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Household Food Insecurity and Coping Strategies among Small Scale Farmers in Tharaka Central Division of Tharaka South District, Kenya

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Abstract: *Food insecurity is a major development problem that is caused by myriad of factors in the global, regional, national and local spheres of human life. Several efforts have been put in place to alleviate food insecurity globally, nationally and even locally. Despite these efforts, the situation continues to prevail and sometimes even increase in the contemporary human society. It is therefore imperative that food insecurity gets addressed appropriately. Small scale farmers play a vital role in food production especially through subsistent farming. However, their households are major casualties of food insecurity despite their efforts in food production. This paper is a report of an investigation of household food insecurity and coping strategies among small scale farmers in Tharaka Central Division of Tharaka South District, Kenya. The investigation revealed that low food production is precipitated by droughts, food consumption patterns are characterized by low household dietary diversity score - HDDS (83.3%) and acceptable household food consumption score - HFCS (50.7%). The main source of household food is market. Household food insecurity statuses were: 44.7% food insecure, 43.3% vulnerable to food insecurity and 12%, food secure. Reduction in size of meals was the major coping strategy and the coping strategies were not detrimental to livelihoods. There were significant positive relationships between sizes of farms and sizes of farmlands (r = 0.653, p=0.000); between (HFCS) and farmland size (r=0.299, p=0.0000); significant difference between maize expected and maize harvested (t=22.927, p=0.000). There was also significant positive association between HDDS and HFCS ($\chi 2=13.463$, df=4 and p=0.009), sources of maize and the statuses of household food insecurity ($\chi^2=160.895$, df= 6, p=0.000). Food insecurity has formed a vicious cycle in Tharaka. It is recommended that the small scale farmers' local capacity should be developed through community-based participatory actions; and the Government of Kenya (GOK), through the Ministry of Water and Irrigation should formulate irrigation policies and implement them in all ASAL areas to alleviate household food insecurity.*

1. INTRODUCTION

The World Food Summit of 1996 described food insecure households as those whose members do not have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Aiga & Dhur, 2006). Despite the right of every man, woman and child to be free from effects of food insecurity being declared during the World Food Conference of 1974 (GOK 2008a), these effects linger in the global society. Household food insecurity is one of the major catastrophes in the Sub-Saharan Africa. In Kenya 10 million persons and their households are highly food insecure, with 3.2 million food insecure persons living in arid and semi-arid lands (ASALs) of the country (WFP, 2009).

The Kenya Vision 2030 and the National Food Security and Nutrition Policy (NFSNP) stipulate that the Government of Kenya (GOK) has consistently emphasized on local food production as one of the means of alleviating household food insecurity (GOK, 2008; GOK, 2008b). However, despite the formulation of the strategic plans on that, household food insecurity continues to persist since there is marked reliance on relief supplies by the poor, and in Kenya, 53% of the people in rural areas are overall poor while 51% are food poor (GOK, 2008c).

Household food insecurity in the country is attributed to factors such as decline in agricultural productivity resulting from continuous land fragmentation. Most of the original large scale farms in Kenya have been sub-divided beyond economically sustainable agricultural production. As a result of the fragmentations, some 89% of the households in Kenya are living in less than 7.5 acres of land while 47 % live on farms less than 1.5 acres (Gitu, 2004).

Kenya looks towards achieving the Millennium Development Goals (MDGs) by 2015, such as alleviation of extreme poverty and hunger. In order for the country to achieve this, it should implement the MDG strategic plans to the grass root levels so as to alleviate household food insecurity too. Household food insecurity is a critical issue in Kenya because its magnitude is alarming; especially in ASALs that comprise of 88% of Kenya's land area (Gitu, 2004). Tharaka Central Division in Tharaka South District in Kenya is one such an ASAL area (GOK, 2009).

Small scale farmers are important players in alleviating household food insecurity through their subsistent own crop production. However, own crop production has not played a key role as the main source of household food in Tharaka (Smucker & Wisner, 2008). Food shortages due to high levels of household food insecurity in Tharaka predispose households to employ adverse coping strategies (GOK, 2009).

Not much has been documented on the status of household food production, household food consumption patterns, household sources of food, status of household food insecurity and coping strategies among small scale farmers in Tharaka Central Division. Due to the aforementioned observation, the study on household food insecurity and coping strategies among small scale farmers in Tharaka Central Division was deemed necessary.

The purpose of the study was to establish the status of household food insecurity and identify coping strategies among small scale farmers in Tharaka Central Division of Tharaka South District, Kenya. The specific objectives of the study were to: Establish the status of household food production, determine household food consumption patterns, establish sources of household food, establish the status of household food insecurity and identify coping strategies in the event of food shortage among the small scale farmers' households.

