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An analysis of the factors contributing to food insecurity in Taita-Taveta County

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Abstract

Food security remains a global challenge despite efforts to increase agricultural productivity and identify appropriate policy interventions to address food shortages. It is a major issue in Taita-Taveta (TT) County since the arid and semi-arid land covers approximately 84% of the county's landmass with little arable area left for food production. The County is heavily influenced by the South Easterly winds except for the Taita hills, which are wetter, the rest of the land is dry. The study examined factors that contribute to food insecurity in TT County. A survey was carried out and used a descriptive design. A total of 240 farmers were selected using purposeful and simple random sampling methods in two sub-counties: Voi and Taita. They were interviewed using a formal survey with a structured questionnaire as a data collection tool. Data was collected and analyzed using Statistical Package for the Social Sciences (SPSS) in accordance with the study objective. The findings revealed that major factors contributing to food insecurity were climate change, inadequate rainfall, and natural disasters. Other factors were lack of access to land, lack of government support, and socio-cultural factors. The general perception was the existence of food insecurity, whose effect was perceived to be a rise in the cost of food, hunger, and high food crisis. The majority (64.6%) of farmers did not employ coping strategies, although they adopted local methods to avert the crisis. The land was mainly owned by men therefore women could not make decisions pertaining to long-term utilization leading to perennial food insecurity.

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Introduction

Agriculture contributes 95% of domestic earnings and provides more than 80% of occupation in Kenya (MoALF, 2016). Food availability and accessibility must be consistent in sufficient quantities and diversity, in order to have a positive nutritional impact among households (FSIN, 2020). Severe lack of food is defined as any sign of insufficient diet which endangers livelihoods irrespective of the cause. Acute states of food insecurity - are highly changeable and can manifest in a population quickly due to abrupt variations or shocks that adversely affect the elements of food insecurity (Kenya IPC, 2019). According to Mutea *et al.* (2019) sustaining acceptable food safety levels remains a critical task for the majority of rural families in Africa South of the Sahara. Sustainable Development Goals (SDG) Target 2.1, guaranteeing safe, and the right use of a healthy and appropriate diet for all people throughout the year, and SDG Target 2.2, eliminating all kinds of poverty, have not realized significant progress (FAO, 2021). The World Bank (2021), notes that food insecurity has increasingly undermined years of development progress in many countries, and jeopardized SDG achievement by 2030. According to the World Food Programme (WFP), 137 million persons were extremely food deficient in 2020, and Covid-19 would cause a further 96 million persons to have food uncertainty by 2022 (FAO, 2021 and IDA, 2020).

The Long-term shifts in temperatures and weather patterns are defined as the utmost major ecological dangers of the 21st era and have the possibility to destroy irrevocably the natural resources that agriculture relies on, with serious concerns for food safety. On the contrary, farming is the impending solution to the food crisis (Gioto *et al.*, 2016). When the long-term shifts in temperatures and weather patterns interacts with other societal, fiscal, and ecological pressures, new risks emerge that can intensify vulnerability and exacerbate pre-existing fragility (Regnad *et al.*, 2018). However, World Bank (2021) suggests that climate and development must be integrated in order to facilitate successful mitigation and adaptation. Over the last decade, Kenya's contribution to GHG emissions has been negligible although climate-related losses have been 3-5% of GDP. Pachauri *et al.* (2014) agree that the significance of long-term shifts in temperatures and weather patterns and food insecurity necessitate innovative food security strategies. In this context, improved livelihoods for the rural populace can be enhanced by irrigation which is becoming more suitable for upscaling food sufficiency Wichelns and Oster (2006), Ransford *et al.* (2016). Antti *et al.* (2021) endorse the use of farm and land management practices that can together reduce global temperatures and intensify farmers' adaptive capability. The same authors further recommend that improving food security is determined by critical factors of consciousness of adoption and mitigation measures and access to climate-smart technologies.

Taita-Taveta's primary subsistence and economic activity is rain-fed agriculture practiced by the majority of families (CGTT, 2018). Over the last four decades, the County has been experiencing variations and inconsistencies in the environment. Droughts, unpredictable rainfall, and high temperatures are some of the effects, compounded by the use of low inputs, poor infrastructure, land tenure challenges, wildlife destruction of crops and illiteracy have all contributed to high levels of poverty and food uncertainty (CGTT, 2018). In 2019, the food demand in a population of 340,671 was 33385.758 Metric Tons, with a production of 11050 Metric Tons, just about a third of the demand. The deficit was -22,335.76 MT (GoK and FAO, 2021). There were about 60,000 people uncertain about food availability in the County as reported by the Long Rains Food Security Assessment analysis of 2015 (TTC, 2015). Taita-Taveta is classified in the Stressed (Phase 2) of the Integrated Food Security Phase (IPC), which suggests that even with any charitable aid, families have not only negligible acceptable food intake, but are unable to fund some vital non-food supplies without applying some permanent coping approaches (TTC, 2017). The main reasons for the existing food uncertainty are due to delayed rainfall and premature ending of the extended rains coupled with loss of

