approach. Two research designs were employed, namely phenomenology and a non-experimental design (correlational). The research's paradigm is pragmatic, using both inductive and deductive reasoning to properly analyse the concepts of food security and sovereignty from a realist and interpretive standpoint. The study triangulated both qualitative and quantitative data by drawing on these different data sources. Data was analysed through thematic and statistical analysis. The closed-ended data (quantitative data) was coded, moved to code sheets, transferred to a Microsoft Excel spreadsheet, and then transferred to a computer program called Statistical Package for Social Sciences (SPSS) version 24.0. Therefore, the study considered a 24-hour recall, and the findings shows that 79% of the households rely on local foods to ensure variety in their diet each day. This agrees with the findings from key informants who indicated that households follow a more condensed and focused value chain. Consequently, participants hinted that some of the household's produce is typically sold in informal markets in rural locations and urban areas. Therefore, a T-test was run to check the association between food production, security, and sovereignty. The significance difference was found to be less than $p<0.005$, the study did not accept the null hypothesis, that reflected that there was no statistical deference between the variables. This shows that there is a significant difference between food security and sovereignty when considering food frequency (the number of meals per day) and occurrence (the number of accidences) at household level. In order to examine food security at household level the study examined the correlation between indigenous food production, food security and sovereignty. The results showed a significance level of $p<.001$ which indicates that there is no significant difference for both variables, with a degree of freedom at df =2. Hence the null hypothesis was rejected. Therefore, the study recommended the incorporation of indigenous and pioneering knowledge systems on food production practices to ensure further development.

Keywords: Civilized legalization; food pragmatism; food sovereignty movement; indigenous foods and re-politicizing local food

Introduction

South Africa at national level is deemed to be food secure, hence little can be said about rural households food security status. Recent estimates show that 2.37 billion people worldwide mostly in Asia and Africa face moderate to severe food insecurity (30.4%) and hence about 720-811 million go without enough to eat [8]. This

dilemma is also exacerbated by the fact that the world's population is expected to reach over 10 billion by 2050 [24]. Hence the rise in hunger has been made worse by the COVID-19 epidemic despite decades of international efforts to combat malnutrition. Moreover, the World Economic Forum (WEF) data stipulates that most African households spend more than 45 percent of their income on basic food consumed at home [17]. Considering that 70% of households depend on agriculture for a significant portion of their income [2].

The study argues that food security and sovereignty should be viewed as a singular construct. This relational lens will capture the dynamic and controversial shaping and reshaping of the concepts food security and sovereignty. This interactive lens allow us to examine how actors in the state and in society are dialectically related. There has been a surge of research into the concept's theoretical underpinnings, the dynamics within and across related movements, and real-world attempts to put it into effect. This is expanding the reach of food sovereignty into new geographical and political contexts, resulting in new context-specific understandings of and movements toward food sovereignty [21]

Some of the new questions are centred around the concept civilised legalisation as one aspect of attaining food power and control under the food sovereignty movement. The rise and fall of colonial power, as well as the recognition of a right to self-determination, are all linked to the question of people's civilisation. The development of the human mind and its abilities, as well as how they are used in life, has been moulded by the development of civilization [13]. An example is provided by the Colombian Constitution of 1991 which recognized Ethnic Indigenous and Afro-descendent groups as having legitimate rights to cultural and political autonomy, as does Law 70 of 1993, which granted Black communities the right to the communal territory [4] . The colonial authorities, and the Mandate System denied some peoples the right to immediate self-government and subsequently recognition as sovereign and equal subjects of international law. Colombia was the site of the longest-lasting armed struggle, which cost Colombians more than 50 years of hardship. As a result, the concept of sovereignty was perverted, making the majority of the local population susceptible. This issue had a direct bearing on the food system since Colombia needed to stop relying on colonial legacy rules. The social construction of what is deemed a right, including the right to food, had an impact on people's worldviews and how food systems have been affected.