2. CONCEPTUAL FRAMEWORK

The conceptual framework is based on the World Food Program's (2006) Household Food Consumption Approach model that uses dietary diversity, food frequency and food sources as proxy indicators of household food insecurity.

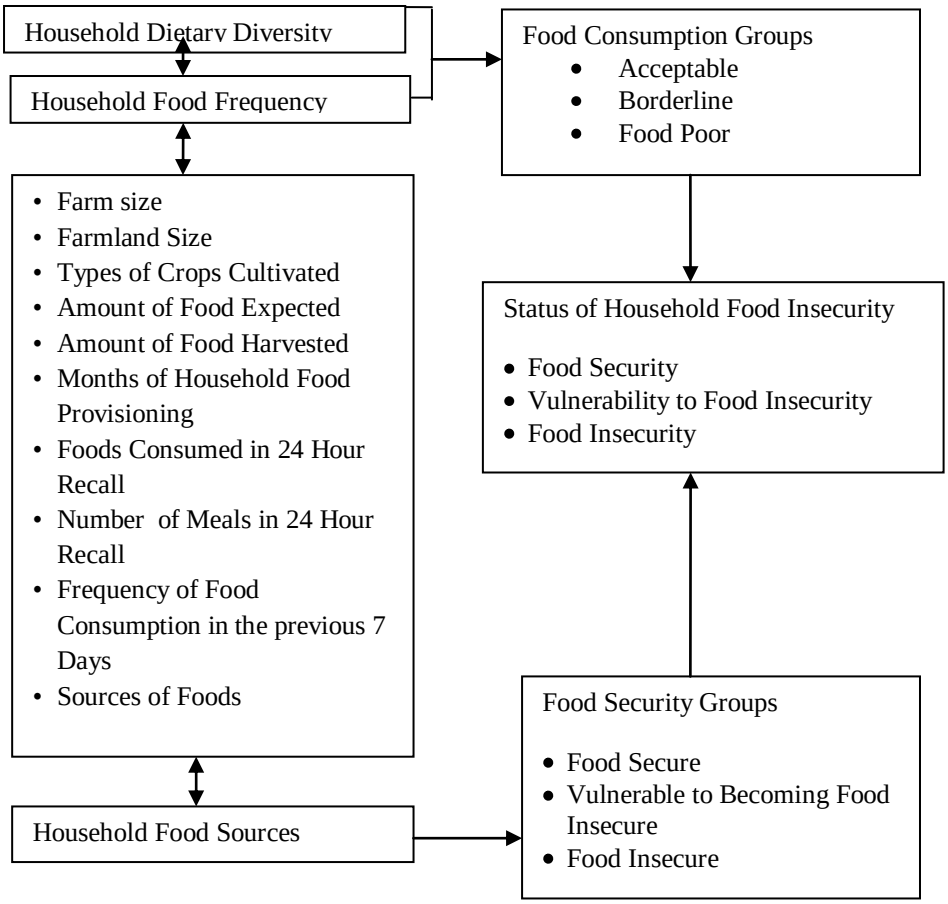

Fig1. *A Conceptual Model Illustrating Household Food Consumption Approach Adapted from WFP (2006)*

3. METHODOLOGY

Cross sectional analytical survey design was used for the study carried in March and April, 2011. Mugenda & Mugenda (2003) says the design enables a researcher to investigate an existing status of behaviour. It produced statistical information about the existing status of household food insecurity and coping strategies for analysis, which by Olsen & Marie (2004), asserts that the design allows the use of structured questionnaire and also produces statistical information for analysis.

The farm family households reflected the situation of food production. Respondents of the study were household heads and principal care givers. Household heads were the main respondents because of their knowledge about food production and land use; and caregivers gave information on food consumption and coping strategies.

The sample size of the study was 351 households in accordance with Sample Size Determination Table by Krejcie & Morgan (1970) at an alpha level 0.05 and a t value of 1.96 for a sample size derived from a population size of 4000 of categorical data (Bartlett et al, 2001). Tharaka Central Division was purposely identified out of five administrative divisions of Tharaka South District for the following reasons: drought resistant crops are cultivated in the area. Marimanti Town, the headquarters of Tharaka Central Division is a major food market and food source. Thirdly the area is centrally situated in the district thus would produce reliable data about household food insecurity from a central location. Simple random sampling was used to select five Sub-locations out of eight in the division making a total population of 2250. The formula below illustrates how the 351 households were systematically sampled.