yields during the preceding season. The costs of foodstuffs are high with a kilogram of maize selling at Ksh. 60–70. An average goat in 2017 was selling at Ksh 3,850, which was approximately 17% above the five-year average of Ksh 3,280. Majority of families in farming areas lost their animals and ultimately, their earnings worsened as the level of milk supply diminished due to the drought situation (TTC, 2017). Grass and browse conditions in the diverse farming (crop/livestock) zone, went from fair to poor resulting in poor body condition of livestock. Cultivatable land accounts for only 12% of the entire land area, while national parks occupy 65% (GoK, 2013).

In a study by RoK and FAO (2021), low productivity, had a direct impact on the relationship with food security in Taita-Taveta County. It was noted that while the cropland area increased steadily from 2.5% in 1990 to 3.3% in 2019, forest cover had decreased from 4.8% to 3.3% in 2019 with the average amount of land per household being 2.0 acres. Increased human population put pressure on agricultural land. The aim of the study was to provide detailed information on the causes of food insecurity and further aid in the alleviation of food poverty in Taita-Taveta County.

Materials and methods

Introduction

This section describes approaches that were applied in carrying out the study. It gives an account of the study site, research design, population, sampling method, research tools, and data collection techniques.

Study site

Taita-Taveta County is located in the Coastal region of Kenya. It borders Tana River, Kitui, and Makueni Counties to the North, Kwale and Kilifi Counties to the East, Kajiado County to the Northwest, and the Republic of Tanzania to the South and Southwest.

The County was divided into four sub-counties namely; Mwatate, Taita, Taveta, and Voi which was further fragmented into 20 wards (CIDP 2018). The County covers an area of 17,128.3 Km2 of which 62 percent is occupied by Tsavo East and West National Parks. The County has a population of 349,671 (KNBS, 2019). The County has six livelihood zones, namely; mixed farming (food crops/horticulture/dairy), mixed farming (crops/ livestock), mixed farming (irrigation/ livestock and food crops), casual waged labor, and formal employment (MoALD, 2016).

Research Design

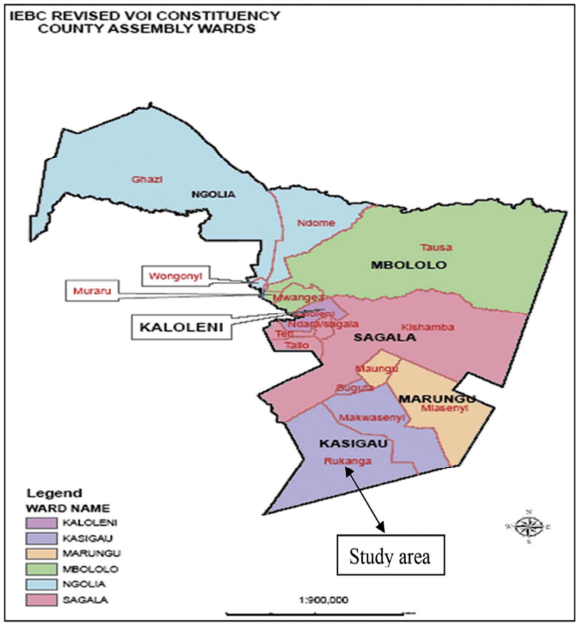
A cross-sectional descriptive survey design was adopted for the objective. Explanatory survey designs are used to enable the researcher to collect information, sum up, present, and infer it for reasons of explanation (Orodho, 2002), which, therefore, explain the state of affairs, Kombo and Tromp (2006). Descriptive survey design entails providing numeric descriptions of some part of the population, describing and explaining events as they are, as they were or as they will be Oso and Onen (2009).

The motive of choosing a descriptive study design was to investigate and analyze rigorously the diverse experiences that comprise the life cycle of the unit, with the aim of establishing conclusions about the bigger population to which the unit belongs Cohen and Manion (1989).