In colonial contexts, food security and sovereignty must recognize both active sharing and deliberate withholding of food as political acts, as well as the fact that culinary culture is more than just a market product, but also a politically ingrained process [11]. It is thus important to decolonise peoples mind set on how they view food production systems, trade market and the value chain. Another case referred to in the study is that of Botswana as it has tried to keep the ties between what is consumed and maintains the strong knowledge about an indigenous plant cuisine [1]. Even though, pluralistic ideologies and traditional knowledge have been suppressed by colonial supremacy, which considered tradition as inferior to conventional or modern food production systems, consumption patterns, and distribution practices.

The research examines pluralism through the lens of political philosophy, which emphasizes the significance of interpersonal relationships as a necessary component of democracy to develop and encourage a plurality of political viewpoints and participation. The study accords that, traditional food knowledges and conventional food knowledges can collaborate to attain a common goal (feeding the growing population). [3] states that the theoretical make-up is that it has more purposeful democratic models for policy construction. Therefore, to further interrogate this, the study used post growth theory, which seeks the quest of social-ecological factors linked to food security and sovereignty.

The third view is that it encourages a multi-faced relative form of understanding and institutionalization of sovereignty, this is profoundly supported by the existence of complex institutionalised engagements of people in the movement itself and that there is a difference between classical sovereignty in contrast to emerging sovereignty. This early thinking was centred around bargaining for power over food produced and distributed, the later thinking is more concerned with ‘power with’ and ‘power to produce localised products. This movement-centred theory has brought to the forefront knowledges produced by the social actors themselves. The food sovereignty movement contributes to the growing re-politicization of the debate on how to feed the world from an actor-oriented perspective [7].

Materials and Methods

The study used two research designs namely an exploratory design (phenomenology) and a non-experimental design (correlational). Using phenomenological approaches, subjective realities, insights, beliefs, motivation, and deeds, as well as folk wisdom, portrayed more benefits in trying to understand the phenomenon [19]. As a result, the design was chosen because of its potential to aid the researcher in developing a clear concept and knowledge of the study problem. This design assisted the researcher in generating debates on food production and created an accurate picture of what is being investigated. The exploration of the connection in food security and food sovereignty at Nkomazi

Local Municipality, while providing narrative descriptions of the phenomenon that was studied. On the other hand, the correlational designs was employed to enable researchers to collect numerical data and generalize it across groups of people in order to explain a phenomenon.

Hence the epistemological viewpoint in the study is that knowledge is both subjective and objective, and that it is frequently contested, negotiated, or interpreted. The study suggest that knowledge is both socially constructed and positivist in nature. With an ontological view that suggests that reality is dependent on its context to exist and persist, which means that changing the environment alters reality, and the existence of various contexts implies the possibility of multiple realities [14].

The basic argument in the study is that human perceptions of reality drive their behaviours, and interactions among these behaviours build a new context throughout time, which forms a new reality. There are merits associated with the choice of philosophy such as its ability to assist in obtaining the truth and reality about the research problem akin to rural household food security and sovereignty. The study's sample method was a combination of probability and non-probability sampling procedures. Purposive sampling was utilized for non-probability sampling, and simple random sampling was used for probability sampling. The researcher purposefully sampled 7 participants, 3 from the local municipality (LED officers) and 4 extension officers from the Department of Agriculture, Land Reform and Rural Development. Simple random sampling method was used to sample 393(n) respondents from a household population size of 103965 (N). The study used Roasoft statistical calculator to quantitatively sample participants from a household population size of 103965(N) households and below is the formula that was used to derive the sample:

$$x=Z(c/100)^2 r\,(100-r)\quad n=Nx/((N-1)E^2+x)\quad E=\text{Sqrt}\,[(N-n)x/n(N-1)]$$

Here N is the population size, r is the fraction of responses that the researcher was interested in, and $Z(c/100)$ is the critical value for the confidence level c. Hence, the researcher used 95% confidence level and considered standard margin of error of 5%. The response distribution considered was 50% which gives the largest sample size and avoided skewness. The data was therefore collected using semi structured interviews and questionnaires. Each interview lasted for 30 minutes . The data was analysed using both thematic and statistical analysis.

