Diversity Of Vegetables And Fruits And Their Utilization Among The Nduuri Community Of Embu, Kenya.

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Abstract

A field survey was carried out to determine the types of vegetables and fruits grown in a small scale farming community on the slopes of Mt. Kenya. A wide variety of both vegetables and fruits were grown in small plots. Many farmers had several crop species on their farms. There were more vegetable species than fruits. Most vegetable species were the leafy type. There was a general scarcity of these products especially fruits. It was concluded that some measures should be taken to increase productivity and consumption of these crop products.

Introduction

Nduuri is a catchment area on the eastern slopes of Mt. Kenya where the *People Land Management and Environmental Change project (PLEC)* has activities. The area has a bimodal pattern of rainfall that comes in March to May (long rains) and October to December (short rains). Farmers in this area are small-scale farmers with high dependence on farm activities. The majority of farms range from 0.25 to 2.00 acres. The farmers grow maize and beans as the main food crops, and coffee, tea and macadamia nuts as cash crops. Coffee was their major cash crop, but it is now stagnant due to poor market conditions, which have led to very low payments. Some farmers have uprooted this crop while others have hope for better prices in future. New crops such as soybeans and climbing beans have been recently introduced in the area. Livestock is kept under zero grazing or semi zero grazing. The main livestock are dairy cattle and poultry. Farmers use manure for their crop production with limited use of fertilizers. Horticultural crops are grown as secondary crops. The objective of this survey was to carry out an inventory of vegetables and fruits, determine how these crops are utilized and the behavior of the farmers during the times of glut and shortages of these crops.

Materials and Methods

A total of 41 farmers were selected randomly for this survey using a combination of stratified and systematic sampling procedure. The area was stratified into seven

administration units and farmers from each unit were selected systematically for the interview. The number of farmers selected from each unit ranged from 5 to 9, which was relative to the size of its population.

A structured questionnaire was used. A multi-disciplinary team of research officers, from the Kenya Agricultural Research Institute and extension agents from the Ministry of Agriculture, administered these questionnaires. Three groups each consisting of two research scientists and one extension agent were formed and used as enumerators. Farmers filled the questionnaire with the help of these enumerators. The groups were also to confirm the farmers' information by directly observing the activities on the farm. The questionnaire was designed to capture information on farming in general and vegetable and fruit production in particular.

There was one day for initial briefing and testing of the questionnaire after which the team was split into the respective groups. The survey was carried out over a period of 6 days. On the last day of the survey, an open forum was held between all informants, other interested farmers and enumerators for further clarification of information. Data collected was analyzed using SPSS Statistical programme.

Results and Discussion

Diversity of Crops

Farmers grew both exotic and local types of vegetables (Table 1). The most widely grown vegetables included cowpeas, amaranthus, kales, pumpkin, black nightshade and tomatoes. Over fifty percent (50%) of farmers grew these vegetables. It was observed that every home had a portion of cowpeas that was used both as a vegetable and a grain legume. The crops were scattered in the farms on plots estimated to be around 20 m^2. Some vegetables were planted in a few lines across the farms where grain crops were grown.

The most frequent local vegetables were cowpeas, amaranthus, pumpkins and black nightshade, which were grown by more than half of the farmers. These are commonly used in various parts of Kenya {M'Ribu et al. 1993; Chweya, 1997). A number of other indigenous vegetables were observed. These included *'mariara'*, *'karimi ka nthia', 'muka-urivu'* , *'makangati', 'magerema', ' maviu',* and *' matanga'*. These were not properly

identified or characterised. Many wild and semi-wild species are utilized as vegetables (Yongneng and Aigou, 1999). There is need to be properly characterised and developed as crops in their respective areas.

Other than cowpeas and pumpkins the local vegetables were not deliberately planted. They grow on their own on the farm and were tended. Due to prolonged drought and continuous cultivation, most of the indigenous vegetables had disappeared or were threatened to disappear. Indigenous crops although nutritious, are not very popular with the younger generations. Some were associated with poverty while others were considered bitter and primitive. There was therefore a tendency towards the exotic vegetables. This has also been observed in other parts of the country (Chweya, 1997).

The most widely grown fruits were pawpaw, avocado, mango, banana, passion and guava (Table 1). These fruits are popular in many parts of the country (M'Ribu et al. 1993). Many farmers considered passion, loquart and guava as indigenous. The common indigenous fruits included '*macuca ma ngunga*', *'mubiru', 'mburu'* and *'ndoroma'*. These were not grown by the farmers but were observed as individual plants scattered in the farms and in the forest areas.

Table 1. List of vegetables and fruits grown on the farms

Vegetables	**No. of farmers growing**	**Fruits**	**No. of farmers growing**
Cowpeas	41	Pawpaw	37
Amaranthus	39	Avocado	37
Kales	36	Banana	30
Pumpkin	34	Mango	29
Black night shade	30	Passion	27
Tomatoes	23	Guava	22
Spinach	12	Loquart	16
'Mariaria'	9	Pineapple	10
'Karimi ka nthia'	8	Mulberry	7
Chillies	7	Tree tomato	4

'Makangati'	6	*'Macuca ma ngunga'*	1
Russian comfrey	6	*'Mubiri'*	1
Onion	6	*'Mburu*	1
Cabbage	5	*'Ndoroma'*	1
Carrots	4		
'Muka-urivu'	3		
'Magerema'	1		
'Matanga'	1		
'Maviu'	1		

Farmers had up to fourteen species of vegetables and eight of fruits grown in their farms (Table 2). The frequent number of vegetables was four to six whereas fruits were five to seven. There were no farmers with less than three species. More species of vegetables were generally found in the farmer's fields as compared to fruits.