Target Population

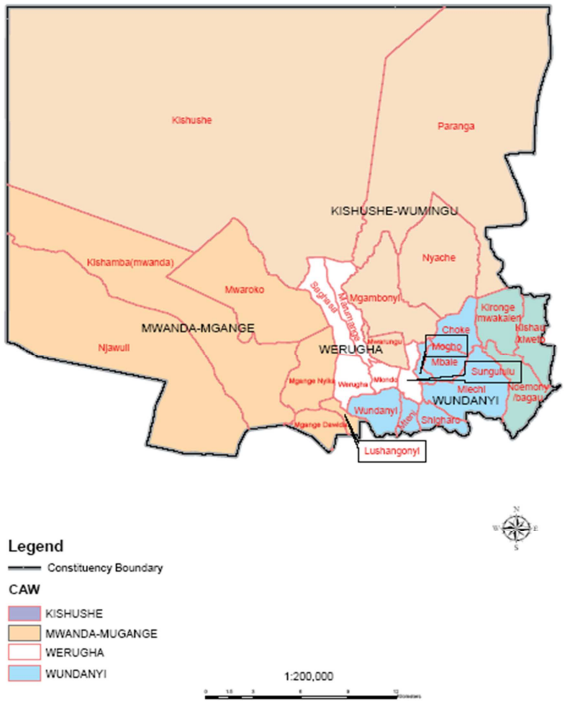
The survey was carried out by probing farmers in two Sub-counties; Voi and Taita Sub-county. The Wards which were covered in Voi Sub-county were Kasigau, Kaloleni, Mbololo, and Ngolia (Map of Voi Sub-county). Those covered in Taita Sub-county were Wundanyi and Werugha (Map of Taita Sub-county).

The population of Voi Sub-county is 56,115 males and 55,711 females, whose total was 111,831. Taita Sub-county population is 28,386 males and 27,573 females making a total of 55,959 (Republic of Kenya, 2013). The total county land area is 17,059.1 per square kilometre with farmland consisting of about 2,055Km^2. The rest is arid land suitable for livestock rearing. About 14,307Km^2 of land is non-cultivatable. The percentage of the arable and non-arable land area is 12% and 88%, respectively.



Adopted from IEBC Constituency Boundaries Maps

Map of Voi Sub-county



Adopted from IEBC Constituency Boundaries Maps

Map of Taita Sub-county

Sampling technique

The sample size was determined using the formula described by Anderson *et al.* (2007) as Follows;

$$n = \frac{p(1-p)Z^2}{E^2}$$

Where n is the sample size, p is the proportion of the population having the major interest, Z is the confidence interval and E is the margin of error. Since the proportion of the population at the study site was unknown, the values were set as p = 0.5, Z = 1.96, and E = 0.05. Purposive and simple random sampling methods were used to select two sub-counties, Voi and Taita, and a sample size of 240 farmers was agreed upon.

Research instruments

A structured questionnaire as a data collection tool, with both open and closed-ended questions, was administered by gathering qualitative and quantitative primary data. Secondary data from books, journal articles, and periodicals were used to access information.

Data analysis and presentation

Data obtained was organized methodically under various subjects. Qualitative and measurable methods of data analysis techniques were applied in the study. Qualitative data collected through the structured questionnaire were transcribed, analyzed thematically, and presented in a narrative form. The quantitative data collected was coded and entered into the Statistical Package for the Social Sciences (SPSS) in line with the study objective. Data were analyzed descriptively and then presented using tables and pie charts, Creswell and Creswell (2018).

Results and discussion

Socio-demographic profile of the interviewed farmers

Of the 240 farmers who were interrogated in the current study, there was just about an equivalent representation by both males (41.2%) and females (58.8%) (Fig. 1); although women had a bigger percentage. This has a divergent view of most studies done in Africa which depict a higher representation of males than females alluding that females are mostly preoccupied in domestic activities which limits their flexibility and critical opportunities for interaction with other stakeholders (Mudde *et al.,* 2017). Consequently, any efforts to support food security should be structured in a way that targets both males and females. A third (33.7%) of the farmers were between 36 and 45 years old (Fig. 2).

This is a prime age representing a young population of farmers which implies that they could easily understand and adapt to new forms of technologies and innovation if they are empowered.

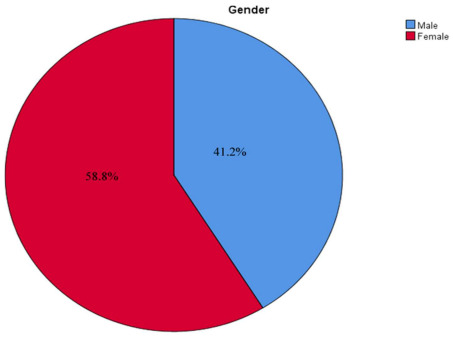


Fig. 1. Population surveyed.

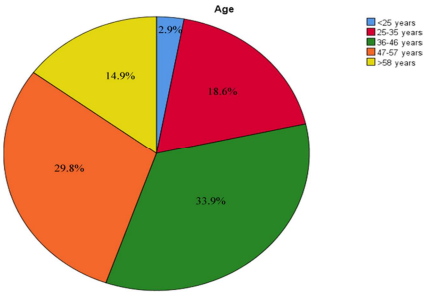


Fig. 2. Respondent's age bracket.