$$K= N/n$$

$$6=2250/351$$

K=sampling interval, N=population size, n=sample size

The study employed three sets of data collection instruments: Interviewer-administered structured questionnaire, observation checklist and key informant interview guide. The reliability coefficient of the instruments was calculated using Cronbach's Coefficient Alpha formula:

$$\underline{N/ (N-1) (\text{Total Variance} – \text{Sum of individual variance})}/\text{Total variance}$$

$$14/ (14-1) (281.9-30.359)/281.9=0.960$$

N= number of questions in the instrument

A reliability coefficient of 0.960 was obtained. A reliability coefficient of 0.80 or more implies that the items correlate well among themselves and also there is a high degree of reliability of the data (Yu, 2010). Content validity was established by seeking the expertise of the study supervisors. During the research, the respondents were visited in their homes for interview sessions. Observations were done after the interview sessions. The researcher booked appointments with the area ALRMP II Manager and the area Agricultural Extension Officer to conduct key informant interviews with them.

Quantitative data collected was analyzed using the computer software programme Statistical Package for Social Sciences (SPSS) Version 11.5 to make the analysis easier and to obtain accurate results. Descriptive statistics were used to describe and organize the data. Frequency tables, pie charts, bar graphs, cross-tabulation and line graph were used to present the findings. Pearson Product Moment Correlation tests were used to determine the magnitude and direction of relationships between non-categorical variables: sizes of farms and farmland sizes; statuses of HFCS and household size; and HFCS and farmland sizes. T test was done to establish whether a significant difference existed between the amount of food expected and amount harvested. Chi square tests were done to establish whether significant associations existed between HDDS and HFCS; and between sources of maize and statuses of household food insecurity.

4. FINDINGS AND DISCUSSION

The presentation and discussion of the findings include demographic characteristics of the households, household food production, household food consumption patterns, sources of

household food, household food insecurity status, and household coping strategies in the event of food shortage among the small scale farmers.

5. HOUSEHOLD DEMOGRAPHIC INFORMATION

Sizes of the respondents' households are presented as follows (Table 1).

Table1. *Household Size*

Household Size	Frequency	Percentage
1	6	1.7
2	4	1.1
3	50	14.2
4	85	24.2
5	100	28.5
6	43	12.3
7	19	5.4
8	37	10.5
9	3	0.9
10	4	1.1
Total	351	100

The total number of persons in the 351 households was 1758 with a mean of 5. Majority of households (69.7%) had 5 or less members. According to Alem and Shumiye (2007), a shift to smaller family size (smaller than the sample mean family size) decreases the probability of food insecurity. Following this assertion, majority of households would be deemed to be less food insecure because majority had 5 or less than the mean members. The finding on household size is comparable (although slightly higher) with that of Kenya Demographic and Health Survey (KDHS), 2008 – 2009 which reports that the mean size of a Kenyan household is 4.2 persons (GOK, 2010b).

6. HOUSEHOLD MAIN SOURCE OF LIVELIHOOD

The small scale farmer households' sources of livelihood are as shown in (Table 2).

Table2. *Household Main Source of Livelihood*

Source of Livelihood	Frequency	Percentage
Agriculture	263	75.1
Agro-pastoralism	15	4.3
Formal Employment	54	15.4
Casual Labour	17	4.9
Others	2	0.3
Total	351	100

Agriculture (75.1%) was the main source of livelihood for the households, followed by formal employment at 15.4%. The finding is also comparable with that of Tharaka District Development Plan 2008-2012 Report, which stipulates that agriculture is the major mainstay of the economy and livelihood of the people in Tharaka District and, it is estimated that 80% of the population depends on farming (GOK, 2008b).

7. HOUSEHOLD FOOD PRODUCTION

Establishing household food production - household sizes of farmlands, types of crops cultivated in the two rainy seasons of 2010, amount of harvests and months of household food provisioning was as shown hereunder**.**

8. SIZES OF HOUSEHOLD FARMS AND FARMLANDS

The household heads were asked to state sizes of their farms and farmlands and provided the following information. Majority of respondents (27.4%) possessed 2 acres of farm. The mean household farm size was 3.05 acres. The farm holdings were utilized as farmlands for crop cultivation and as pasture land for livestock grazing. It is estimated that 80% and 60% of Tharaka population draws their livelihood from agriculture and livestock keeping respectively (GOK, 2009). These findings are in agreement with a study by Gitu (2004) which observed that due to

continued land fragmentations in Kenya, some 89% of the households in the country are living in less than 7.5 acres of farms, while 47% of households live on less than 1.5 acres. This is comparable with the results of the study which show all respondents had farms of sizes 7 or less acres, and some 44.7% of households had 2 or less acres of land.