Results and Discussion

Food security is the state of always having physical and financial access to enough food to meet one's nutritional needs and lead a successful and healthy life [27]. As a result, food is a basic need for every household. If none of a household member is threatened by or suffer hunger, the household is said to be food insecure. Food supplies, hubs, and nets must always be protected to achieve the Sustainable Development Goal Number One, which is to end all forms of hunger. Hence, the first specific objective of this study was to determine food security and sovereignty status at household level. To achieve this objective, the study employed the Household Food Insecurity Access Scale (HFIAS), to distinguish between food secured and food insecure households. In addition, the HFIAP indicator, was used to divide households into four levels of household food insecurity, are used in the analysis of the Food Insecurity Access Scale to quantify household food security [26]. The analysis will first look into issues of occurrences scales of food insecurity then after it will then investigate the issue occurrence frequencies.

Household food occurrence scales

Food insecurity may occur in different scales and the study considered a 24-hour recall to with food quality questions in the context of the HFIAS that do not directly pertain to nutritional quality. Rather, these questions seek to elicit the household's perception of changes in food quality, regardless of the diet's objective nutritional composition. Hence, the researchers were aware that 24-hour recall are subject to memory and in cases where the member was unable to remember another member of age (18 years and above) was given the opportunity to answer on behalf of their household head. This is also supported by Grey, S., & Newman, L. (2018) who stipulates that like all dietary techniques, 24-h recalls are susceptible to systematic and random mistakes that can affect accuracy at various stages of the measuring phase [11].

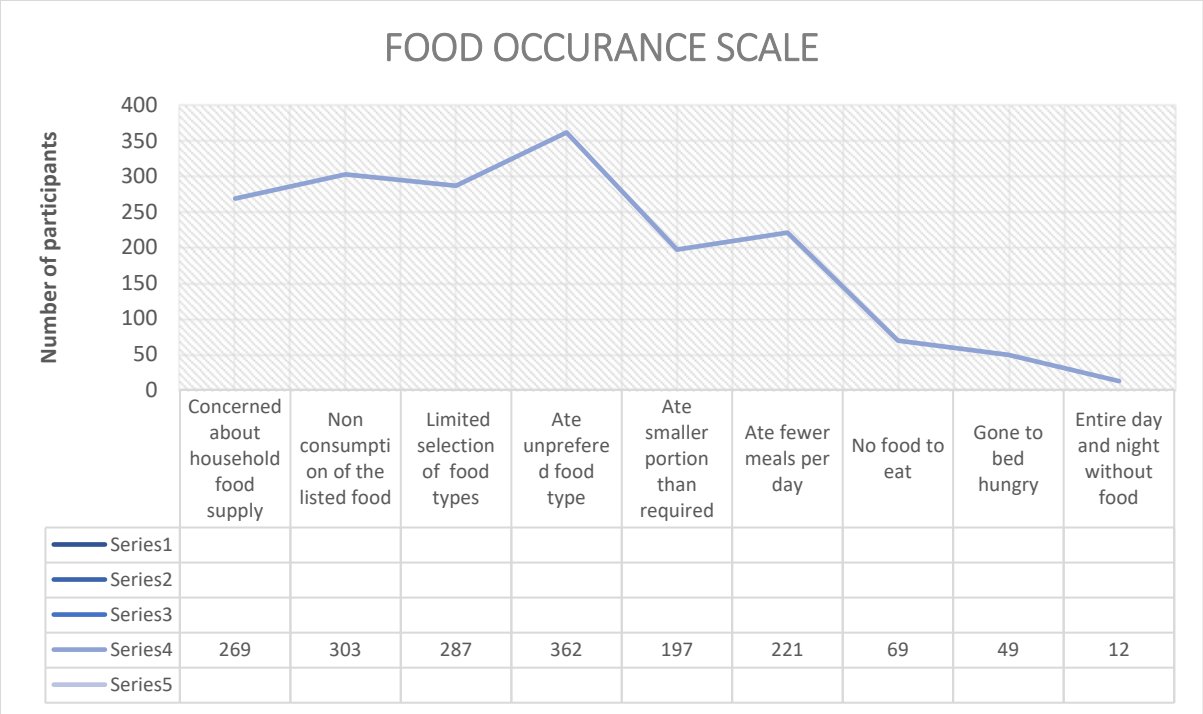

Figure 1: Food Occurrence Scale (Source: fieldwork (2018), n=383 household heads)

