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# Effects of Climate Variability on Wild Edible Plant Products: A Coping Strategy applied by Pastoralists of Northern Kenya

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**Key words:** Climate variability; coping strategies; pastoralists; wild edible plants

## Abstract

Drought which is a manifestation of climate variability has become a perennial problem in Kenya with chronic vulnerability being concentrated in Arid and Semi-Arid lands (ASALs). Traditionally, pastoralists have used wild edible plant products namely; fruits, vegetables and seeds as a coping strategy while faced by climate related calamities. However, recent studies have shown that pastoralists' traditional coping strategies have become weak as a result of recurrent droughts. The overall objective of this study was to investigate the effects of climate variability on wild edible plant products. This study applied; household interviews (n=400), focus group discussions and key informant interviews to collect data. Quantitative data derived from the household interviews were edited, coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 20 spread sheets. Descriptive statistics were run to give frequencies and percentages. Results of this study indicate that wild plant fruits and vegetables were occasionally used as food by pastoralists during the time of droughts. Findings also indicate that recurrent droughts have affected the availability of wild edible plants that pastoralists used to rely on, hence increasing the distance, they travel to look for such products. This study revealed that some new plants have sprouted in the area but they are not fit for human consumption. This study came up with two recommendations on the need to train livestock keepers on appropriate coping strategies which are sustainable and on the best methods of conserving the available wild edible plants in their locality.

## Introduction

Climate variability is one of the major challenges for the dryland ecosystems which comprise more than 80% of Kenya. IPCC (2014) gives indicators of climate variability as extended droughts, floods, and conditions that result from periodic El Niño and La Niña events. According to Huho and Mugalavai (2010) as many as 28 droughts have been recorded in Kenya in the past 100 years, at an increasing frequency. The enormous changes due to unreliable rainfall means availability of forage is affected. As a result livestock productivity goes down and sometimes the livestock die in large numbers. Pastoralists have therefore developed a set of indigenous strategies and mechanisms that enabled them to deal with multiple threats, variability and environmental changes. Their mechanisms have helped them to survive and effectively use the harsh and highly variable environment. Some of these strategies are ecologically-based, while others depend upon socio-economic and cultural mechanisms (Eriksen *et al.* 2008). One of these strategies is relying on wild edible plant products namely fruits, vegetables and seeds which is ecologically based. Wild edible plants refer to species that are neither cultivated nor domesticated but are available in their wild natural habitat. Pastoral communities occasionally use wild fruits and vegetables as food during times of natural calamities (Langil and Ndathi 2001).

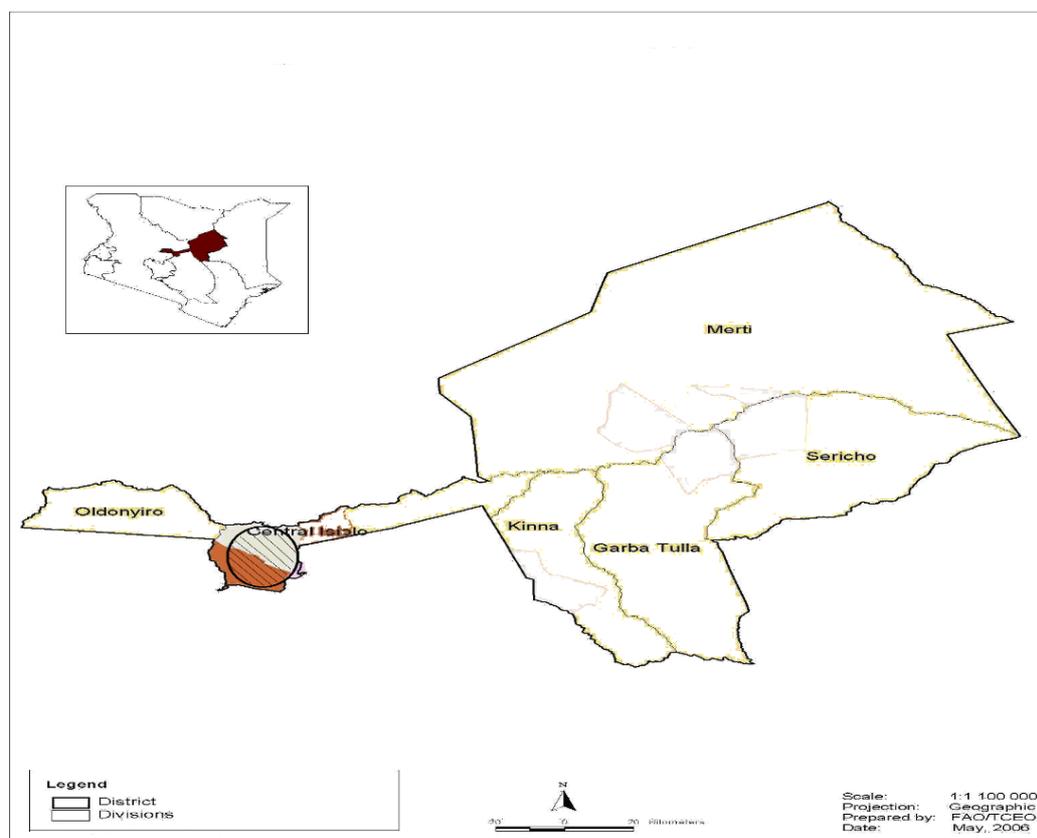
This coping strategy appeared to have worked well since time in memorial. But to what extent this strategy has been affected by severe and frequent droughts is not known. Therefore, this study was initiated with the aim of investigating the extent at which wild edible plants as a coping strategy has been affected by climate variability in Isiolo County. This study was guided by two objectives; to identify the wild edible plants relied on by the pastoralist of Northern Kenya, to examine the extent at which the wild edible plants have been affected by climate variability and lastly, to identify if there are plants which have emerged due to the effects of climate variability in the study site.