According to Ikutwa and Magani (2020), women in some developing and underdeveloped countries have shown great prospects in leveraging workable farming methods in the fight against famine, malnourishment and other effects of food and nutrition uncertainties.

This supports results of the study as 76% (Fig. 3) of the female farmers had completed secondary education, 38% primary and 24% tertiary education. Therefore, it was easy for extension officers to convey relevant information to the farmers.

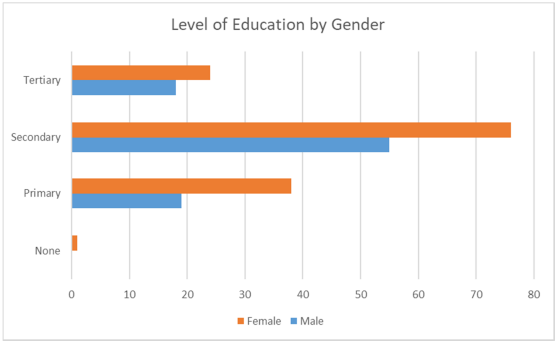


Fig. 3. Gender and Education Cross Tabulation.

Factors contributing to food insecurity and its effects

Taita-Taveta has been facing weather fluctuations and inconsistencies in the last four decades (MoALF, 2016). These factors mirror those cited by the farmers, top three causes being climate change, inadequate rainfall and natural disasters. Other factors that were reported to contribute to food insecurity were: lack of access to land, inadequate government support and sociocultural factors in order of decreasing importance (Table 1). These findings also concur with those of CIDP (2018), who state that the high poverty levels experienced are as a result of unrelenting rainfall deficiency, frequent downpours, over-reliance of rainfall and few adaptive strategies.

Table 1. Factors affecting food security.

Factor	Rank									
	1	2	3	4	5	6	7	8	9	10
Climate change	130	61	40	12	0	0	0	0	0	0
Limited access to land	5	11	28	19	24	26	38	24	14	0
Wastage of food	1	1	3	5	27	23	28	22	28	44
Land grabbing	1	1	1	2	6	31	30	44	40	26
Conflicts/Political Instability	0	2	0	1	1	8	10	38	40	87
High population growth	0	7	12	24	26	31	27	18	33	7
Natural disasters	16	31	45	47	21	17	12	4	2	0
Lack of government support in food security	1	18	62	49	50	24	21	7	8	0
Inadequate rainfall/water	91	101	37	6	0	0	0	0	0	0
Socio-cultural factors	1	8	14	29	32	27	17	24	13	19

According to the results, the general perception was that there was food insecurity in the County with 89.4% farmers agreeing with this fact (Fig. 4). KNBS (2019) did a household survey and reported that Taita-Taveta significantly lags behind the rest of Kenya in food security. Mortimore *et al.* (2009) concur that the food safety situation causes an apprehension, particularly in Kenya's dry and semi-dry lands.

This is because of unpredictable and undependable rainfall with amounts smaller than 500 mm, thus leading to occurrence and persistent droughts (FAO, 2000; FSIN 2017). The results show that 32.9% of the farmers used irrigation on home gardens, permaculture, creating terraces in the farms, water harvesting and mulching as innovative ways of capturing water for crop development and curb food insecurity.

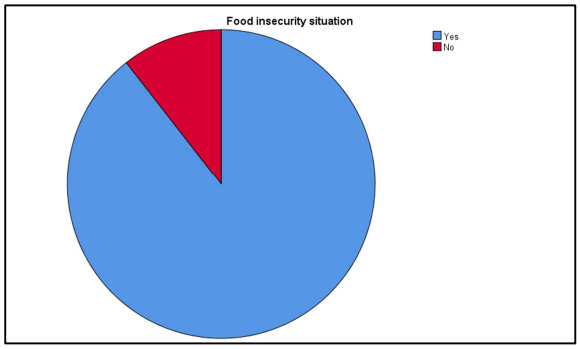


Fig 4. Perceived food insecurity situation in Taita Taveta County.

The effects of food insecurity could be felt among the farmers as 64% farmers in Taita and 49% in Voi reported rise in the cost of food. Others felt that food insecurity would cause hunger and high food crisis (Fig. 5). The results revealed that delayed rainfall and premature ending of extended rainfall caused food insecurity a factor cited in the County's report (TTC, 2017).

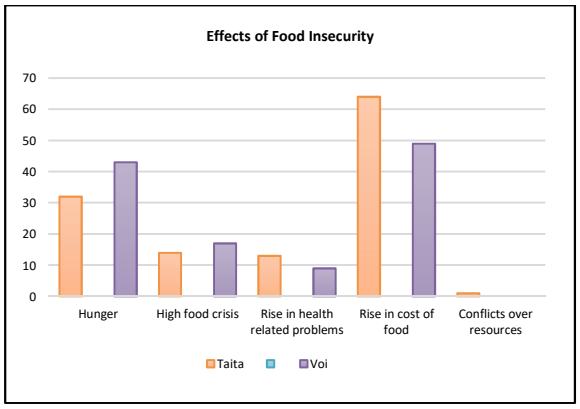


Fig. 5. Effects of food insecurity.