Slightly more than half of households (50.2%) possessed 2 acres of farmland, while 38.7% owned 1 or less acre of farmland. The mean size of household farmlands was 1.62 acres. Although there were large potential cultivation lands, it was found that the respondents did not want to cultivate vast farmlands which they were not capable of controlling weed. According to Alem and Shumiye (2007), small farmland size increases vulnerability to household food insecurity because the smaller the farmland size, the smaller the volume of crop output (upon holding the rest of variables constant). A 2 tailed Pearson Moment correlation test showed a strong positive correlation between sizes of farms and sizes of farmlands of $r = 0.653$ and $p=0.000$. This implies that the more farm a household owned, the larger its farmland.

9. TYPES OF CROPS CULTIVATED IN MARCH/MAY AND OCTOBER/DECEMBER, 2010

Food crops were the major crops cultivated among the households at 95% of all crop output. Cereals provided staple food while pulses were for consumption as well for sale. Rose (2008) says production of staple food crops contribute to household food availability; since when foodstuff is available in a household, it increases the chances of a household being food secure. The types of food crops cultivated by households were similar with those listed in GOK (2009) as being grown in Tharaka (maize, sorghum, millet, green grams, pigeon peas, cowpeas).

The October/December 2010 rain season was the most significant for analysis of food production because it was highly reflective of the existing status of household food availability in March and April, 2011 when the study was carried out. In the season, food crop production was much lower than March/May 2010 rain season. Maize and millet outputs were at a mean of 91 kg and 78 kg respectively as opposed to the previous season's 270 kg and 218 kg respectively. The low crop outputs were attributable to erratic rains that were experienced. This reflected a pathetic state of food security, despite the fact that ordinarily it was supposed to be the season with the heaviest rainfall since it is the long rain season in the study area. The finding is comparable with that of Makueni County (which is also ASAL area) whose households had harvested a mean of 89 kg of maize during the same season (Scribd, 2011).

The t test on food expected and harvested in October/December season showed significant differences of 22.927, 28.832, 5.110, 19.029, 12.341on maize, millet, sorghum, green grams and cowpeas respectively at a p value of 0.000. There was a decline in the amount of harvest during the season in Makueni County also as was compared with the previous season (Scribd, 2011). Studies show that declines in harvests bring about food shortages thus predispose households into vulnerability to food insecurity

10. MONTHS OF HOUSEHOLD FOOD PROVISIONING

According to FANTA (2006), months of household food provisioning are characterized by adequate or inadequate food provisioning (GOK, 2008c). Many households had enough food provisioning during the months of June to August in the previous year, at 40.5%. The months of enough food provisioning were immediate to post-harvest seasons. The respondents said harvesting is done in June for March/May seasons. This finding is supportable by GOK (2008d) that harvests for short rains are done in June.

The respondents mentioned different intervals in months of inadequate food provisioning. October to January had the most inadequate food provisioning at 30.2%. March to April (also combined with other months) was mentioned adversely at 34.8%. The provisioning was compromised because the months were too far from post-harvest seasons. The findings are supported by the report of Tharaka District Development Plan 2008-2012 that had shown persistent food shortages in October to December due to prolonged dry spells beginning in June which are months of no cultivation of food (GOK, 2009).

11. HOUSEHOLD FOOD CONSUMPTION PATTERNS

Household food consumption patterns were investigated by asking

12. HOUSEHOLD DIETARY DIVERSITY OF 24 HOUR RECALL

The study adopted 12 food groups proposed by FAO, WHO and FANTA (2006) in calculating HDDS: cereals, roots and tubers, vegetables, fruits, meat-poultry-and-offal, eggs, fish and sea food, pulses-legumes-and-nuts, milk and milk products, oil/fats, sugar and honey, miscellaneous (GOK, 2008c). HDDS of 24 hour recall 12 food groups are thus: 3 or less food groups, 4 to 5 food groups and 6 or more food groups are classified as lowest dietary diversity, medium dietary diversity and high dietary diversity. Household principal caregivers were respondents.