Table 2. Diversity of Vegetables and Fruits grown per farm

No. of Species per farm	***No. of farmers in the category***	
	Vegetables	***Fruits***
1	0	0
2	0	0
3	3	6
4	10	5
5	7	8
6	5	10
7	2	8
8	4	4
9	2	-
10	2	-

11	1	-
12	3	-
13	1	-
14	1	-

Crop Preference

Farmers ranked vegetables and fruits according to their production, liking and utilization (Table 3). Amaranthus, cowpeas, kale and pumpkin were the most highly ranked vegetables whereas pawpaw, banana, avocado and mango were the most highly ranked fruits.

Table 3. Ranking of crops by the farmers (crops appearing in the top 3 categories)

Vegetables		**Fruits**	
Crop	**No. of times the crop was ranked**	**Crop**	**No. of times the crop was ranked**
Amaranthus	36	Pawpaw	37
Cowpea	33	Banana	29
Kales	29	Avocado	28
Pumpkin	25	Mango	18
Black night shade	17	Passion	6
Tomato	11	Tree tomato	2
Spinach	7	Pineapple	1
Russian comfrey	3	Mulberry	1
Cabbage	2	Guava	1
Chillies	1		
'Mariaria'	1		

Seasonal Availability of Fruits and Vegetables

Vegetables were relatively available during the period of March to May (Table 4). About half of the farmers (59%) sell any excess vegetables while others (27%) consume more or share with friends and 12% feed them to animals. Only 2% preserve the excess vegetables for use during the time of shortage.

Table 4. Seasonal availability of vegetables in the farmers fields

Season	**% of farmers responding**	
	Adequate	***Inadequate***
March – May	50.4	49.6
June – August	37.5	62.5
September – November	30.8	69.2
December – February	27.0	73.0

There was no season with adequate production of fruits (Table 5). This was confirmed by the few fruit trees observed in the farms. The period between September and February had very low levels. Mangoes were available from late February to May while avocado and pawpaw were available during the period between May and August.

Table 5. Seasonal availability of fruits in the farmers fields

Season	**% of farmers responding**	
	Adequate	***Inadequate***
March – May	29.2	70.8
June – August	31.8	68.2
September – November	18.4	81.6
December – February	17.4	82.6

When vegetables are scarce or absent, about 61% of the farmers buy from the market whereas 39% do without vegetables during such periods. The commonly bought vegetables are as shown on Table 6. Despite the scarcity of these products almost all seasons, only a few fruits were bought for home consumption.

Table 6. Percentage of farmers that buy vegetables and fruits

Crops bought	**% Farmers that buy**

Vegetables	
Kales	58.5
Cabbages	51.2
Cowpeas	29.3
Tomatoes	7.3
Carrots	2.4
Fruits	
Passion	14.6
Mango	12.2
Avocado	9.8
Pawpaw	4.9
Pineapple	2.4

Utilization of fruits and vegetables

Although the production of fruits was low, half of the fruits produced were sold while the other half was consumed at home. The commonly sold fruits were pawpaw, avocado and bananas. Fruits utilized at home were either eaten direct, together with other foods or processed into juice, jam or other products.

Most of the vegetables were utilized at home (75%). Almost every home used vegetables for *ugali* and *githeri*. Pumpkin and cowpea leaves were used mainly for mashing potatoes and/or bananas. Tomatoes were used for stewing vegetables and meats. They could also be eaten as salad or making tomato sauce.

Sources of seed

Farmers acquired both vegetable and fruit seeds by producing their own seeds, buying from the shops or by doing both. The local vegetable seeds were the ones mostly produced on the farm while the exotic ones were purchased from the shops. Farmers generally produce their own seed of local crops whose production potential is known (Chweya, 1997). There was a lot of giving or buying of seedlings from neighbours.

Pests and diseases affecting the crops

The diseases that affected vegetables included bacterial wilt, blight, mildew, and root rot. Being primarily minor subsistence crops, little effort was put in controlling diseases

in vegetables. Farmers did not bother much with crops that had no commercial value. However, some farmers used indigenous technical knowledge (ITK) and chemical methods, to reduce these diseases.

Fruits were affected by greening disease as the case of citrus while others were aborting apparently due to mildews. The common pests affecting vegetables and fruits were aphids, beetles, bollworms and caterpillars. They were controlled by use of chemicals and ITK in vegetables while little or no attempt on fruits (Table 7).

Table 7. Percentage of farmers taking measures in controlling pests and diseases in vegetables and fruits

Measure	***Pests***		***Diseases***	
	Vegetables	**Fruits**	**Vegetables**	**Fruits**
Chemical	61	5	22	0
Indigenous Technical Knowledge	19	2	15	0
None	20	93	63	100

Conclusions

Farmers grew a diversity of vegetables and fruits in their farms. Although these crops are widely grown in this area they were considered as minor crops and the production levels were low. Indeed the crops were normally weeded last. There was a general shortage of products most time of the year and thus low consumption. Strategies should be laid down to have adequate vegetables and fruits most of the year, considering that these crops are nutritionally essential.

The survey showed that the exotic vegetables were replacing the traditional ones in the diet. There were many traditional wild and semi wild species that have potential economic value as fruits, vegetables or medicinal plants. Some of these species were available as early as 1960's but are now considered as weeds and were in danger of being extinct. There seems to be a place for some of the indigenous vegetables, considering the percentage of farmers who had them on their farms. Growing of these vegetables should be encouraged as a way of conserving agro-biodiversity.

References:

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