Normal rainfall received was unevenly distributed, 3-4 dekads late and ranged between 26–50%, negatively impacting crops and livestock (GoK, 2021). Household groups not only consume insufficient food but are also unable to afford essential food necessities (TTC, 2017). The respondents reported human-wildlife conflicts, where animals roam freely due to a lack of electric fences, destroying crops and killing humans. When respondents were questioned about awareness of long-term shifts in temperatures and weather patterns, 93.8% responded on the affirmative (Table 2.). The affirmation is supported by KCSAP Strategy (2017), who state that agriculture division is the most susceptible to shifts in temperatures and extreme weather events. For this reason, the government recognised the need to develop interventions that make agriculture more resilient to long-term shifts in temperatures and weather patterns. 70.8% of the respondents acknowledged crop failure as the top effect of climate change. A fifth (19.9%) and 9% of the respondents reported drought and loss of livestock due to lack of fodder/feeds were other factors contributing to food insecurity. These were mentioned by more respondents from Voi compared to those from Taita Sub-county (Table 3). Despite the County's negative effects to food security, 63.6% (Table 4), believed there could be a reversal of these effects. Although only 10% of households used artificial water application methods (GoK, 2014). During adverse weather patterns, farmers preferred planting stress-resistant/drought-resistant crops with high yielding varieties, improved seeds, fodder/ shrubs, and irrigating small parcels of land to secure food availability (Table 5). Pachauri *et al.* (2014) suggested that the consequences of shifts in temperatures and extreme weather events and variability, droughts, and food insecurity require innovative strategies to address them. This is in contrast with this study's findings where the majority of the respondents (64.6%) did not have any strategies to cope with low food production (Table 6).

Table 2. Climate change awareness.

Awareness about climate change					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	228	93.8	93.8	93.8
	No	15	6.2	6.2	100.0
	Total	243	100.0	100.0	

Table 3. Climate change effects on food security.

If yes, how has it affected you		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Crop failure	160	65.8	70.8	70.8
	Animals die due to lack of fodder	21	8.6	9.3	80.1
	Drought	45	18.5	19.9	100.0
	Total	226	93.0	100.0	
Missing	System	17	7.0		
Total		243	100.0		

Table 4. Ways to increase food production.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	150	61.7	63.6	63.6
	No	86	35.4	36.4	100.0
	Total	236	97.1	100.0	
Missing	System	7	2.9		
Total		243	100.0		

Table 5. Methods adopted to increase food production.

Statistics		Planting stress/drought resistant crops	Practice conservation agriculture	Home gardens	On-farm tree planting	Composting	Small scale irrigation	Fodder shrubs	Hibiscus legume planting	Improved grasses	Livestock genetic improvement	Restoration of degraded rangelands	High yielding varieties
N	Valid	155	99	101	95	100	122	132	104	152	107	120	152
	Missing	88	144	142	148	143	121	111	139	91	136	123	91

Table 6. Methods invented in extreme weather conditions.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	80	32.9	33.8	33.8
	No	157	64.6	66.2	100.0
	Total	237	97.5	100.0	
Missing	System	6	2.5		
Total		243	100.0		

Table 7. Crops planted in extreme weather conditions.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	cassava	138	56.8	56.8	56.8
	Sweet potatoes	46	18.9	18.9	75.7
	Maize	25	10.3	10.3	86.0
	Cow peas	1	.4	.4	86.4
	Green grams	3	1.2	1.2	87.7
	French beans	3	1.2	1.2	88.9
	Bananas	9	3.7	3.7	92.6
	Vegetables (indigenous)	1	.4	.4	93.0
	None	3	1.2	1.2	94.2
	Miraa	1	.4	.4	94.7
	Napier grass	12	4.9	4.9	99.6
	Passion fruit trees	1	.4	.4	100.0
	Total	243	100.0	100.0	

Farmers were categorical that in extreme weather conditions, they concentrated on growing cassava, sweet potatoes, and maize in order to avoid hunger in their families. Of the crops grown, 60% in both sub-counties confirmed that they achieved the produce expected (Fig. 6) and 44% indicated that the production of 5 bags of 90Kg maize (Fig. 7), would last them only 6 months (Fig. 8). When asked if they had any excess produced, 57.6% answered in the negative and stated that they relied on county reserves for their supply (Fig. 9). Farmers were asked what they did with any extra foodstuffs. The minority, about a quarter of the respondents (25.9%) stated that whatever remained from the previous season was sold to generate income for other household responsibilities like paying school fees and buying uniforms for school-going children (Fig. 10).

