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Changing Feeding Routines as a Strategy for Coping with Drought in Rural Kenya

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Abstract: ***Drought is a recurrent phenomenon in Kenya occurring every year in the arid and semi-arid lands (ASALs) and resulting in chronic food shortages. Nevertheless, the problem of food shortage is not only a preserve of the ASALs but also occur in humid regions. Nyairoko sub location in Nyandarua County, Kenya has a sub humid climate. Although the sub location is largely food self-sufficient, occasional droughts cause food shortages. Failure of the October, November and December (OND) short rains in 2016 and delayed onset of the March, April and May (MAM) long rains led to poor crop performance. The drought was accompanied by frost, moderate winds and pests. The consequence was severe food shortage in 2017. To cope with food shortage, households changed their feeding routines depending on availability of food. Three changes in feeding routines namely removal or skipping of some of the meals, reducing the size of food ration and changes in meal types were observed. Whereas the first two changes took place simultaneously, the latter was the last to be effected. Although this strategy lengthened the period of food availability, it resulted in poor health of the members of households due to the small portion of food consumed as a result of scarcity and reduced appetite for the available alternative food.***

Keywords: Drought, food shortage, coping strategy, feeding routine

1. Introduction

Drought is the single most cause of hunger and famine representing a persistent threat to world food security. Unfortunately, droughts are increasing not only in frequency and severity but also in spatial extent [1]. With climate change, the drought situations are getting worse. This is exacerbating human suffering. To subsist, resident of drought prone area have developed a number of drought coping and adaptation strategies. These strategies are responses to production, consumption, livestock management, food storage and income generating assets with external assistance being supplementary strategies [2]. Changing feeding routines is one of the strategies of response to consumption. This strategy varies from one household to the other depending on the level of household vulnerability. [3] identifies a number of changes in feeding routines during droughts. These includes skipping some meals, reduction of food portion served, eating wild fruits, vegetable and other foods, skipping meals for the whole day and adults skipping meals so that children could eat.

The problem of food insecurity is not a new phenomenon in Kenya. [4] observes that persistent droughts in recent years have been the cause of deteriorating ability to be self-food sufficient in Kenya. The severity of effects of droughts varies depending on (i) drought characteristics and (ii) households' vulnerability. As households' vulnerability increases so does the severity of the effects. Whereas there are a myriad ways of coping with droughts, [5] observes that choices available to poor households are limited, hence the most vulnerable. Without any form of government assistance, traditional strategies have been identified as more appropriate and relevant to vulnerable households [6]. One of the traditional coping strategies adopted is changing feeding routines. In Kinango Sub-County in Kwale County, Kenya, [7] observe changes in feeding routines during droughts. For instance, reduction in the number of meals per day was the most common practice for the majority of the households in Kinango. Due to less frequency of droughts, like in most sub-humid to humid areas in Kenya, households in Nyairoko sub location cope with droughts without any form of government assistance. Changing feeding routines is one of the most adopted strategies for coping with drought that this paper aims to examine.

2. Objectives of the Study

This study aimed at investigating the changes in feeding routines as a strategy for coping with drought in rural Kenya. Specifically, the study examined the following:

1) The characteristics of the 2017 drought.
2) The source of food during the 2017 drought.
3) The effects of the 2017 drought on food production.
4) Coping with food shortage during the 2017 drought.

3. Methodology and Study Area

Data was collected in Nyairoko sub-location in Nyandarua County, Kenya. It is located at latitude 0° 27' 37" south and longitude 36° 23' 14" east at an elevation of 1,992 meters above sea level. A total of 82 households were purposively sampled. Out of the sampled households, 50 were households who owned land and depended on farming only, 20 were households who lived in rented houses and depended on leased land for farming and 12 were households who owned land and had alternative income in addition to farming. Data was collected using structured interviews.

Nyairoko sub location has a sub-humid to humid climate with annual rainfall averaging at 978 mm. The mean annual minimum and maximum temperatures are 9° and 26° Celsius. A study by [8] shows a gradual increase mean annual rainfall. The short rains that occur in October, November and December (OND) season have recorded a slight increase while the long rains in March, April and May (MAM) have

recorded a slight decline between 1999 and 2009. Analysis of Coefficient of Variation CV) shows a high annual rainfall variation of 23.3% during this period. The climate is favourable for dairy farming and horticultural production. Irish potato is the main food and cash crop in the area. Other crops gown include: peas, cabbages, kales, and maize. However, these crops are grown in small quantities. Dairy farming is practiced largely for commercial purpose though at a small scale. Whereas rainfall is the key climatic parameter that determines performance of crops, the role of temperature in crop production cannot be ignored. The low night temperature in the study area causes freeze damage to crops and particularly to potatoes. This phenomenon mostly occurs in January and February when the area experience dry periods with very cold nights but it can also occur in any other time of the year.