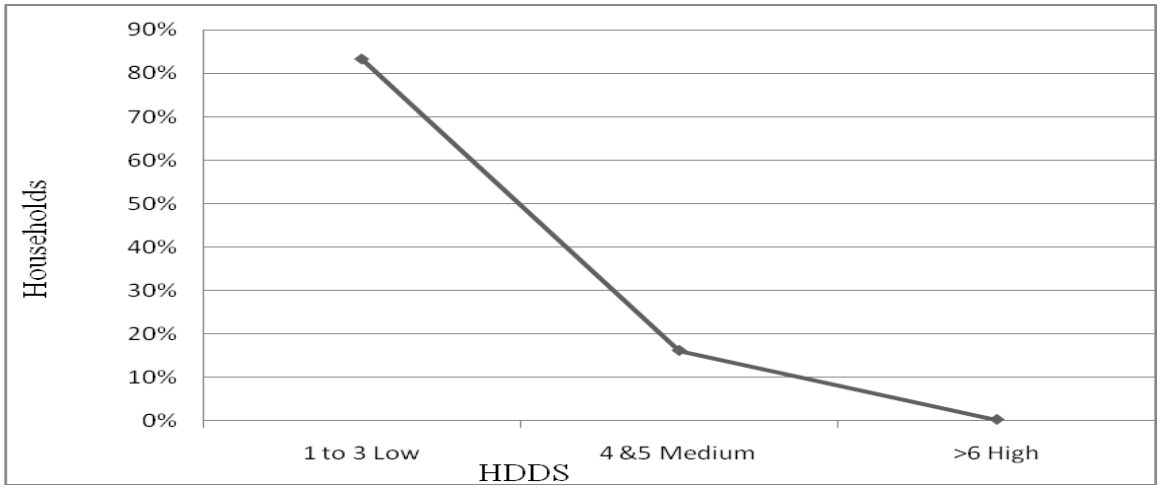

Fig2. *Household Dietary Diversity of 24 Hour Recall*

The HDDS of the previous 24 hours was generally low with 83.3% of households having consumed 1 to 3 food groups, 16.2% had consumed medium dietary diversity of 4 and 5 food groups and 0.3% more than 5 food groups which was high dietary diversity according to HDDS thresholds. The predominant low HDDS was attributed to food inadequacy in the period of the study.

13. THE 7 DAY FOOD FREQUENCY

The 7 day food frequency of the study adopted the quantitative aspect of food consumption pattern by IFPRI (2008) that uses 8 food groups - main staples, pulses, vegetables, fruit, meat and fish, milk, sugar and oil. The principal care givers were asked how many times their households had consumed food items in the previous 7 days. Maize was widely consumed by the majority of households (96.6%) during the past one week. This was because it was accessible through food aid (74.4% consumed it 5 or more times). Maize was the main food item for food relief because it is the main staple food in Kenya and the WFP, GOK and other NGOs offered it as the main food item for food aid. Kaloi, Tayebwa & Bashaasha (2005) too observe that maize is the main staple food of Kenya and averages over 80% of total cereals consumed and 41% source of the daily calorie only 30.9% of households indicated that it was adequate for their household consumption. Pulses, milk (in tea/porridge) and millet were also widely consumed by 94.6%, 54.4% and 54.1% of households respectively. Many households said that pulses, milk and millet consumptions were inadequate at 89.5%, 49.3% and 53.8% respectively.

Main vegetables consumed among the households were cowpea leaves and cabbage by 35.1% and 30.2% of households respectively. Some households (35.1%) and 19.9% said the vegetables were not adequate. Main fruits consumed were banana and mango by 38.5% and 14.8% of households respectively. Bananas either from outside or within are the most common and affordable fruits in Tharaka market. Inadequate quantities of food predispose household members to nutritional deficiencies, which are said to be prevalent in Kenya as energy, protein, iron and vitamin A deficiencies (GOK, 2008c).

14. HOUSEHOLD FOOD CONSUMPTION SCORE (HFCS)

Household Food Consumption Score (HFCS) is a frequency-weighted HDDS (IFPRI, 2008). The HFCS is calculated using the frequency of consumption of 8 different food groups consumed: main staples, pulses, vegetables, fruits, meat and fish, milk, sugar, oil. HFCS is measured using standard 7 day food data by classifying food items into food groups; summing the consumption frequencies of food items within the same group (any consumption frequency greater than 7 is recoded as 7; multiplying the value obtained for each food group by its weight. Thus 2, 3, 1, 1, 4, 4, 0.5 and 0.5 are weights for main staples (cereals, roots and tubers), pulses, vegetables, fruit, meat/fish/eggs, milk, sugar and fat/oil respectively. Then summing the weighted food group scores is done, and finally recoding the variable HFCS from a continuous variable into a categorical variable for the food consumption groups using appropriate thresholds: 0-28 food poor, 28.5-42 borderline and above 42 acceptable, according to (WFP, 2007; IFPRI, 2008). The limitation of the findings on HFCS for this study was that, weighting of food groups was done without considering their adequacy of food portions.