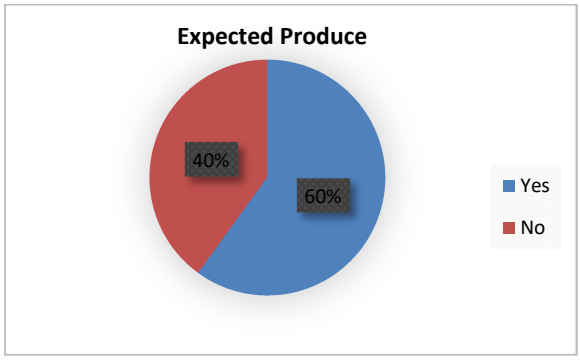


Fig. 6. Expected produce.

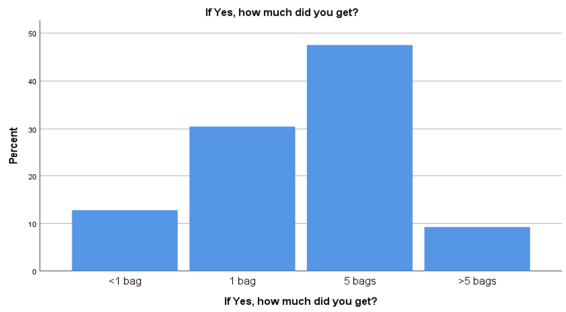


Fig. 7. Number of Bags received in extreme weather conditions.

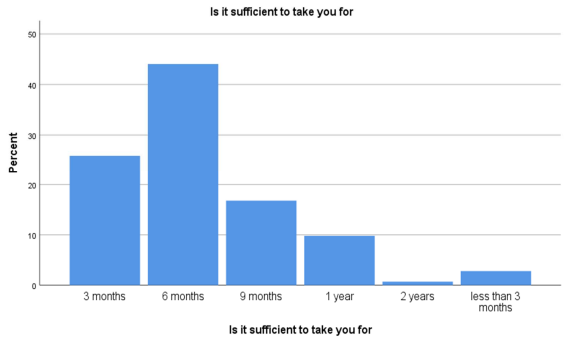


Fig. 8. Food sufficiency.

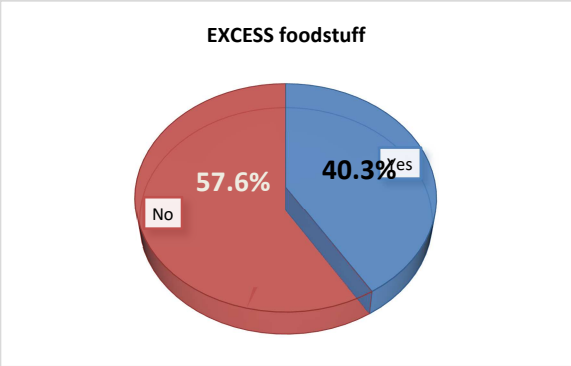


Fig. 9. Excess foodstuff.

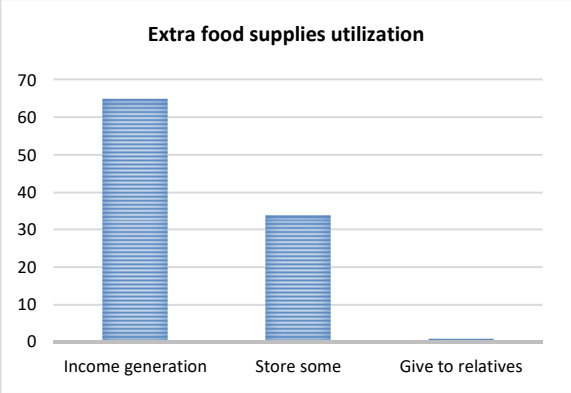


Fig. 10. Extra food utilization.

In Kenya, the implementation of CSA approach to mitigate weather variation effects, signals a new path for sustainable agriculture (FAO & IWMI, 2018; Kiptot & Franzel, 2012). The aim of these adaptation and mitigation strategies was to create a permitting environment that supports the activities in order to attain sustainable safety dietary under adverse weather variability (World Bank, FAO, and IFAD 2015). It is, therefore, important for farmers to be aware of the implementation and its activities. When the respondents were asked if they had heard about CSA and whether both men and women could voice their concerns concerning the practice, 74.9% of the population under study replied that they knew about it (Fig. 11). On importance of CSA and its prioritization, 40% of the farmers responded that CSA was important for them to increase crop yields/livestock while 28.3% said it is important for market value of crop/livestock, 25% for increased market demand of crops and livestock and 6.7% for nutritional value addition (Fig. 12). These responses reveal the need to document and satisfactorily address the main concerns and necessities in the design and implementation of CSA in order to realize sustainable outcomes in food security in affected counties (World Bank, FAO, IFAD, 2015). Farmers were also asked whether they understood that food security was a human right and 91.5% the affirmed that indeed they understood while the rest 8.5% did not (Fig. 13). Their response resonated well with Article 43 (1) (c) of the Kenya Constitution (RoK, 2010).