With good climate and substantial land sizes of over 2.02 Ha (5 acres), households in the study area are largely food self-sufficient. The staple food in Nyairoko Sub location is potatoes. Good potatoes production translates not only to food sufficiency among the households but also a viable income source. Thus, about 90% of cultivated land is under potatoes. [8] observes an increasing trend in annual and seasonal potatoes production. The increase in production is majorly due to expansion of acreage under the crop. More new farms are put under potatoes production. However, occasional prolonged dry spells and, in some instances very wet seasons, causes food shortages. Heavy rainfall coupled with low temperatures leads to freeze damages on crops and/or rotting due to waterlogging. Nevertheless, the most common cause of food shortages is drought.

4. Results and Discussion

4.1 The 2017 Drought

The 2017 drought experienced in Nyairoko Sub-location was exceptionally severe due to the acute food shortage and income, a phenomenon which is rare in the area. Households regarded it as the worst in the last ten years. The drought was characterized by a continuous dry spell of six months spanning from November 2016 to April 2017. The drought begun after the 2016 short rains (OND) failed. Subsequently, the 2017 long rains (MAM) delayed until May. The severity of the drought was exacerbated by occasional frost and moderate winds and pests. The months of January and February 2017 were characterized by occasional frost and moderate winds that accelerated the rate of drying of crops and plant matter including stinging nettles (*Urtica dioica*) and pasture for livestock. The dry condition led to invasion of potato crop by white grub (*Phyllophaga spp*), wireworms (*Coleoptera, Elateridae*) and potato cut worms (*Agrotis ypsilon*) pests in all cultivated farms. The severity of the invasion increased with increasing in drought intensity. The white grubs, wireworms and cut worms drilled several holes into the potato tubers. Where infestation was high, the tubers started to rot rendering them unfit for consumption. Mild to moderate infestation led to wastage of affected parts during preparation of meals and also market value of such tubers is very much reduced. In addition, the wireworms and cut worms fed on the young crop sprouts by cutting their stems, pulling all parts of the plant into the ground and consuming them.

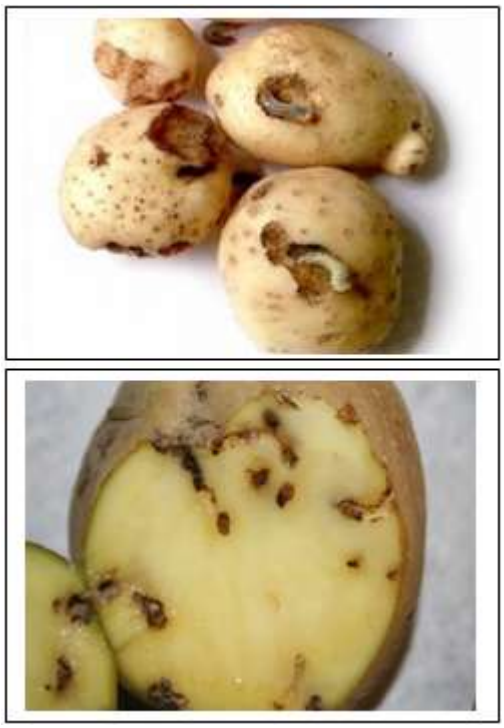

Figure 1: Potatoes destroyed by wireworms and white grabs

4.2 Source of Food in Nyairoko Sub Location

Household depend on food from the farms. The main food crop is potatoes followed by maize. While potatoes are grown for both commercial and subsistence purposes, maize is grown largely for domestic consumption. There are two main growing seasons for potatoes and one for maize. These are MAM and OND for potatoes and MAM for maize. The main potato harvests are obtained from end July to September and from end of December to February. However, due to the sub humid climate of the area, different households plant potatoes in between the main seasons depending on rainfall performance, availability of seeds and other inputs. This makes potatoes available throughout the year. Maize crops are harvested from January through February. Other food crops include cabbages and kales which are grown purely for domestic consumption. Thus, the common type of meals to nearly all households was kitoweo (a mixture of maize, beans and potatoes) which was sometimes interchanged with ugali (a form of thickened porridge).

At the beginning of the 2017 drought, households relied on harvests obtained from 2016 seasons. Potatoes were harvested between December 2016 and January 2017 depending on the planting date. Due to the perishability of potatoes, the harvest lasts for a maximum of one month. Maize planted during the 2016 MAM season was harvested between January and February 2017. The maize harvest ranged between 20kg and 1,350kgs per household.

