

**INDIGENOUS VEGETABLES PRODUCTION AND UTILIZATION
IN SUBA DISTRICT, KENYA**



“IMPROVING HEALTH, UNLOCKING THE WEALTH IN SUBA DISTRICT”

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Introduction

Indigenous vegetables are plants which have evolved within and spread throughout an area unassisted by human beings. Most of them have since been domesticated and cultivated. A few examples of indigenous vegetables are outlined in table 1.

Indigenous vegetables are still considered minor crops. Even in the Ministry of Agriculture plans, there are no specific targets set for their production.

Indigenous vegetable consumption in Suba district is among the highest in the lake region. However, the daily intake is far below the requirement recommended by the nutritionists. Traditionally, farmers grow indigenous vegetables on their homesteads and others along the lakeshore either in pure stands or intercropped with other crops especially cereals, but production is low and constrained by several factors. They have multiple uses and can increase the family and woman's income in a number of ways.

During long and short rains, the indigenous vegetables voluntarily grow almost everywhere and supplement cultivated ones. This is proof that their seeds stay viable in the soil until conditions are favorable for germination. This, further, is proof of their sustainability as sources of good nutrition at table. Several may be mixed at one cooking to give desirable tastes and improve palatability.

Indigenous vegetables generally provide forage to livestock as is often the case with most leguminous plants/crops. Consequently the grazing and nibbling cause extinction especially when this happens before seed setting. Some of them, though, have drought-tolerant rooting systems that rejuvenate with the onset of rains. A case in mind is that of cowpea *Vigna unguiculata* which regenerate successfully at the on-set of rains. This seasonal production depends on the distribution of the rains, which are often unreliable.

Uses of indigenous vegetables

Traditional foods that were once widely collected from the wild but now must be cultivated to be enjoyed are one of the few natural resources that are best protected through greater exploitation. Indigenous vegetables are rich sources of essential nutrients especially vitamins and minerals for health maintenance and cure of nutritional disorders in human. These green vegetables also provide a secondary source of proteins and dietary fiber and make other foods more palatable when used in combination with others. The grains play an important role as protein source of plant origin, hence quite useful in formulating vegetarian diets.

It has been proved that indigenous vegetables have medicinal properties and are a great aid to lactation in nursing mothers and play a big role in therapeutic treatments of HIV/AIDS patients.

Most indigenous vegetables are leguminous hence effective in soil fertility amendment through nodulation and nitrogen fixation, nutrient recycling, and addition of organic matter which helps in maintaining soil productivity.

They provide additional income to the farm families through sale of surplus. Women, in particular, appreciated the fact that vegetable growing project enabled them to earn some income which they have full control over. This empowered them to start merry-go-round among themselves and has helped to strengthen groups' cohesion. This has enabled the

women to start petty businesses and also to acquire household items like utensils, some even purchased small livestock such as chicken and goats. Finally, organic farming creates job opportunities from production to marketing.

Production

Indigenous vegetables are short duration crops and it is not unusual to grow several crops on the same piece of land. This is the case with those that are grown under conventional agricultural regimes. Most of the indigenous vegetables are drought, disease and pest tolerant/resistant and in this context, considered superior in survival. Their production involves lower capital input compared to improved exotic counterparts.

Generally, indigenous vegetables are an income-generating farm produce and cost more per unit measure from the leaves to the grains. In the local open-air markets sales are made by rough estimation, often in the palms in the case of leaves and un-standardized small cups in the case of grains. In Suba, vegetables are produced for local markets in town centres and boarding schools. Market linkages remain one of the challenges among small-scale vegetable producers because the production lacks consistency in both quality and quantity and due to the fact that rural processing is also not well developed.

Production of indigenous vegetables in organic kitchen gardens.