Table3. *HFCS*

Profile	HFCS	Frequency	Percentage
Poor	0-28	93	26.5
Borderline	28.5-42	80	22.8
Acceptable	>42	178	50.7
Total		351	100

The findings indicate that 26.5% of households had poor HFCS of 0 to 28 and majority (50.7%) had acceptable HFCS of above 42 in the previous 7 days of household food consumption. This means that the overall HFCS was relatively good. The HFCS was acceptable at a average, which was attributable to high consumption of cereals and pulses in the 7 days. These results are supportable in Economic Review of Agriculture which showed upward consumption trend of world cereals from 2006/07 to 2009/10 (GOK, 2010c).

Pearson Correlation test showed significant relationship between borderline HFCS and farmland size of r=0.533 at a p value of 0.000, thus the larger the farmland size of a household, the better was their HFCS. It would be said that those at borderline were the farm family household whose farm food stock had remained in their stores as overall food stock was depleting. There was no significant relationship between acceptable HFCS and farmland size. This too would be attributed to food relief aid that was provided to some farm families ultimately increasing their food access and consumption frequency. An overall 2 tailed Pearson correlation test was done on HFCS and farmland size, and the correlation obtained was r=0.299 at a p=0.000..

A 2 tailed Pearson correlation test on the relationships between the statuses of HFCS and household size revealed different coefficients. The relationship between poor HFCS and household size was not significant. The correlation between borderline HFCS and household size revealed a positive relationship of r=0.491 at a p=0.000. While acceptable HFCS revealed a negative correlation of r=0.313 at p=0.000. The relationship between borderline and household size was positively significant implying that the more persons in a household, the more vulnerable to food insecurity it was. An overall 2 tailed Pearson correlation was also carried out on HFCS and household size and it revealed a negative correlation of r=-0.476 at a p value of 0.000; meaning that the more persons a household had, the poorer the status of HFCS. These findings were in corroboration with Alem and Shumiye (2007) who observe that small family size correlates with acceptable food consumption.

15. MAIN SOURCES OF FOOD ITEMS

The respondent was the principal care giver on main sources of food items in a household as presented in (Table 4).

The findings show that the households' main source of all food items was from markets as illustrated in Table 4. Maize was mainly sourced from markets at 36.7% and from free relief food at 35.9%; and it was the main cereal consumed (96.6%) among the households. Millet was mainly sourced from markets at 30.2% and own production at 19.1%. Sourcing cereals mainly from

markets was attributed to depletion of cereal stocks from stores due to a period of non crop production from January and February. The findings are further supported by the result of probing respondents on their main source of all their household food and 86.9% said it was markets. This implies that the households did not consume sufficient food from their own production, as Mjonono, et al (2009) say that, small scale farmers major food source is supposed to be own food production.

Table4. *Main Sources of Food Items*

Food Type	Total Consumption by Households (%)	Main Sources of Food Items (%)			
		Market	Own Production	Gifts from relatives, neighbours and friends	Free relief food
Pulses	94.6	50.1	34.5	0	10.0
Honey/sugar	49.6	49.6	0	0	0
Banana	38.5	38.5	0	0	0
Maize	96.6	36.7	18.3	5.7	35.9
Rice	31.6	31.6		0	0
Millet	54.1	30.2	19.1	4.8	0
Cabbage	30.2	30.2	0	0	0
Cowpeas leaves	35.1	30.2	4.9	0	0
Fats/oils	50.1	25.4	0	0	24.7
Wheat	25.4	25.1	0.3	0	0
Red meat	15.1	15.1	0	0	0
Finger millet	19.9	10.0	10.0	0	0
Milk	54.4	9.7	44.7	0	0
Sorghum	15.1	5.1	10.0	0	0
Eggs	20.0	5.1	14.8	0	0
Poultry meat	9.7	4.8	4.8	0	0
Fish	9.6	4.8	4.8	0	0
Kales	4.9	4.8	0	0	0
Mango	14.8	4.8	5.2	4.8	0

These findings are divergent from Kaloi, et al (2005) and Gitu (2004) points of view that much of the food consumed in rural households in Kenya is obtained from the farm and very little is purchased from the market and, on the average 30% of the food consumed by rural households is purchased while 70% is derived from own farm production. This contradiction is partly due to the seasonality of the study (the far flung post harvest period) and also because there had been erratic rains during the preceding rain season. However, the findings tend to corroborate with the findings about Makueni County in April 2011 that showed 64.5% of households' main source of food was market (Scribd, 2011). Food consumption and food sources are likely to vary depending on the proximity of the harvest (Aiga & Dhur, 2006).

16. HOUSEHOLD FOOD INSECURITY BY HDDS AND HFCS

The findings on household food insecurity by cross-tabulating HDDS and HFCS were as shown (Table 5).

