

Prolonged Dry Spells and Food Security Among Households in Endinzi Sub County Isingiro District, Uganda

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Abstract

Background: The study was about the effect of prolonged dry spells on food security among households in Endinzi sub county Isingiro district. The study objectives were; (1) To identify the effect of prolonged dry spells on food availability among households in Endinzi sub county Isingiro district, (2) To identify the effect of prolonged dry spells on food access among households in Endinzi sub county Isingiro district (3) To assess the effect of prolonged dry spells on food consumption among households in Endinzi sub county Isingiro district. The study was anchored on the Anthropogenic Global Warming theory by Joseph L. Bast (2010).

Methods: The study adopted a cross-sectional design where quantitative research methods was utilized. The study involved 350 households which were selected from seven villages in Endinzi sub county using simple random sampling techniques. Data was collected using a Likert scale questionnaire and the data there of was analysed using SPSS.

Findings: The main findings revealed that there were food availability inconsistencies among the households, prolonged dry spells resulted into poor yields at the end of the harvesting period which generates limited food access among the households and that dry spells negatively impacted on households' ability to maintain a balanced diet.

Conclusion: The study concluded that dry spells heavily influenced food security in Endinzi Subcounty. It was therefore recommended that interventions that promote climate-smart agriculture as a strategy to improve resilience against dry spells be encouraged.

Keywords: Food Security, Households, Prolonged Dry Spells, in Endinzi Sub County, Isingiro district

Background

Across the globe, prolonged dry spells is traced far back from 1850 where the earth temperature risen by average of 0.6⁰C and since 1982 there has been rapid increase in variations of temperature and in 1960s the world recorded steep increase in temperature of 1.3⁰C never the less it has continued to rise and it is projected to be at 2.5⁰C in 2050 causing a strong damage on food security around the world where Asian countries such as Iran , Afghanistan experienced the most extreme dry spells in 1985 leading to death of thousands of people due to famine . (UNDP, 2012).

In sub-Saharan Africa, the north Africa and the horn of Africa experienced severe dry spells where experienced in 1984 which extended to 1986 where countries of Somalia, Ethiopia, Egypt, and Sudan

causing migration of 450000 people and thousands of livestock due to loss of vegetation which resulted to no food for human and livestock (Vincente et al 2012). In east Africa since 1985 there has been recurrent severe dry spells with the rising temperatures of 0.3°C which has led to reduced agriculture production. In western Kenya neighboring Somalia there has been extended dry spells and the most extreme started begun in 2014 and extended to 2016 where millions of people were displaced to Uganda and death of thousands of livestock due disrupted growing seasons which caused famine (FAO, 2015).

Uganda witnessed a strong disaster of prolonged dry spells in 1999 which resulted into disrupted growing season of food crops leading to wide spread of famine across the country (FAO REPT 2015). In Isingiro district the effect of prolonged dry spells was observed in 2016 which extended to 2017 which caused destruction of the agriculture produce by drying up of food crop gardens, which resulted into food insecurity and death of animals forcing people to migrate from the district to the different parts of the country. Since then Endinzi sub county has experienced the challenge of food insecurity through decreased precipitation, decreased rain variability, late or delayed seasonal rain falls, unpredictable hail storms and increase in general temperatures

Prolonged dry spells have led to damage on the agriculture sector resulting into scorched banana plantations, scorched farm grasses and scorched gardens which has made it hard for the people of Endinzi sub county to access, utilize food and availability of food in the area. (Nalule 2017). Over 98% of the people in Endinzi sub county depend on agriculture with 90% people depend on banana plantations 5% people on cattle grazing and 3% people grow sweet potatoes, Irish potatoes and others according to Nile post wed 2024. In the same report shows prolonged dry spells have led to reduction in agriculture produce to 51% of bananas produced from 90% and shifting of livestock to Tanzania This has created a challenge of food security in the parishes of Busheka, Rwambaga, Kashonga and Buhunga resulting from dry spell. The above parishes even they have not yet planted any single seed compared to other parishes. The resident district commissioner expressed her concern on the people of those parishes to have a food relief because of extended dry spells causing the disrupted food crop growing season (Nile post wed 2024). This could result into catastrophic hunger in the area and can lead to poor health due to poor access to food, inadequate food items and utilization of food in terms of the number of meals supposed to receive by a household.