Project started in March 2002 with an aim of improving the household nutrition and also to facilitate all-year round vegetable production and availability to households in suba community. The organic farming techniques/options make intensive use of the land. Assorted indigenous vegetables are planted in well prepared and fertilized beds of about 1.5 x 6 m. Seed unavailability was a major constraint initially but now majority of the farmers have stored enough seed for their use and surplus for sale and sharing with fellow farmers. Some seed loans recovered from participating farmers are also available in TTU office. Farmers have appreciated the variety of indigenous vegetables existing in the district as a result of organic farming. This has enabled them to prepare a variety of vegetable dishes which improves the diet and health in general. Prior to project implementation, indigenous vegetables were so scarce to the extent that they were left for rich people. Availability and increased indigenous vegetable production has contributed to improved food security in the district. This is because farmers no longer exhaust their cereal stores to get money for buying vegetables imported from other districts. The participating farmers have gained adequate knowledge and skills on organic farming which has enabled many to engage in it as a full time business. Through conservation kitchen garden project, taboos hindering women’s participation in development activities and access to benefits such as the right to use productive resources like land, irrigation water and increased income have been overcome.

Table1. Indigenous vegetables popular with farmers and scientists in Suba District

Family	Botanical name	Common name	Local name
<i>Amaranthaceae</i>	<i>Amaranthus spp</i>	Pig weed	Ododo
<i>Capparidaceae</i>	<i>Gynandropsis gynandra</i>	Spider plant	Dek/Akeyo
<i>Commelinaceae</i>	<i>Commelina bengalensis</i>	Wondering jew	Andhodho

<i>Curcubitaceae</i>	<i>Curcubita maxima</i>	Pumpkin/malenge	Susa
<i>Polygonaceae</i>	<i>Oxygonum sinuatum</i>		Awayo
<i>Portulacaceae</i>	<i>Portulaca oleraceae</i>	Oxalis spp	Obwanda
<i>Solanaceae</i>	<i>Solanum nigrum</i>	Black night shade (assorted)	Osuga
<i>Tiliaceae</i>	<i>Corchorus olitorius</i>	Jute	Apoth
<i>Leguminoceae</i>	<i>Vigna unguiculata</i>	Cowpeas	Alot-bo, Bo
<i>Fabaceae</i>	<i>Crotolarai ochreleuca</i>	Crotolaria	Mitoo
<i>Euphorbiaceae</i>	<i>Acalypha volkensii</i>	Wild cowpeas	Dindi
<i>Asteraceae/Compositae</i>	<i>Sonchus schweifurthii</i>		Achak
<i>Basellaceae</i>	<i>Basella alba</i>		Nderma

Constraints

- Inadequate supply of good quality seed/seedlings
- Inadequate knowledge of intensive vegetable production technologies like organic farming.
- Erratic weather conditions
- Many indigenous vegetables have not been researched on, hence no proper documentation on the same.
- Negative attitude – considered as “woman’s” crop.

Future research and development needs

- To improve homestead vegetable production and vegetable production in general, it is necessary to ensure the supply of good quality seeds up to the village level. Initiatives may be taken to produce seeds of some varieties in demonstration farm, for example NALEP focal area demo plots, farmer field schools, and to train selected farmer groups (CBOs) on the techniques of seed production. For example, in Suba District, Bungkwach Seed growers Association – BUSGA, in Lambwe Valley is engaged in seed bulking, processing and marketing. Capacity building was done by Ministry of Agriculture, BioVision-TTU, UNDP, Winrock International and LAGROTECH.
- Promotion of organic farming techniques in dry areas to help bridge the seasonality gap in vegetable production, consumption and sales.
- Since indigenous vegetables are considered “woman’s” crop, the quality of involvement of women in homestead production needs improvement. This can be done through training of women in areas of production, storage of seeds,

composting, utilization and nutrition education including cooking and preservation practices



Mature plant. *Crotolaria ochroleuca*
(*Leguminosae* subfamily *Papilionaceae*)

Common name: Crotolaria

Local names: mitoo (Luo), mtoo (Kiwahili)
miroo (Luyha), kamumusuu (kamba).

Diagnostic characters: A short lived, erect perennial herb growing up to 1.2 metres high with ribbed branches sparsely pubescent. It belongs to the family *Leguminosae* (subfamily *papilionaceae*). Leaves are divided into three long narrow leaflets with long petiole. Flowers are borne in terminal, long, many flowered racemes,

pale yellow in colour and purple-veined. Pods are short, fat and contain numerous small pale yellow seeds. Another species, *Crotolaria brevidens* var. *intermedia* is distinguished by its wider leaves, longer thinner pods and deep orange seeds – refer to figure 1: b below.