The households that had low HDDS and poor HFCS were 85, low HDDS/borderline HFCS were 72. The cut offs for the household food insecure households was determined by adding the frequency (n=85) and frequency (n=72) to get n=157 which is, 44.7% of households classified as food poor. Those that had low HDDS/acceptable HFCS were 136, medium HDDS/poor HFCS were 8 and medium HDDS/borderline HFCS were 8. These frequencies were summed up and their percentage calculated to establish households' vulnerability to food insecurity (borderline). The households at borderline were 43.3%. The households that had medium HDDS and acceptable HFCS were 41. Neither did any household have high HDDS and poor HFCS, nor high HDDS and borderline HFCS and only one household had high HDDS and acceptable HFCS.

Frequency (n=41) and frequency (n=1) were summed up to get n=42. Therefore 42 (12%) households' food security was acceptable.

Table5. *Cross-tabulation of HDDS and HFCS*

% of Households			**Categories of HFCS**			
			Poor = 0 – 28	**Borderline = 28.5 – 42**	**Acceptable= ≥42**	**Total**
Categories of HDDS	**Low = ≤3**	Frequency HDDS HFCS	85 29% 91.4%	72 24.6% 90%	136 46.4% 76.4%	293 100% 83.5%
	Medium = 4 &5	Frequency HDDS HFCS	8 14% 8.6%	8 14% 10%	41 71.9% 23%	57 100% 16.2%
	High = ≥6	Frequency HDDS HFCS	0 0% 0%	0 0% 0%	1 100% 0.6%	1 100% 0.3%
	Total	Frequency HDDS HFCS	93 26.5% 100%	80 22.8% 100%	178 50.7% 100%	351 100% 100%

$\chi 2=13.463$, df =4 and p=0.009.

44.7%=Food Insecure | 43.3%=Vulnerable to Food Insecurity | 12= Food Secure

The null hypothesis stating that there were no significant association between HDDS and HFCS at a significant level of 0.05 was tested by carrying out 2 tailed Chi square test and it showed a significant association between HDDS and HFCS of χ^2=13.463, df=4 and p=0.009; therefore the null hypothesis was rejected. This meant that the higher the HDDS, the more acceptable the HFCS. It is ordinary to expect that households with acceptable HFCS would also have high and medium HDDS since both show increasing trends; which is supportable by IFPRI (2008) assertion that HFCS is a frequency-weighted HDDS.

The analysis of household food insecurity status was in accordance with an analysis by WFP's Humanitarian Practice Network's study carried out in Darfur in 2005 for emergency food security and nutrition assessment that first classified households into three food consumption groups ('acceptable', 'borderline' and 'poor') according to the diversity of the diet and consumption frequency (Aiga & Dhur, 2006). The classification of the households in the study area according to status of household food insecurity was thus: 44.7% food poor, 43.3% borderline food security and 12% acceptable food security. This translates into 44.7% households were food insecure, 43.3% were vulnerable to food insecurity while 12% were food secure according to WFP (2006). Tharaka South District is classified as moderately food insecure by Kenya Food Security Update (2009).

17. Statuses of Household Food Insecurity and Sources of Maize

The interaction between the statuses of household food insecurity and sources of maize were established by cross-tabulating the variables (Table 6).

Maize was selected as an indicator for sources of food because it was the main staple food among the small scale farmers' households. Majority of food insecure households (n=106) sourced maize from free relief food. This category received food aid because they were not able to afford to purchase maize from the market. Relief food assistance is ordinarily given to vulnerable and poor populations. This proposition is supported by (GOK, 2008c) which stipulates that limited accessibility of food by food insecure households is linked to poverty (whereby about half of the Kenyan population fall below the poverty line), and inadequate incomes coupled with low employment rates.

Majority of households vulnerable to food insecurity sourced their maize from market (n=69), while the main source of maize for the food secure households was own production (n=20) and the market (n=19). The former had their maize from markets partly because their economic status was not as pathetic as those in food insecurity category while the latter accessed food in their

household stores as their farm maize stocks were still available in the stores (had not completely depleted). Mjonono, et al (2009) says that low crop production reduces the availability of food for consumption and exposes farmers into getting food from other sources, such as purchases; which is comparable to this finding.