The challenge of food security in Endinzi sub county has led most families to take one meal a day due to the inadequate food, and limited access to food items forcing people to migrate to other areas which receive little amount of rainfall such as Tanzania, (Nile post wed 2024). This has resulted into poor feeding practices and economic hardships among households which has affected the health of people. (Nuwagaba et al 2013). In Endinzi sub county the issue of poor access to food, inadequate food items and utilization of food in terms of the number of meals the household supposed to have, have greatly reduced which has accelerated malnutrition in young babies, (FAO report 2023). Since agriculture is the main source of food, over 40% of the families consume a single meal a day due to prolonged dry spells spell causing disruption of crop growing seasons hence resulting to shortage of food (Mbolayi, 2017).

However, the government of Uganda has patterned with the non-governmental organizations to implement different prolonged dry spells adaptability strategies to increase food security among the households which include modified resource management, introduction of new varieties of crops and changes in husbandry techniques that may sustain crops and agriculturally based industries, (Srindharan et al 2019). Despite the above mechanisms the study, Endinzi sub county experiences perennial food

insecurities (Twongyirwe et al 2017). Therefore, the study set out examine the effect of prolonged dry spells on food security among households in Endinzi sub county Isingiro district.

Methods

Research Design

A cross-sectional design was employed by the study where quantitative research methods was utilized. Cross sectional research was employed by the researcher since the researcher was to gather data in course of the study which is cost effective. Quantitative data was collected through use of questionnaire method and analyzed by SPSS ver. 23 and qualitative which was descriptive in nature (Braun & Clarke, 2020).

Area of Study

Endinzi sub county is located in Bukanga constituency Isingiro district local government in Uganda. It is constituted of 4 parishes; of Busheka, Rwambaga, Kashoga and Buhunga. It has a total of 19 villages. Endinzi sub county borders Endinzi town council in north west, Mbare together with Rwanjojera in the west, Rakai in north east, Tanzania in the south having a family size of 4.3 people. Endinzi sub county is the one of most affected area where 80% of its population depend on agriculture as their major source of livelihood such as banana plantation and livestock products, dry spells effects have had far reaching consequences causing food insecurity in the area. (UBOS 2024). Isingiro district has always been affected by extended dry spells following the past events such in 1994, 2006, 2017 where the women in the homesteads were cooking blankets compared to the neighboring districts such as Mbarara and Rakai which do not have extended dry spells (Magala and Owiny 2020).

Study Population and Sample size

Information was obtained from 350 households which were selected from seven villages in Endinzi sub county. Using Taro Yamane's formula sample size of 352 was selected; 70 households from Matara, 55 households from Ekinazi, 55 households' people from Ntura, 55 households from kagaga, 40 households from Rushenyi, 40 from Rwamagana, and 35 households Ekiyonza by use of simple random sampling technique. Taro Yamane's formula which determines 95% of the population to get a sample size of the households where data was collected from. The study utilized simple random sampling, all the participants from seven villages were involved in the gathering of data for study in Endinzi sub county. With the aid of chairperson local council three and cooperating the civil servants at the Endinzi sub county to select the participants.

Data Collection Tools

Data was collected using a questionnaire, Wallace (2013) defines questionnaire as a research instrument consisting of a set of questions or prompts used to gather information from respondents. The researcher formulated questions in a five-point rating scale of strongly agree (Strongly Agree-5), agree (Agree- 4), (Not Sure-3), disagree (Disagree-2) and strongly disagree (Strongly Disagree-1). Likert questionnaire was simple to use, cost effective and it measured the relationship between the variables accurately. Questions were pre tested to ascertain if they were specific to the variables to eliminate bias in research.

Data Quality Control

The researcher ensured the validity and reliability of the instruments. In order to ensure validity, the questionnaire was pre tested on the voluntarily participants to ensure validity in the study. All the questions were reviewed by the university supervisor and at proposal presentation to ensure if the tools were relevant to the study and the those which were not applicable to the study were deleted. From participants' rating, Content Validity Index (CVI) was computed using the following formula: $CVI = \frac{R}{(R+IR)}$. The tools were

considered valid, if their CVI was 0.7 and above as recommended (Amin, 2005). On the other hand, reliability was ensured through subjecting the values from the pretest to Cronbach alpha values the instrument was considered reliable since its alpha was 0.7($r = 0.7$).