Crotolaria is indigenous to Africa, and in Kenya, it occurs primarily in Nyanza and Western provinces and can grow at elevations up to 2000 metres. Compared to other indigenous vegetables, it is rarely observed in the wild. It is propagated from seeds cultivated in finely prepared and preferably fertilized beds.

Use: the leaves are eaten as cooked green, usually in combination with other greens because of *crotolaria*'s bitter taste. When cooked alone, it is warmed with at least 1 glass of fresh milk daily for at least 3-4 days to reduce the bitter taste before serving it. Recent research by KEMRI (Kenya Medical Research Institute) recommends *Crotolaria* as nutritionally important to HIV/AIDS patients particularly due to its high zinc content. Leaves contain up to 10% proteins

In Suba, leaves are said to be good in treating gastrointestinal problems.

Preservation:

Preservation of vegetables by drying is the oldest and the simplest method. This process involves removal of water from vegetables by drying either under the sun or in a dryer. Dehydrated vegetables are superior in quality to sun-dried products because temperature, humidity and air flow are controlled in dehydration. Preliminary treatment like blanching is essential to improve the quality of dried products in both methods of drying.

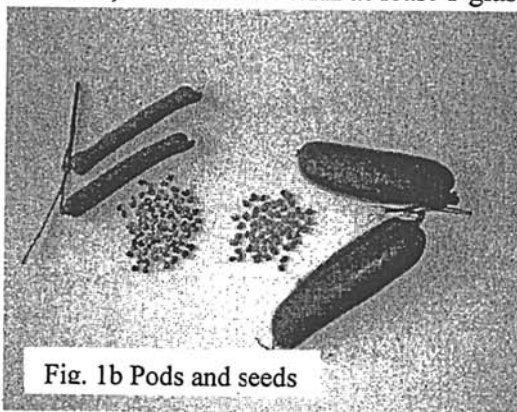


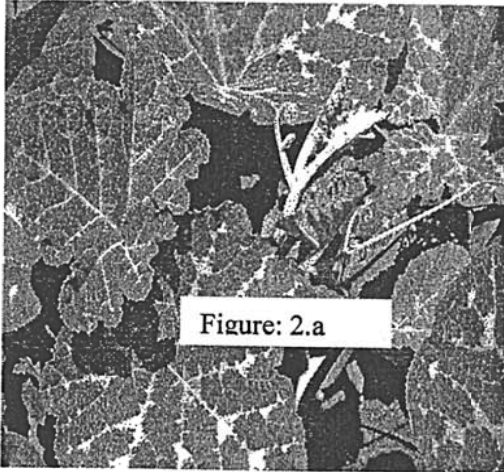
Fig. 1b Pods and seeds

Cucurbita maxima (family *Cucurbitaceae*)

Common name: Pumpkin

Local names: Budho (Luo), malenge (Kiwahili), lisiebebe (Luhya), mareng (Kikuyu), risoa (Kisii), ulenge (Kamba)

Diagnostic character: A spreading annual herb with long-running, bristled stems, large, deeply lobed leaves often containing white "blotches" and yellow or orange flowers separated into male and female types on the same plant. The fruit exhibit various shapes and colors but is often cream or green containing about 70% flesh and several seeds of different shapes and sizes as shown in figures 2b. and 2c.



Pumpkins are propagated from seed by planting in small mounds usually 2-3 metres apart, preferably in well drained fertile soils with additional compost manure. Pumpkin is susceptible to mildews but this usually appear later in the life of the crop.

Use: The fruits, leaves and seeds are used as foodstuff. Fruit is usually steamed or boiled and seeds are roasted. Tender leaves are mixed with jute (*Corchorus olitorius*) and sour or fresh milk to make a good weaning diet.

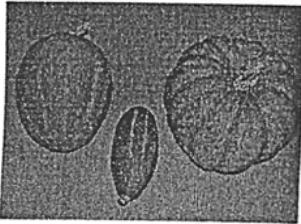
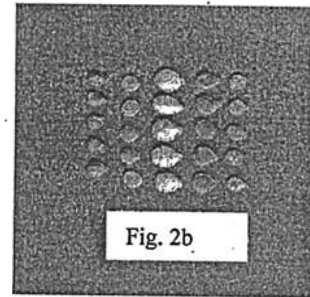


Fig. 2C



Preservation: Fruits are normally stored whole in cribs for as long as one year.