Food shortage is a rare phenomenon in the sub humid Nyairoko sub location. Regular feeding routines were therefore followed by majority of the households with exception of those who largely depend on casual labour for

income and source of food. Normally, households ate the following meals: breakfast (tea with milk and accompaniments), lunch (*kitoweo*, rice or *ugali*), supper (*kitoweo* or *ugali*) and tea after supper (tea with milk but without accompaniments). In addition, some households took 10 and 4 o'clock teas (without accompaniments). *Ugali* was largely accompanied with cabbage or kales and spinach in selected households. It was a common practice for the households to frequently interchange *kitoweo* or *ugali* with *chapati* and also add any form of animal proteins in cabbage or kales as accompaniment for *ugali*.

4.3 Food shortage during the 2017 drought

Severe food shortage during 2017 drought was caused by four compounding factors. First, the 2016 crop harvest was poor. The 2016 MAM season was characterized by heavy rainfall that negatively affected crop growth resulting in poor potato and maize harvests. Second, the 2016 OND season rains failed resulting in near crop failure. Also, the delayed onset of 2017 MAM seasonal rainfall led to late planting prolonging the duration of food shortage. In addition, occasional occurrence of frost during the 2016-2017 drought period destroyed the geminating and young crop sprouts. The third cause of severe food shortage was pest infestation. Potatoes that were in the farms between January and February 2017 were severely affected by pests. The wireworms and white grub destroyed the tubers by making irregular holes while potato cutworms (*Agrotis ypsilon*) and wireworms (*Coleoptera, Elateridae*) destroyed the geminating and young sprouts. Thus, up to the time of this study (June 2017), households depended on the meagre maize harvests from the 2016 MAM season. Fourth, there was no substantial source of income. Households dependent on proceeds from farm produce mainly sale of potatoes and milk. With near crop failure, majority of the households had no potato surplus to sell. Similarly milk production was very low due to drought. The low purchasing power heightened inaccessibility to food.

Whereas households started experiencing food shortage from January 2017, significant shortage occurred from mid-February 2017. By this time, the stock potato harvest was exhausted by nearly all the households. The remaining potatoes (in farms) were not only severely destroyed by pests but also very expensive. A 20kg container of potato (locally called *debe*) retailed at Kshs 700 (US$ 7) in February with the cost rising to Kshs 800 (US$ 8) in March. Potatoes were completely unavailable in April and May. Lack of access to potatoes (the main meal in the area) either due to shortage or high cost caused severe food shortage. Similarly, as the drought advanced, the overreliance on maize as the major source of food led to exhaustion of the maize stock harvests. Coupled with high market prices of maize and maize meal flour (Kshs 150 [US$1.5] per 2kg of maize meal flour) exacerbated food shortage. However, the severity of food shortage varied depending on household characteristics.

Households who depended on casual labour as a source of income and those with small area under food crops bore the brunt of food shortage in early January. The small areas under food crops provided on-farm consumption with no stock harvests. On the other hand, casual labour was not available during the dry spell denying these households the much needed income to buy food. Food shortage among these households can be characterized as severe. For households with adequate growing areas (who were the majority), the shortage started in mid-February. Stock potato harvest lasted for about a month while maize harvest lasted up to the month of May. However, most of these households sold the maize to meet other financial obligations including buying of alternative food after exhaustion of the stock potatoes harvest. Food shortage among these households was characterized as moderate to severe. Mild food shortages were experienced by households who had other sources of income such as small business or formal employment in addition to adequate growing areas. These household had access to food from the farm in the early stages of drought and from the shops markets in the latter stages.

4.4 Coping with food shortage

The magnitude of the 2017 drought was exceptional affecting the availability and accessibility of food. The main sources of food during the drought were buying from the shops and/ or markets, accessible food substitutes and from previous stock harvests from farms. Low purchasing power, small quantities of previous stock harvests and competition for accessible food substitutes forced households to adjust to various feeding habits and routines unusual to them as outlined below.

4.4.1 Removal and skipping of meals

Ten and four o'clock teas were completely removed from the daily food routine by all households. Breakfast and lunch meals were sporadic depending on the availability of food to households. More often, these meals were omitted in households where food shortage was severe but frequently skipped in households suffering moderate food shortage. In the former, households survived on one meal per day. Any available food was preserved for evening meals. As a coping strategy, [5] observes similar scenarios where pastoralists in Afar and Borana in Ethiopia eat only one meal a day.