The data suggest that 269 (70%) of the participants were concerned about home food supply on a regular basis. The accompanying chart illustrates the frequency of food discrepancies that are connected to daily intake. Therefore, 303 (79%) out of 383 rely on local foods because they do not have a variety of dietary meals each day. Only 12 (3%) people, according to the study, go a whole day without eating, which can be attributed to the fact that most homes use locally grown food as a substitute when food is scarce. Hence, this opposes what [5] say about South African household small percentage of households making use of wild foods as part of a healthy diet.

Household food frequency of occurrence

The measure of household food frequency of occurrence is suggested by Food and Nutrition Technical Assistance reflect on usually increasing level of food insecurity (access) and uses a nine "frequency-of-occurrence" questions, which are answered as a follow-up to each occurrence question to find out how frequently the situation happened. If the respondent states that the condition listed in the relevant occurrence question was not encountered in the preceding four weeks.

Table 1: Food frequency of occurrence

	Mean	Std. Deviation	N
Concerned about household food supply	2.0653	.80796	383
Non consumption of the listed food	1.9948	.63902	383
Limited selection of food types	2.0731	.75188	383

Ate unpreferred food type	2.8460	.47972	383
Ate smaller portion than required	1.7963	.84710	383
Ate fewer meals per day	2.0548	.94599	383
No food to eat	1.2663	.60286	383
Gone to bed hungry	1.1462	.39570	383
Entire day and night without food	1.0548	.30634	383

(Source: fieldwork (2018), n=383 household heads)

The results show the mean and standard deviation of the respondents, and the findings show that a $\bar{x}$= 2.84 which reflects a positive distribution and may also reflect as an outlier in the study. This is a situation where households were eating unpreferred food type because of unavailability. In a survey conducted in 2016, it was discovered that 86% of households have reduced their consumption of pulses, the main source of protein for vegetarians, while 80.0% of households limit milk for their kids [10]. The results also shows that some of the households go to bed hungry with a mean of $\bar{x}$=1.14. Hence, the study used Multivariate Tests to test an association between food production to security and sovereignty looking at food frequency of occurrence as an indicator.

Household food prevalence

The data shows a pairwise comparison information about food prevalence. Hence food prevalence in the aspect of the study is measured into 4 namely food secure, food insecure, mildly secure, and moderately secure**.**

Table 2: Food prevalence

Food prevalence	**Frequency**	**Percentages %**
Food secure	90	23
Mildly food secure	123	32
Moderately food insecure	52	14
Severely Food insecure	118	31
	383	100

(Source: fieldwork (2018), n=383 household heads)

The data shows that 32% of the household is mildly food secure and only 23% of the household is food secure. This demonstrates that there is a great number (55%) of households which is more than halve of the sampled households who are food secure to some degree. Therefore, these findings conflict with those of [6], who claimed that a total of 77.2% of households who experienced food insecurity. The findings also agree with [18], who discovered that 67% of respondents reported being food secure. Hence to test the hypothesis of whether the households are food secure or not, the study there run a Kruskal-Walli's test. The test investigated food security by considering the number of members in the household to close the gap of member representation. Even though the study does not by any chance look into food distribution to each member, but it is able to account for a household as a single unit.

Table 3: Independent-Samples Kruskal-Wallis Test Summary

Total N	383
Test Statistic	354.321[a]
Degree Of Freedom	3
Asymptotic Sig. (2-sided test)	.000
a. The test statistic is adjusted for ties.	

(Source: fieldwork (2018), n=383 household heads)

The one-way repeated measured analysis of variance (ANOVA) was conducted to evaluate the null hypothesis that there is no causal relationship between the food production to food security and sovereignty at Nkomazi Local Municipality. The results indicated a significance effect, Wilks Lamda=3, $p<.01$. Thus, there is significant evidence to reject the null hypothesis. Pairwise difference is therefore significant.