Vigna unguiculata (L) Walp. (*Legumonsae*, subfamily *Papilionaceae*)

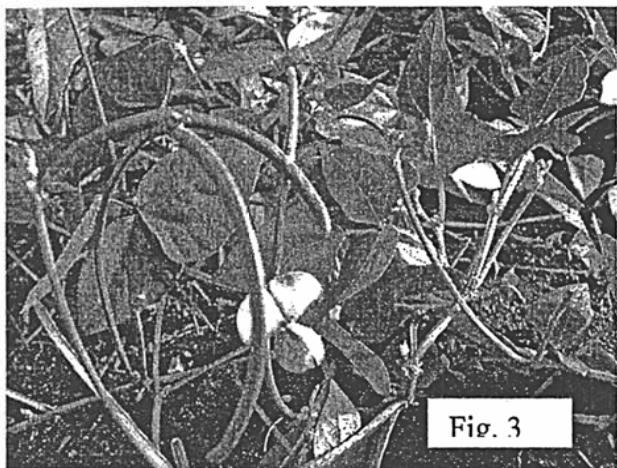
Common name: Cowpea

Local names: a lot-bo (Luo), kunde (Kiswahili, Kamba, Kipsigis), mathoroko (Kikuyu), egesale (Kisii), likhuvi (Luyha)

Diagnostic characters: A tall twinning, spreading or erect perennial but commonly grown as annual herb. The crop exhibits much variation in growth habit, leaf shape, flower colour and seed size and colour. For most cultivars, leaflets are broadly rhombic-ovate with entire margin. Produce many flowers averaging 2 cm long, bright scarlet or purplish in color. Pod averages 20 cm long, lightly pubescent or glabrate and beak rather stout.

Cowpeas are propagated through seed and are often grown as an intercrop with maize or

sorghum but can be grown as monocrop for commercial purposes. Cowpeas are drought tolerant and the early maturing cultivars are well-adapted to semi-arid areas. Some cultivars are susceptible to common diseases and pests, particularly foliage beetle (*Ootheca mutabilis*), legume pod borer (*Maruca testulalis*), thrips and Aphids. And it is also susceptible to powdery mildew caused by *Erysiphe polygoni*. Being a leguminous crop, it has the ability to fix atmospheric nitrogen thus improving soil fertility.



Use: Dried and fresh seeds are edible. Leaves used as vegetables. Tender cowpea leaves and shoots contain 4% protein, 4% carbohydrates, and are rich in calcium, phosphorus, and vitamin B. Dried seeds contain 24% protein and 61% carbohydrates. The leaves can be cooked alone or mixed with other traditional vegetables like spider plant, black night shade, and others to make a vegetable dish called “ayiecho” – see description under Figure 4. A mixture of cowpea leaves and *Corchorus olitorius* makes a popular dish eaten with ‘ugali’.

Preservation: Cowpea is the most commonly preserved indigenous vegetable. The leaves are sun-dried and stored in clay pots for later use. The dried leaves are mixed with a local weed known as ‘bware’ or ‘apoth’ at cooking time to improve the texture and palatability.

Gynandropsis gynandra

Common name: Spider plant or Cat's whiskers.

Local names: Dek/Akeyo (Luo), saga (Swahili), chinsaga (Kisii), thangeti (Kikuyu), saget (Kalenjin), mwianzo (Kamba)

Diagnostic characters: Belonging to the family **Capparaceae**, Spider plant is an erect branched annual herb with hairy, often purple thickly glandular stems growing up to 1 meter high. Leaves are petiolate, having 3-7 palmate leaflets growing up to 8 cm long. Inflorescence is long and bearing many small white or pale pink flowers. The elongate