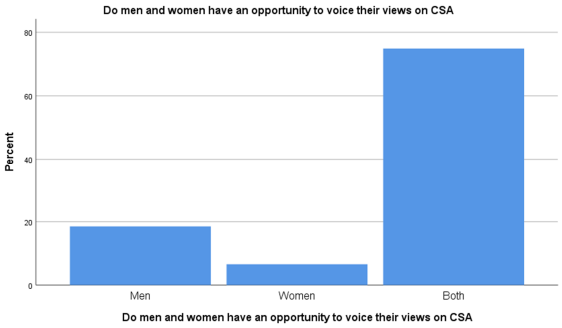


Fig. 11. Climate-smart agriculture awareness and voice of concerns.

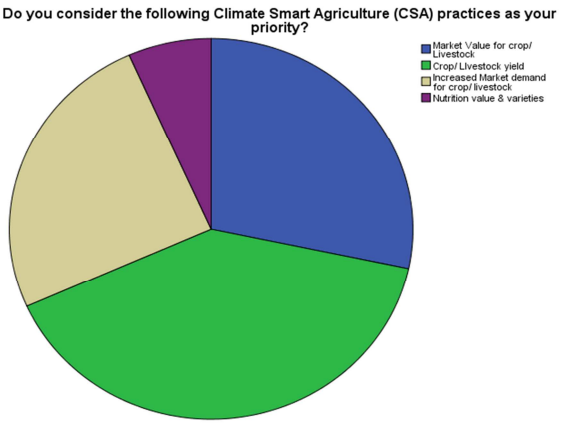


Fig. 12. Respondent's Climate Smart Agriculture prioritized practices.

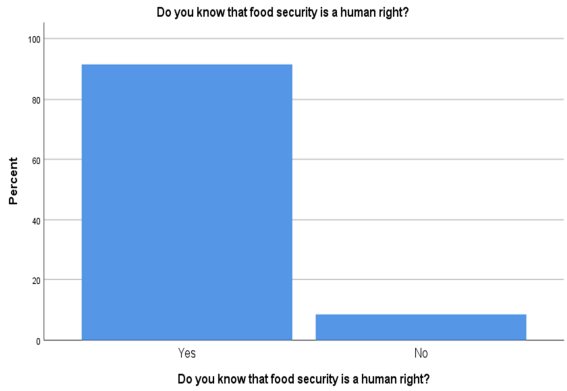


Fig. 13. Food security as a human right.

Land ownership and tenure

Arable land in Taita-Taveta consists about 205,500 ha or 12% of the entire land area. The typical farm size for moderate farmers is about 0.4, 1.3, and 4.8 ha in the higher ground, midlands, and plains, respectively. Over 90% of the population grows maize, 46% grow beans, and 31% cowpeas. The majority of the females are engaged in farming activities (CGTT, 2018).

According to the results of the study ownership of land is primarily held by men at 60.1%, family at 25.9%, followed by the community at 5.8%, women at 4.5%, and joint ownership at 3.7% (Fig. 14). This is in contrast with a report by CGTT, (2018) whose results stated that land is communally owned with 35% holding title deeds. Property use and manual labour pronouncements are agreed upon within each household (Wangui, 2003). This agrees with this study findings where 66.1% reported equal participation and decision-making pertaining to the use of land (Fig. 15).

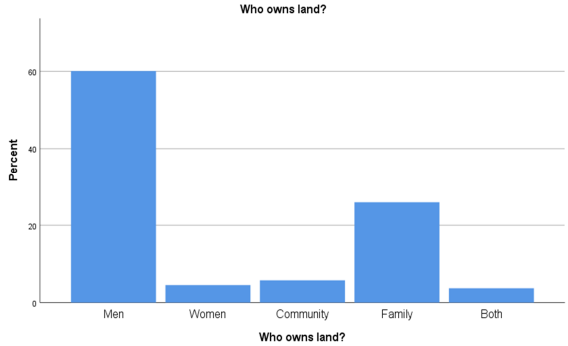


Fig. 14. Land ownership.