Data Collection Procedure and Analysis

Before the actual data collection was made the researcher first sought informed consent from the participant or respondent to participate in the study. There was an option granted to the respondent that he or she would terminate the consent in the middle of participation if she he or she feels un comfortable. the respondent was allowed to ask questions voluntarily in the middle of the interaction to understand fully that was he or she answering. The researcher ensured a high level of privacy whereby there was no room for uttering secrets which have been shared by the respondent. In this case the researcher entered data into a computer data software SPSS for analysis and interpretation of findings. Descriptive statistics of frequencies, percentages, means and standard deviations were presented. To study the relationship between prolonged and security in Endinzi subcounty, a Pearson correlation test was used for the main study variables.

Findings

Demographic Characteristics of Participants

As in shown in Table 1 below, of the 352 participants who took part in the study 214 were male indicated by (61%) while 138 (39%) were female. The results showed that both genders were adequately represented to contribute their views towards study variables. The participants were categorized according to various age groups to find out by age category their opinions concerning the study variables. It was found that majority of participants 121 (35%) were aged 29-38 years followed by the participants who were aged years 39-48 years indicated by 85 (24%), followed by the participants who were 18-28 years 61 (17%) and then followed 59 and above years indicated 48 (14) and the least number of participants were aged 49-58 years indicated by 37 (10).

Participants were also asked to state their education levels as this would help the researcher to know the extent to which the participants understood the study variables and agree or disagree with the underlying assumptions in the questionnaires. It was found that, 142 (40%) of the participants attended secondary followed by 131 (37%) followed by 36 (10%) never went to school followed by 20(6%) attended diploma courses followed by 14 (4%) attended certificate courses and least is 8 (2%) had attained a bachelor's degree or above. Data was also collected about the number of households each participant had and it was found that most, families had between 6 -10 members 168 (48%) followed by 1-5 members 124 (35%) followed by 11-15 members 53 (15%) and the least was 16 and above members with 7 (2%). All this data concerning the demographic characteristics of participants is presented in table 1.

Table 1: Showing the demographic characteristics of participants

Response	Frequency	Percentage
Gender		
Male	214	61
Female	138	39
Age Bracket		
18-28 Yeas	61	17
29-38 years	121	35

39-48 years	85	24
49-58 years	37	10
59 and above years	48	14
Education Qualifications		
Never went to school	36	10
Primary	131	38
Secondary	142	40
Certificate	14	4
Diploma	20	6
Bachelors	8	2
Number of Households		
1-5 members	124	35
6-10 members	168	48
11-15 members	53	15
16 and above members	7	2

Source: Primary Data 2025

Effect of prolonged dry spells on food availability among households

A significant majority of participants agreed (87% combined agree and strongly agree) that food is available, with a mean score of 4.18, though a notable majority (73%) disagrees about continuous availability, with a mean score of 2.25, indicating that food availability is inconsistent. The participants continue to affirm that while food may be present at times, it is not reliably available throughout the year. The data gathered from the Endinzi sub-county reflects significant community concerns regarding food stability, heavily influenced by environmental factors such as drought, evaporation rates, pests, and climate variability. The general sentiment is that, while food can be available on occasion, consistent availability is a challenge, and external factors greatly affect agricultural practices. The findings suggest areas for potential intervention to improve food security, such as enhancing dry spells resilience, pest control, and promoting diverse agricultural practices. A Pearson correlation test was used to determine the relationship between prolonged dry spells and food availability in Endinzi subcounty, and the results are presented in table 2.

Table 2: Showing a correlation between Correlations

		Prolonged dry spells	Food Availability
Prolonged dry spells	Pearson Correlation	1	.597**
	Sig. (2-tailed)		.000
	N	352	350
Food Availability	Pearson Correlation	.597**	1
	Sig. (2-tailed)	.000	
	N	352	352

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data 2025

From the table above the correlation coefficient between prolonged dry spells and food availability is 0.597. This value indicates a positive correlation; as the extent of prolonged dry spells increases, food availability tends to decrease. The correlation coefficient of 0.597 suggests a moderate to strong positive relationship between prolonged dry spells and reduced food availability. As prolonged dry spells conditions persist, it is likely that households will experience challenges in accessing adequate food supplies. prolonged dry spells adversely affect food availability. Households struggle to meet their dietary needs, leading to malnutrition and other socio-economic consequences. Therefore, this analysis emphasizes the critical impact of environmental factors, such as prolonged drought, on food security in Endinzi Sub County, Isingiro District.