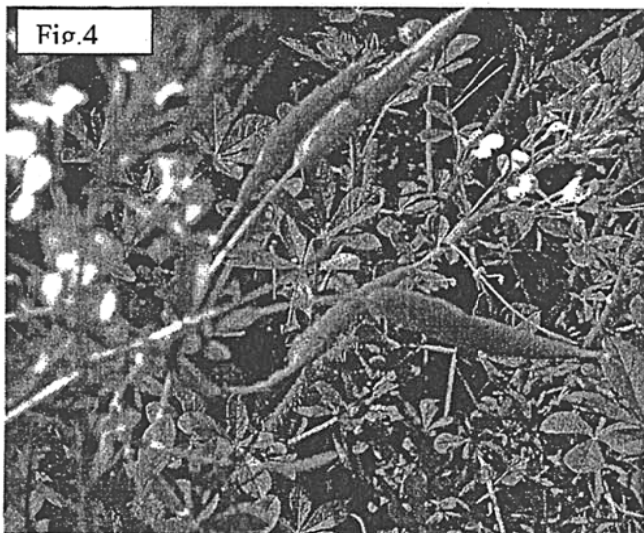


Fig.4

fruit resembles a pod but is referred to as a capsule, containing many small, dark seeds. Spider plant now is widely distributed in the lake region. In Suba it grows from lowlands along the lakeshore to higher elevations of 1200 metres on top of the hills. The plant is either cultivated or harvested from the wild, and when cultivated, the seeds are mixed with sand and either grown by drilling in rows of 45 cm wide and thin the plants to about 15 cm within the row or broadcasting the seeds on finely prepared beds. It is a fast growing

plant and is ready for harvesting as early as three weeks after planting under favorable conditions. Flowering is delayed when adequate well decomposed manure is used in the planting beds. Periods of drought will hasten development of flowers and lower the yields. It requires exposure to sunlight and does not do well in the shade. Pests and diseases are not usually serious except aphids which appear in dry whether.

The first few harvests usually consist of thinned plants and the tops which are removed about 10 cm from the ground. Nipping tops allow the development of new side shoots. The harvesting regime and interval is maintained for prolonged life of the crop.

Use: Leaves are eaten fresh as a cooked vegetable with a bitter taste derived from polyphenolics, which constitutes 0.5 to 0.9% of the edible leaf. It can be cooked alone or in combination with other local vegetables mainly cowpeas, black night shade, and amaranthus to make a dish popularly known as "Ayiecho". 'Ayiecho' has variety of tastes depending on the proportion of the vegetables used. Spider plant has high nutritive value, it contains 5% protein, 6% carbohydrates, and is high in vitamins A and C, Calcium, Phosphorus and Iron, hence recommended for therapeutic treatments in HIV/AIDS patients and other nutritionally vulnerable groups.

In Suba District, it is believed to be good in treating stomach problems; also used for treatment of conjunctivitis and severe infection of thread-worms.

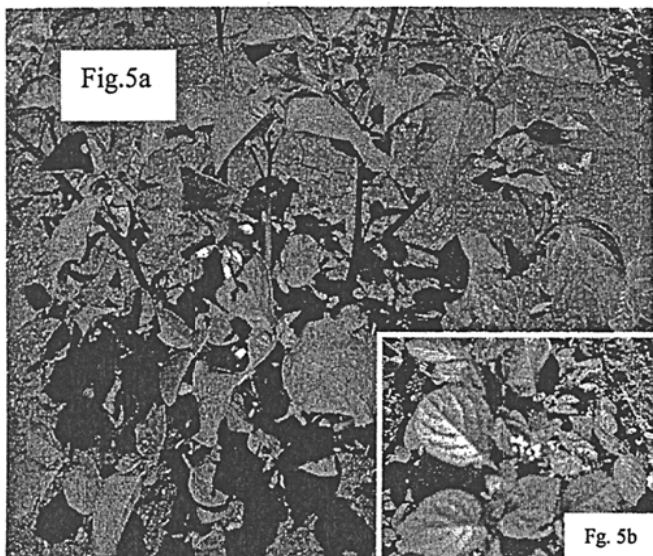
Preservation: The leaves may also be dried and stored for up to one year though this practice greatly reduces the nutritive value and changes the texture. This is a common practice with the older generation while addressing household food security, whereas the younger generations prefer freshly prepared spider plant.

Solanum nigrum (Family: *Solanaceae*)

Common name: Black night shade

Local names: Osuga (Luo), mnavu (Kiswahili), managu (Kikuyu), kitulu (Kamba), namaska (Luyha).