Coping strategies index (CSI)

Food shortages in rural household is one of the most topical issues when looking at food security and sovereignty. A lot of households have to survive with minimal food they are able to secure through purchase or own production. Numerous coping strategies were identified in reaction to the strain of food insecurity in the household [23]. The study investigates (figure 2) the different copying strategies used by rural households at Nkomazi to deal with food shortages.

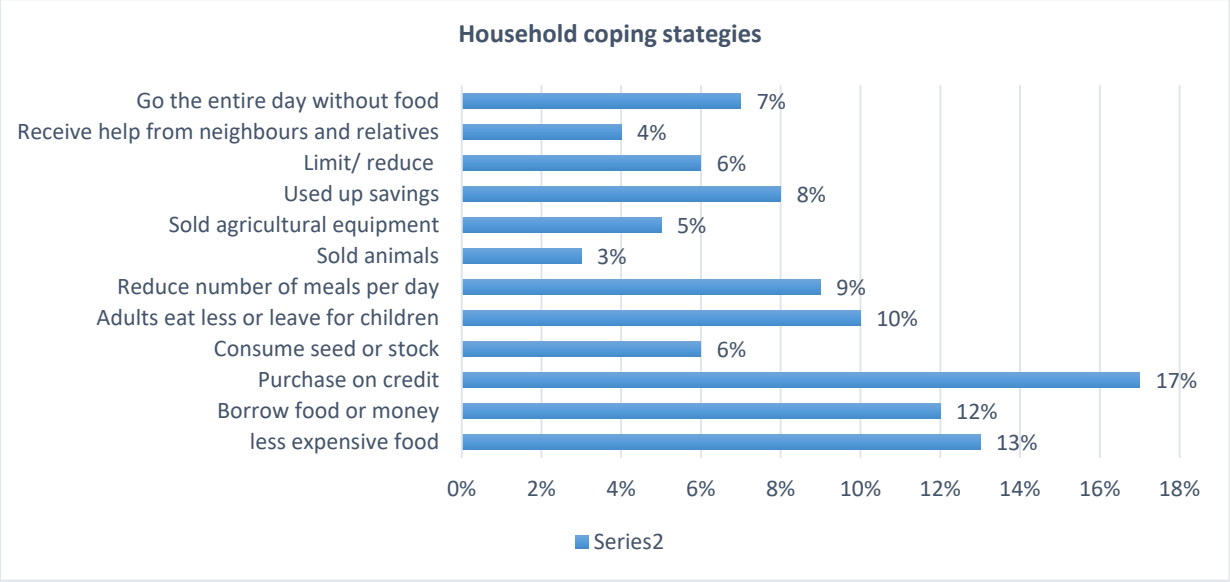

Figure 2: Household copying strategies. (Source: fieldwork (2018), n=383 household heads)

The results shows that 17% of the household purchase food on credit, whether in retail outlets or in local shop. This also followed by the 13% of households resulting to purchasing less expensive food to the household food baskets each month. Surprisingly, only 3% of the households sell their animal stocks to get other food types. This is supported by [9] who states that there are six coping mechanisms used by food insecure households were selling or mortgaging

assets, consuming low-quality food, eating fewer items of food, stopping household members from attending school, borrowing food, and borrowing money.

Household dietary diversity scale

Food security in all of its dimensions refers to having access to food at all times; hence, the study extends this definition to include a variety of foods in the diet rather than just any food. Therefore, the study took into consideration a 24-hour recollection for the previous 30 days into account to determine what the respondents had consumed over those days. It must be stated clearly that the study only considered diversity, not individual caloric or nutritional needs, as anthropometrics academics typically do. Table 4 show the different food groups that a household may have consumed in the last 30 days.