## Methods and Study Site

### Study sites

This work was conducted in Kambi Odha, Kambi Bule and Kambi Garba villages of Isiolo County in Northern Kenya.

The county borders Marsabit to the North, Garissa and Wajir to the South East, respectively. Isiolo County covers an area of approximately 25,700 km and most of the county is a flat, low lying plain (MoALF, 2017). Which rises gradually from an altitude of about 200 m above sea level at Lorian Swamp in the Northern part to about 300 m above sea level. The county lies in two ecological zones namely semi-arid and arid (G.o.K. 2018). It has two rainfall seasons, the long and short rains, with the long rains coming mainly in March and May while the short rains come between October and November. Rainfall is scarce and unreliable, which means it cannot support perennial agricultural crops.



**Map: Map of Isiolo showing the study sites**

## Population

According to the 2019 population census, Isiolo County has a population of 268,002 persons (KNBS 2019). According to the (G.o.K, 2018) report the County is occupied by pastoralists and agro pastoralists. The population consists largely of Oromo-speaking Borana and Sakuye, the Turkana, the Samburu, the Rendille, the Ameru, the Somali and other immigrant communities from other parts of the country (G.o.K, 2018).

## Economic activities of Isiolo County

The MoALF (2017) report reveals that livestock production is the major economic activity of the inhabitants of Isiolo County, rearing camels, cattle, sheep, goats, donkeys and poultry.

Crop farming in the county is limited to the wetter areas of the County that is in Isiolo Central and Kinna (GOK, 2012). The types of crops grown include Maize, beans, sorghum, cowpeas, onions and tomatoes.

Tourism is another economic activity of Isiolo County and it has three game reserves, namely, Sihaba Game Reserve, Buffalo Springs and Bisanadi National Reserve which accommodates rare species of giraffes, zebras, ostriches, antelopes, elephants, buffalos, rhinoceroses, lions, cheetahs, and hyenas.

### **Sample size and sampling procedure**

This study applied both random and non-random sampling strategies. In selecting the study site simple random sampling technique was applied where by the names of the three Isiolo sub-counties were written, folded several times and then they were put in a container and the researcher picked one and after opening realised that she had picked Isiolo Central. However due to the nature of the study which focused on the Borana community the largest community in Isiolo County. Odha sub-location was identified for the study purposively since it is the areas which is occupied by the Borana Community, while simple random sampling procedure (rotary) was applied to select the villages where by three villages out of six were chosen that is, Kambi Odha, Kambi Mbule and Kambi Garba.

A total of 400 households were interviewed which was a 10% of the total population. According to Mugenda and Mugenda (2003) a study sample of 10 to 20% of a population is representative enough for the findings to be generalized. These consisted of 206 men and 194 women. The proportion of men was more than that of women because men were the ones who were readily available’.

### **Data collection methods**

#### **Household interviews**

Household interviews were conducted with household heads, male or female, through the administration of a semi- structured questionnaire to the respondents. The questions included, the existing wild edible plants in Isiolo, whether they rely on them, and the extent at which they have been affected by climate variability and whether there are new ones which have emerged?

#### **Focus group discussions**

Two focus group discussions were conducted and each group had 10 participants who were selected purposively both men and women were represented. An interview schedule was used to guide the discussions.

#### **Key informant interviews**

A total of 12 Key informants were selected purposively and the focus was on those informants with rich information on the topic and who were willing to share the information.

#### **Data processing and analysis**

Data obtained from focus group discussions and key informants were sorted out and interpreted in relation to the research objectives. Quantitative data derived from the household interviews were edited, coded and analysed using the Statistical Package for Social Sciences (SPSS) software version 20 spread sheets. Descriptive statistics were run to give frequencies and percentages.

### **Results**

#### **Types of edible fruits, vegetables and seed**

The findings of this study revealed that pastoralists of Northern Kenya have been relying on some wild edible plants during the drought period as a mitigation measure against food shortages. In answering a question on whether there were traditional fruits, vegetables and roots which used to be eaten by the pastoral communities of Isiolo County, 86% of the respondents indicated that there were while 14% said that there were none. Figure 1 gives a summary of the outcome.