4.4.2 Reducing food ration

This was common among all the households. However, it was more pronounced in households who dependent on casual labour as a source of income and consequently source of food. In as much as the amount of food served during supper was equally reduced, remarkable reduction was experienced during lunch meals. Largely, lunch meals were made up of the left over foods from previous supper. Where supper was inadequate, lunch was skipped. This observation echoes the [9] observation that drought reduces overall food consumption.

4.4.3 Change of Meal Types

The composition of meals changed across all households. The changes were triggered by shortage of the regular foods and availability of substitute foods. In the initial stages of food shortage, *kitoweo* was prepared with few potatoes and eventually without potatoes. In the long run, households turned to alternative foods that were easily available. [5] notes that people eat non-cultivated food plants. In Nyairoko

sub location, households turned to stinging nettle (*Urtica dioica*) which was largely available in uncultivated areas. The diet thus changed to a mixture of stewed maize and stinging nettle (locally referred as *mukurugushu*) particularly for lunch meals. Change to alternative foods during drought has been observed among the pastoralists in northern Kenya, when milk production declines pastoralists collect foods from plants available in the region and also consume bovine blood [10]. During the evening meals, the diet changed to either *mukurugushu* or *ugali* accompanied with stewed stinging nettle. The disappearance of stinging nettle with intensification of drought forced households to entirely depend on *ugali* during lunch and evening meals. Maize flour was available through grinding of the dried maize. In absence of cabbages, kales, spinach and stinging nettle, *ugali* was accompanied with stewed cow peas (*Vigna unguiculata*) and green grams (*Vigna radiate*). But due to high cost of cow peas and green grams, the portion served per plate was quite small. Sprouting of African nightshade (*Solanum nigrum*), amaranths and stinging nettles (Fig 2) after the start of rains in the month of May 2017 became the new accompaniment to *ugali*. Other changes in meals included tea without milk during breakfast, maize meal porridge instead of tea during breakfast, *ugali* with tea (with or without milk). Changes in meal types have been exercised in other parts of Kenya during droughts. For instance eating fruits and vegetables that are not eaten under normal circumstances have been observed as a strategy used by pastoralists in many parts of East Africa [6]. [4] asserts that the Keiyos in Kenya collected vegetables that were rarely consumed, in the bushes surrounding their farms.

Figure 2: Stinging nettle and amaranth plant used as alternative food

4.5 Challenges of Changing Feeding Routines

Whereas changing feeding routines helped households cope food shortages during the 2017 drought, the strategy had several challenges.

4.5.1 Resistance from Children

Children resisted stinging nettles and amaranths. Parents were forced to get alternative food for their children. To a small extent, some adults disliked these food substitutes while others argued that they made them sick.

4.5.2 Poor Feeding Caused by Loss of appetite

Repeated consumption of one type of food for both lunch and supper led to loss of appetite to majority of the household members. The most affected were children who either decline to eat or ate very small portions. It was observed that most of the leftovers of the food carried by children to school were from household where meals consumed during the previous super were similar to packed lunch for the following day. As [9] observes, drought diminishes dietary diversity leading to poor nutrition.

4.5.3 Competition of Alternative Food

The most common alternative food in the areas was stinging nettle. In as much as the stinging nettle was accessible during the early part of the drought, the high demand from the households led to competition for access. Households who had the stinging nettle within their homesteads or their land controlled who to pick and the quantity. In few cases, theft was reported. This led to strained relationships between neighbors and quarrels in some instances. In open fields where there was no control, the high demand led to rapid exhaustion.

5. Conclusion

The 2017 drought in Nyairoko, like in many other parts of Kenya, caused severe food shortage. The drought was occasioned by failure of the OND short rains in 2016 and the delayed onset of the MAM long rains in 2017. The lack of rains affected resulted in very poor crop performance. The problem was aggravated by occasional frost and moderate winds and occurrence pests. This caused severe food shortage in the area in 2017 particularly from mid-February since there was no stock potato harvest remaining. Households over depended on the meagre maize harvest leading to quick exhaustion of the stock. The price of food commodity rose. Potato prices increased by 14% between the months of February and March. The ability to cope varied depending on access to land and other source of income. The effects were severe to households who depended on leased land and lived in rented houses while the least affected were households who owned land and were in formal employment or had alternative source of livelihood. Without external assistance, households coped with food shortage by changing their feeding routines. Although the most common practice was skipping or removal of some the meals, it occurred concurrently with reduced size of food portion and change of meal types. Although this strategy lengthened the period of food availability, it compromised the health of the members

of households and especially the children. It caused poor nutrition. People grew weak due to small portion of food consumed as a result of scarcity and lock of appetite to available alternative food.

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