Table 4: Food groups

	Frequencies N	Percentages %	Mean	Std. Deviation
Cereals	270	70	1.3629	.48147
Tubers and Roots	88	23	1.9164	.27708
Vegetables	383	100	1.0078	.08827
Fruits	239	62	1.6005	.49043
Meat, Poultry and Offal	350	91	1.0444	.20622
Eggs	302	79	1.3316	.47140
Fish and Seafood	235	61	1.9478	.22276
Pulses, Legumes and Nuts	204	53	1.9138	.28097
Milk and Milk products	274	72	1.5222	.50016
Oil and Fats	383	100	1.0261	.15967
Sugar and Honey	383	100	1.0366	.18791
Miscellaneous	240	63	1.9608	.19424

(Source: fieldwork (2018), n=383 household heads)

The study in table 1.4 shows the different food groups the household may have consumed in the last 30 days. The findings shows that 100% of the households consumed oil and fats, sugar, honey and vegetables. According to the findings, a 1% increase in dietary variety is linked to a 1% increase in per capita consumption (food and non-food), a 0.7% increase in total per capita caloric availability, a 0.5% increase in household per capita daily caloric availability from staples, and a 1.4% increase in household per capita daily caloric availability from non-staples [12]. Hence this is followed by 91% of them recalled having consumed meat, poultry, and offal. Contradictory, the household seem to not consume much of the tubers and root foods and the reasons were that of unavailability in the market for those households who are non-producers. The mean value of is $\bar{x}$=1.04 which suggest a positive distribution leaning towards the right side of the curve.

Households Use of Indigenous knowledge systems

The 2030 Agenda for Sustainable Development gives priority to food and nutrition security. The incorporation of indigenous foods may be a solution for the rapid increasing hunger and poverty rates at household levels. Therefore, it is important to promote regional and indigenous foods and crops, leveraging local farmers' and communities' "local food plates," as well as their traditional knowledge and technological capabilities. The study considered investigating the number of households that use indigenous knowledge in food production and what they perceived to be the advantages associated with the use. Hence figure 1.3 investigate the advantages of using indigenous knowledge systems.

Table 5: Household use of indigenous knowledge systems

	Observed N	Observed %	Expected N	Residual
Cost effective	189	49	95.8	93.3
Skills and knowledge proficiency	94	25	95.8	-1.7
To protect our knowledge	59	15	95.8	-36.7
To ensure knowledge transfer	41	11	95.8	-54.7
Total	383	100		

(Source: fieldwork (2018), n=383 household heads)

The data shows that 49% of the respondents believe that adopting IKS is cost-effective. The significant majority (25%) of respondents, who believe that applying indigenous knowledge will include skills and knowledge proficiency, comes next. However, a tiny percentage of families (41; 11%) believe that IKS's benefit is assuring knowledge transmission. The study thus run a Chi-Squire to determine the relationship between the number of advantages of using IKS at Nkomazi Local Municipality.

Table 6: Indigenous knowledge systems

	Number of HH (Household heads) that Use IKS	Advantages of IKS use
Chi-Square	133.822[a]	136.258[b]
Df	2	3
Asymp. Sig.	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 127.7.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 95.8.

(Source: fieldwork (2018), n=383 household heads)

The results show a significance level of $p<.001$ which indicates that there is no significant difference for both variables, with a degree of freedom at df =2 for number of house households using IKS and df=3 for advantages of IKS use. Hence the null hypothesis is rejected, and homogeneity may be claimed in this case.

Wild food gathering

Wild food gathering in rural households has been a practice that has shaped food diversification for decades. Hence, wild plants serve as a source of building materials, crafts, and religious observances. Wild foods are a variety of edible items produced by various undomesticated plant, and animal species. Cereals, tubers, vegetables, fruits, meats, eggs, and other items fall within this specific groups [15]. Therefore, a paired sample test was used in the study to examine the relationship between the variables wild food gathering and food security and sovereignty.