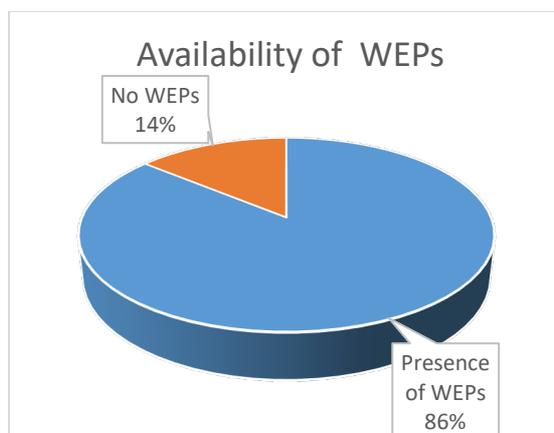


Figure 1: Response relating to availability of WEPS

Respondents gave names of some of these plants which were used such as *deka* (*Grewia tembensis*), *mader* (*Cordia gharat*), *qurqura* (*Zizyphus khona* (*Hyphene coriacea*)), *domog* (*Grewia tenax*), *bejelo* (*Lannea alata*), and *madeer* (*Cordia sinensis*). *mauritianana*, *jaj jab* (*Berchemia*), *ogomdi* (*Grewia villosa*) and *kumude* (*Lannea alata*). Some of these plants produced fruits which were eaten by the pastoralists especially during periods of droughts and famines. Others, such as *mader* (*Cordia gharat*) in addition to edible fruits were a source of gums that were chewed during drought periods. Conversely *urbu* (*Acacia tortilis*) pods were boiled and eaten during droughts. Some of the plants, such as *iddi hiddi* (*Solanum scabrum*) also produced vegetables and fruits eaten during droughts. *Sumalele* (*Mormodica trifoliolata*) was consumed as vegetables and also in form porridge. The *ng'orondo* (*Cyphostemma nierrense*) plant also contributed to survival during drought since its leaves are cooked and eaten as vegetables, its fruits are eaten when raw while its roots are sliced, dried, powdered and stored for famine periods. One of the elders made this statement, “when herding, herders ate these plants and they got satisfied such that when they got home they did not eat anything more.” (Elder, Kambi Odha, Isiolo).

### Edible fruits, vegetables and seeds which have disappeared

Majority (88.5%) of the respondents affirmed that many of the plants had disappeared while the rest were of the opinion that they had not disappeared. It also came out clearly from the study that the distance travelled while going to collect wild fruits and vegetables had changed as a result of climate variability. A majority (81.3%) of the respondents said that the distance travelled is longer than it used to be in the last 20 years as a result of climate variability since some of the wild edible plants had disappeared. Focus group discussions also revealed that the distance covered had increased and at the same time some of the plant species had disappeared. A FGD participant had this to say:

*When we were growing up, wild fruits, seeds and vegetables were plenty. We used to get them near our houses. Today we walk very long distances to get some. There are some which are no longer available as they have been affected by the increasing droughts.*

### Wild plants which have emerged

On whether there were some plants which had emerged due to climate variability, a majority (63%) of the respondents stated that there were, while 37% said that there were none. The plants mentioned include Biscuit *Mjinga* (*Prosopis juliflora*), commonly known as *Mathenge*, *gurbi* (*Acalypha* sp), *anno* (*Euphorbia trucalli*), *leuceana* (*Leucocephala*) and *caliandra* (*Calothyrsus*). All these plant which have emerged in the study site

are not suitable for human consumption. But they are all suitable for livestock consumption although focus group discussants indicated that they had negative attitudes towards the utilization of *Prosopis juliflora* saying that they had heard that the plant was harmful to livestock and human beings. Other plants which were perceived as important by the focus group participants and key informants are *leuceana* and *caliandra*. These are multipurpose plants used for fodder and fuel wood. According to the findings of this study these plants were introduced by the Ministry of Agriculture in an effort to promote agro-forestry practices in the region. Although there were fodder trees and shrubs which had emerged and others introduced as a result of climate variability, they were few and in small quantities. Thus, they could not be relied on to feed the livestock populations as severe and frequent droughts do not give them sufficient time to recover.

### Discussion

The results of this study indicated that wild edible plant products were occasionally used as food by the Borana of Isiolo County during droughts. The respondents indicated that during droughts and famine pastoralists collected wild foods such as roots, tubers, leaves, seed on a regular basis and this work was done particularly by women and children. This study indicated that the wild plants have been affected by climate variability and many of the plants have disappeared. The respondents also reported that the distance travelled to gather these plants had increased greatly. This study came up with two recommendations: the need to train livestock keepers on appropriate coping strategies which are sustainable and also training the pastoral community on the best methods of conserving the available wild edible plants in their locality.

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