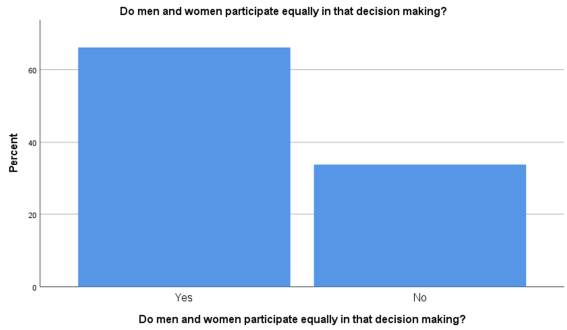


Fig. 15. Participation and decision making.

From the study, the keyword 'equally' used as a response to the open-ended question had the most tally drawing conclusions that the work is shared equally among the two genders. Other responses had a sentiment that Men would do the more strenuous tasks like tilling, clearing bushes, and herding (Fig. 16). Apart from the usual household chores, women were also involved in farming activities.

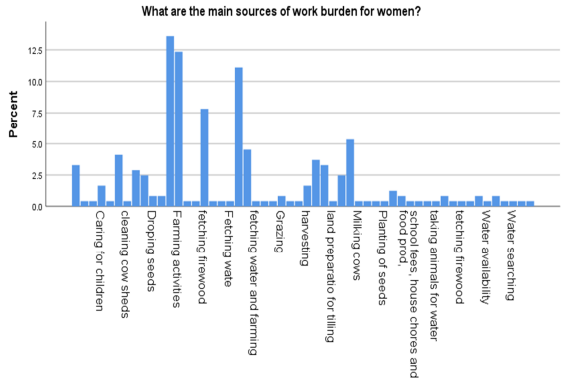


Fig. 16. Sources of work burden.

Social Cultural factors and effect of conflicts/political instability on food security in the county

The following social-cultural factors were measured and how they affect food availability and nourishment (Table 8-13). Alcohol and drug abuse, lack of access to land and gender roles are among the high negative impact activities cited as affecting food security. In their study, AWSC (2014) reported that drug and alcohol abuse was prevalent in Taita-Taveta County, which was primarily due to their lifestyle. When respondents were asked about the effect of conflicts and/or political instability, the keyword 'Negatively' was sighted as the opinion in the majority of the responses among other keywords in the open-ended

question such as reduced farming, activities, increased food prices and food scarcity.

Table 8. Drug/Alcohol abuse * Sub County Cross tabulation.

Count				
		Sub County		Total
		Voi	Taita	
Drug/Alcohol abuse	Negative Impact	119	124	243
Total		119	124	243

Table 9. Lack of access to land * Sub County Cross tabulation.

Count				
		Sub County		Total
		Voi	Taita	
Lack of access to land	Positive Impact	0	1	1
	Negative Impact	118	123	241
Total		118	124	242

Table 10. Gender roles * Sub County Cross tabulation.

Count				
		Sub County		Total
		Voi	Taita	
Gender roles	Positive Impact	45	53	98
	Negative Impact	70	71	141
	Total	115	124	239

Table 11. Lack of decision making * Sub County Cross tabulation.

Count				
		Sub County		
		Voi	Taita	Total
Lack of decision making	Positive impact	3	2	5
	Negative impact	114	122	236
Total		117	124	241

Table 12. Religious activities * Sub County Cross tabulation.

Count				
		Sub County		
		Voi	Taita	Total
Religious activities	Positive impact	106	116	222
	Negative impact	8	8	16
Total		114	124	238

Table 13. Welfare groups/Networking * Sub County Cross tabulation.

Count				
		Sub County		
		Voi	Taita	Total
Welfare groups/Networking	Positive impact	107	121	228
	Negative impact	11	3	14
Total		118	124	242

Conclusion

In this study factors affecting food security in Taita Taveta County were examined. The study shows evidence that climate change, inadequate rainfall and natural disasters are the major factors identified to cause food insecurity. Other factors reported are lack of access to land, inadequate government support, and socio-cultural factors. As a result, the effects of inadequate food lead to high cost of food, hunger and high food crisis. Other effects are crop failure and loss of livestock due to drought. Notable is the fact that majority of farmers do not have coping strategies during extreme weather events. However, a small proportion (about a third) of the farmers have adopted various methods to secure food for their families. Land ownership poses challenges, as the majority of the land is owned by men.

Recommendations

It is recommended that climate change effects and inadequate rainfall could be reduced by employing rigorous adaptation strategies like afforestation and reforestation, effective land-use changes, conservation agriculture and flood mitigation measures. There is a need to promote adoption of Climate-Smart Agriculture practices with the help of the National and County governments. Farmers should be encouraged to construct water pans and harvest flash floods for irrigation and storage. Land ownership issues cultural practices need to be addressed to allow women as food producers to make decisions on food production and where to produce it.

Abbreviations

Ksh.- Kenya Shillings
GHG- Green House Gases
IPC- Integrated Phase Classification

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