Table7: Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Wild food gathering seasons - Types of food production or available	-3.85117	3.26111	.16664	-4.17881	-3.52354	-23.111	382	.000
Pair 2	Indicators of food security and sovereignty - Food prevalence	2.07050	1.75688	.08977	1.89399	2.24701	23.064	382	.000

(Source: fieldwork (2018), n=383 household heads)

Table 7 shows that the sample mean difference of $\bar{x}$= -3.85117 for pair 1 which indicated a negative distribution. Hence the standard deviation s=3.26111 with df=382 and significance p<.001 which indicates that there is no significance difference between the variable, hence the null hypothesis is rejected resulting into homogeneity. This proves a relationship between wild food gathering and food security and sovereignty. Hence the absence of wild food gathering in the household might cause a negative effect, leading to food insecurity. [22] states that wild edible plants also provide a variety of benefits at household level such as in the spatial context of the Democratic Republic of Congo whereby it is used as important component in the household diet. Hence, for pair 2 there is a positive distribution of the sample mean by $\bar{x}$ =2.07050 and the standard deviation is df=382 with a significance of p<001 which indicated that there is no significant difference between the variable and the study may claim homogeneity, whilst rejecting the null hypothesis. This proves that there is a relationship between indicators of food security, sovereignty, and food prevalence.

Food value chain

The study reveals that unlike big cooperations and commercial farms, households follow a shorter and more specific value chain. Participants eluded that some of the food produced in the households is normally sold in the informal markets in the rural areas and in the city centres. When these entrepreneurs are questioned about where they gather the food, they normally mention local forests and some are produced at households level. Participant **G2 and G5** alluded to that by stating that:

''The only process I follow after I have produced and harvested food, I sell my produce at local markets every Saturday and during the week I sell my produce in town'' ***G2.***

''I often produce for two reasons; one is to sell and generate income and for household consumption. The food I normally sell is fresh vegetables and processed foods such as jam making ***G5''.***

With an emphasis on connecting smallholder farmers to local markets by taking into account their participation in value chains, inclusive value chain development is a novel idea that is associated with income production, employment opportunities, and food security [16]. The data draws an attention that household value chains follow the spherical events starting from food production, distribution, processing, preservation, storage and ends with food marketing. The data also show that the is an indication that some of the rural households partake in all the processes without involving any intermediaries and breaks the norm or procedure, but others are unable to follow the value chain because of the cost incurred when producing secondary goods through food processing.

''I do not have a middle man that connects me to the formal markets, hence it is my responsibility to identify where there is demand for the food stuff and try to ensure that I sell my food there''**G2**.

Therefore this proves that the food value chain is informed by a variety of activities that are set to bring a product or service from conception through the different phases of delivery, finalization and lastly disposal after use [25]. The results show that the value chain exists when the actors in the chain operate in such a manner that allows the maximization of the generation of value to products and services along the chain. This chain involves several upstream linkages or sources of supply (agronomists) and downstream linkages (distributors and the ultimate customers). Hence the use of the value chain ascertains a collective use of methods such as retailers, traders, and exporters. This value chain plays a significant role in the reduction of unemployment at a community level which later have a direct impact on households. The value of the chain is that it has a multiplier effect in the production sector. This multiplier effect ranges from food production, processing, storage, distribution, and marketing. Value chain in this instance act as a fundamental approach to reduce hunger and poverty in the rural household. Hence, [20] states that institutional and socio-economic limitations, smallholder farmers are unable to participate in commercial and high-value marketplaces, even though smallholder farming has a significant potential to generate employment and contribute to household income.

Conclusion

The study revealed that 79% of rural households rely on local foods because they do not have a variety of dietary meals each day. Only 12 (3%) people, according to the study, stay for a whole day without eating, which can be attributed to the fact that most homes use locally grown food as a substitute when food is scarce. The results also shows that some of the households go to bed hungry. Hence, the study used a Multivariate Tests to test association between food production to security and sovereignty looking at food frequency of occurrence as an indicator. The findings shows that households eat unpreferred food type because of unavailability. The data shows that 32% of the household is mildly food secure and only 23% of the household is food secure. This demonstrates that almost halve (45%) of the households are food insecure to some degree. This raises a question on what can be done to assist rural households who face daily hunger. The study therefore investigates some of the coping strategies that household use in the absence of income to purchase food and the study shows that food production at household' level and gathering of wild food assist in desperate times.

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