Effect of prolonged dry spells on food access among households

Finding about the effect of prolonged dry spells on food access among households in Endinzi sub county Isingiro district, showed that a significant majority (64% Agree, 35% Strongly Agree) that prolonged dry spells in Endinzi sub county affect food access at the household level. A large portion (50% Agree, 45% Strongly Agree) also acknowledges adverse effects of high evaporation rates of grown crops results poor yields at the end of the harvesting period which generates limited food access among the households. the table explains that when the temperatures go high some crops such banana plantations, casava and maize dries up leading the households to struggle to access food. A Pearson correlation test was used to determine the relationship between prolonged dry spells and food access in Endinzi subcounty, and the results are presented in table 3.

Table 3: Showing correlations between prolonged dry spells and food access

		Prolonged dry spells	Food Access
Prolonged dry spells	Pearson Correlation	1	.661**
	Sig. (2-tailed)		.000
	N	352	350
Food Access	Pearson Correlation	.662**	1
	Sig. (2-tailed)	.000	
	N	352	352

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Primary Data 2025

From the table above the relationship between prolonged dry spells and food access is 0.661. This indicates a strong positive correlation as prolonged dry spells increases, food access decreases, A strong correlation suggests that prolonged dry spells have significantly impacts food access among households. As dry spells conditions persist, access to food diminishes due to reduced agricultural outputs, increased prices, and possibly a scarcity of available food in Endinzi sub county Isingiro district.

Effect of prolonged dry spells on food consumption among households

Finding also revealed a strong agreement among participants that dry spells negatively impact their ability to maintain a balanced diet. regarding the impacts of dry spells on diet quality, meal frequency, and crop

yield all showed mean scores above 4, indicating strong concern among the participants the table shows that prolonged dry spells significantly affect food security elements among households in Endinzi Sub County, Isingiro District, with strong perceptions of negative impacts on food consumption and stability. Addressing these concerns may require targeted interventions to improve food access and management strategies in response to climate conditions. A Pearson correlation test was used to determine the relationship between prolonged dry spells and food consumption in Endinzi subcounty, and the results are presented in table 4.

Table 4: Showing correlation between prolonged dry spells and food consumption

		Prolonged dry spells	Food consumption
Prolonged dry spells	Pearson Correlation	1	.595**
	Sig. (2-tailed)		.000
	N	352	352
Food consumption	Pearson Correlation	.597**	1
	Sig. (2-tailed)	.000	
	N	352	352

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Primary Data 2025.

From the table above, Pearson correlation for Consumption Score with Food Security is 0.595. This indicates a moderate to strong positive correlation between food consumption and food security, which means that when food consumption reduces also food security reduces and vice versa. The positive correlation (0.595) suggests that households with higher food consumption scores generally report better food security and families with low food consumption faces food insecurity during prolonged dry spells times. This relationship is influenced by the ongoing effects of prolonged drought, which may limit food availability and thus impact consumption scores. The negative impacts on food production and availability likely reflect in consumption patterns. Households may be forced to consume less or lower quality food during dry spells periods, which subsequently decreases food security.

Discussion

The study's findings from the participants show that prolonged dry spells conditions have negatively led to reduction in food availability, impacting their overall food security among the households in Endinzi sub county. A high percentage of participants agree that prolonged dry spells is associated with reduced food availability, low level of consumption and this observation aligns with the study of fussel (2009) who posits that dry spells affect both the quantity and quality of food produced, which can lead to increased vulnerability among households relying on traditional farming. Also, previous studies posits that prolonged dry spells conditions can significantly hinder agricultural productivity, reduce crop yields, and adversely affect livestock, which are essential for food security (Mastorillo et al., 2016). Similarly, a comprehensive analysis by FAO (2017) indicates that erratic weather patterns can cripple crop production and exacerbate food shortages.