Table6. *Cross-tabulation of statuses of household food insecurity and sources of maize*

Status of Food Insecurity		Sources of Maize				
		Market	Own Production	Gifts from Relatives and Friend	Free Relief Food	Total
Food Insecure	Frequency Percentage	48 30.6%	3 1.9%	0 0%	106 67.5%	157 100%
Vulnerable to Food Insecurity	Frequency Percentage	69 45.4%	46 30.3%	20 13.2%	17 11.2%	152 100%
Food Secure	Frequency Percentage	19 45.2%	20 47.6%	0 0%	3 7.1%	42 100%
Total	Frequency Percentage	136 38.7%	69 19.7	20 5.7	126 35.9%	351 100%

$\chi 2=160.895$, df =6, p=0.000

A 2 tailed Chi square test was carried out to test the null hypothesis stating that there was no significant association between sources of maize and the status of household food insecurity at a significant level of 0.05 and it showed significant relationship between sources of maize and the status of household food insecurity of $\chi^2=160.895$, df= 6 and p=0.000. Thus the null hypothesis was rejected.

18. COPING STRATEGIES COMMON AMONG THE HOUSEHOLDS

Assessing the magnitude of a coping strategy entails measuring the frequencies of the strategy by ascribing weights, summing up the weights and then putting the result as a score (Maxwell, 2008). Weights 0, 1, 2, 3 and 4 were ascribed for this study as never, hardly, sometimes, often and always respectively. The weights were multiplied by the percentage of their frequencies and then were summed up to get scores of every coping strategy.

Reduction in size of meals had the highest score of 270.5. It was followed by reduction in the number of meals per day at 259.5 and consumption of immature crop at 170.3. Reduction in size of meals was to ensure small quantities of food available for consumption were distributed among each and every member of the household while reduction in the number of meals prolonged the duration food stock availability thus decreasing the probability of quick food stock depletion.

Table7. *Coping Strategies Common among the Households*

Coping Strategy (in the previous 7 days)	Relative Frequency %					Total Weights
	Never	Hardly	Sometimes	Often	Always	
Reduction in size of meals	0	4.9	39.7	35.4	20	270.5
Reduction in the number of meals per day	0.3	9.7	35	40.2	14.8	259.5
Consume immature crop	10	20	59.7	10.3	0	170.3
Restrict consumption of adults to allow more for children	29.4	10.3	45.4	14.9	0	145.8
Swapped consumption to less preferred or cheaper foods	25.4	24.6	39.4	0.6	10	145.2
Borrow food from a friend or relative	14.9	34	51.1	0	0	136.2
Consume normal wild food	24.9	25.1	45.1	4.9	0	130
Sale of milking livestock	40.3	15.1	30	14.6	0	118.9
Sale of charcoal and/or firewood	55.9	19.3	20.0	4.8	0	73.7

Some of these coping strategies are similar with those identified by Wiley (2007) among Tharaka District households, which were: seeking assistance for food from relatives and neighbours, sale of livestock and collecting bush food by poor households. The findings are implicative that small

scale farmers in Tharaka Central Division relied on a variety of coping strategies to counter their household food insecurity; which is in agreement that increased reliance on coping strategies is associated with lower food availability (Mjonono, et al., 2009).

19. CONCLUSION AND RECOMMENDATIONS

Household food production among small scale farmers in Tharaka Central Division were characterized by small farmland sizes influenced by high cost of production such as the cost of weed control. It is of importance that agricultural extension officers in the area create awareness on the need to use herbicides that kill weeds in large scale rather than over relying on manual methods of weed control. This will enable cultivation of bigger portions of farmlands for larger crop production.

The following policy recommendations are suggested. Household food consumption patterns were influenced by lack of a variety of food items for consumption. Good market infrastructure for cash crops that thrive in the area should be made available by the GOK and the private sector through constructing cotton ginneries and ensuring good market capital for cotton, sunflower and castor. The government should also supply the farmers with cash crop seeds to enable them grow the crops. In this way, the households would be economically empowered to purchase variety of food items for improved HDDS and HFCS.

Among the recommendations for practice are that the households in collaboration with the government and the local NGOs should plan, source and implement irrigation projects so as to improve household crop outputs when rains are erratic. This would mitigate crop loss, reduce over reliance on food aid and minimize the use of coping strategies during food shortages. The main source of food among the small scale farmers was market while own food production played a secondary role. The small scale farmers should invest in education to improve their literacy levels and also access formal employment for improved capacity and better food purchasing powers from the markets. This is because majority of them had no education or were of primary level and only a few whose livelihood source was employment. Household food insecurity prevalence among the small scale farmers was found to be high. To alleviate the situation, development of local capacity through community-based participatory actions is suggested as a means of improving program outcomes as well as promoting human rights of household food security. Apart from providing food relief responses, the GOK together with food relief stakeholders should lay out sustainable food policies, implement them to the letter and conduct capacity building with the small scale farmers through arranging and conducting training seminars and sessions to equip the community with appropriate household food security information.

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