Moreover, participants reported that prolonged dry spells lead to reduced food access among households in Endinzi sub county Isingiro district. Prolonged dry spells result in reduced agricultural production,

leading to food shortages. Households' dependent on rain-fed agriculture are particularly vulnerable as dry spells can hinder crop growth, reduce yields, and ultimately limit food availability and accessibility (Mastrorillo et al., 2016). This study finding is consistent with the study of Guan et al. (2018) found that dry spells conditions were directly linked to reduced agricultural output, which in turn diminished food access for households, particularly in rural settings. The (IPCC, 2021) also posits that climate patterns shift, the impacts on food access and availability may become increasingly severe, necessitating adaptive measures in agricultural practices and policies.

Participants reported that prolonged dry spells lead to reduced food consumption patterns among households in Endinzi sub county. the findings reveal that as prolonged dry spells continue to be extended, the food consumption patterns in the households reduce. Prolonged dry spells led to reduced agricultural productivity and increased food prices, causing households to experience food scarcity. During such times, households often resort to coping strategies, such as reducing meal frequency or the quantity of food consumed, which adversely affects their overall consumption score (Maxwell et al., 2013). This finding aligns with the study of Azzari and Graziano da Silva (2018) who posits that climatic shocks, such as prolonged drought, negatively impact food security and consumption patterns.

Findings showed the challenge of decreased agricultural output due to prolonged dry spells conditions which has affected food security in the whole sub county since dry spells negatively affects crop yields, leading to food scarcity (Zhou et al., 2018). This study's findings are consistent with the study of (Mastrorillo et al., 2016) who posits that Prolonged dry spells tend to exacerbate food insecurity through rising food prices. As local production declines, reliance on markets increases, which often leads to inflated prices as demand exceeds supply.

Findings also reveal nutritional deficiencies with decreasing food availability, households prioritize quantity over nutritional quality, leading to dietary deficiencies. This challenge is consistent with the (FAO, 2020) which posits that that food insecurity often correlates with poor nutrition, which can exacerbate health issues and this challenge has been seen on the ground in Matara village which has children affected by kwashiorkor (Isingiro District Health Report, 2024). Findings also revealed strains in socio-economic structures caused by constant household spending on food items. This challenge echoes the findings of Tschakert et al. (2013) who posits that households facing prolonged dry spells encounter increased social tension and poverty, making it difficult to recover and adapt. Reflecting on the study findings, it is essential to note that previous studies, FAO (2018) posits that dry spells severely affect food production, leading to diminished access to nutritious food options and ultimately contributing to malnutrition among vulnerable populations. the study's' findings reveal that prolonged dry spells has led to reduced food consumption patterns.

Conclusions

About the effect of prolonged dry spells on food availability, findings revealed that there were food availability inconsistencies among the households in Endinzi subcounty of Isingiro district. It is therefore concluded that food availability was heavily influenced by environmental factors such as prolonged dry spells, evaporation rates, pests, and climate variability.

About the effect of prolonged dry spells on food access among households in Endinzi sub county Isingiro district the study findings revealed that a significant majority of participants acknowledged that prolonged dry spells resulted into poor yields at the end of the harvesting period which generates limited food access

among the households. It is therefore concluded that food accessibility was heavily influenced by quantity of yields at the harvesting period.

About the effect of prolonged dry spells on food consumption among households in Endinzi subcounty, findings revealed that dry spells negatively impacted households' ability to maintain a balanced diet. It is therefore concluded that prolonged dry spells significantly affect food security elements among households in Endinzi Sub County, Isingiro District.

Recommendations

Based on the study findings and objectives, the following recommendations are proposed to enhance food security in Endinzi sub county Isingiro district.

1. Promoting climate-smart agriculture as a strategy to improve resilience against dry spells. This includes the use of drought-resistant crop varieties, crop rotation, intercropping, and conservation agriculture techniques as well as adopting appropriate technologies that ensure constant food production
2. Enhancing skills and knowledge of farmers through training programs focused on sustainable agricultural practices, resource management, and diversification of income sources. Literacy and education positively impact agricultural productivity and food security.
3. Encouraging households to diversify their income-generating activities beyond agriculture to reduce vulnerability to climate variability. Diversification is crucial for mitigating risks associated with drought.
4. Replica studies be made on the relationship between prolonged dry spells and food security at a wider scope and with mixed methods approach. This would increase the reliability, validity and generalizability of the findings of this study.

Ethical approval and consent to participate

Approval to conduct the study was obtained from Bishop Stuart University Research Ethics Committee (BSU-REC-2025-567). Moreover, Informed consent was also obtained from all study participants before commencement of data collection.

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