Diagnostic characters: An erect, many-branched herb growing up to 30-60 cm high and is a common weed on farmlands. Branches are glabrous or pubescent. The leaves are thin,



obovate or lanceolate, slightly pubescent and grows up to 10 cm long and 5 cm wide, numerous white flowers borne in umbellate cymes at or above nodes. Mature berry orange (other types black, red or dark purple), glabrous and about 6 mm in diameter containing many small, flattened yellow seeds. Plants are propagated from seeds. African nightshades are well adapted to Suba soils and do extremely well in organic plots. Other solanum species are found in household organic kitchen gardens in Suba having been collected from other districts in

Kenya and the neighbouring countries especially by women. These include *Solanum macrocarpon*, *S. villosum* fig 5b, and *S. scabrun*. Varieties with pubescent branches and leaves are fairly bitter in taste and these are generally found at higher elevations, the variety shown in figure: 5, "Osuga - Nya-luo" is less bitter. Leaves and shoots can be affected by mites resulting in deformed growth and reduced productivity.

The crop is ready for harvest four weeks from transplanting. The stems are cut approximately 15 cm above the ground. This allows new side shoots to develop. Pickings are done at weekly intervals. Picking should be done early in the morning or late in the afternoon.

Use: Leaves are eaten as cooked vegetable, alone or mixed with other vegetables. Fresh ripe berries are eaten by children and birds.

Preservation is done by sun-drying in the same way as for spider plant.



Figure 6a: Local amaranth
Amaranthus hybridus (Family: *Amaranthaceae*)

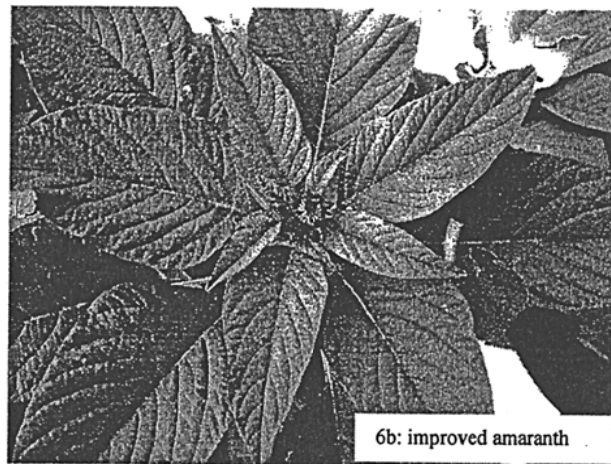
Common name: Pig weed

Local names: ododo (Luo), mchicha (Kiswahili), terere (Kikuyu), lidodo (Luyha), emboga (Kisii)

Diagnostic characters: A herbaceous annual with alternate, usually entire and stalked green or red leaves. Inflorescence is a dense axillary head or terminal branched flower stalk (spike) bearing small, black, shiny seeds. Flowers are white, pink, purple

green. Several other species of amaranth occur, some as serious weeds but others are also eaten including: *A. graecizans*, *A. tricolor* and *A. hybridus*.

Use: Leaves are cooked alone or combined with other local vegetables such as spider plant and pumpkins. The leaves are rich in calcium, iron and vitamins A, B and C. but fairly low in carbohydrates. Amaranth is commonly found as weed hence rarely preserved.





Botanical name:

Common name:

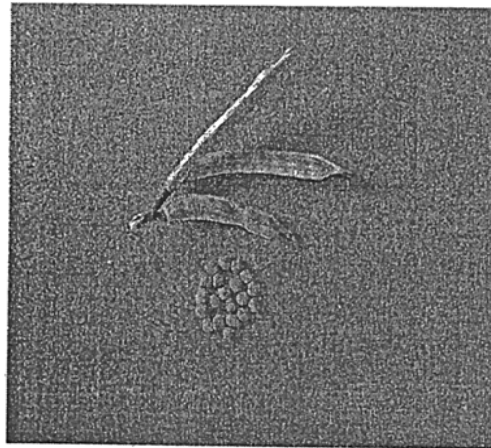
Local name: "Nya-ICIPE"

Description: An erect, many-branched perennial herb growing up to 1 metre high. Leaves glabrous and petiolate. Flowers small and pinkish in colour. Produces numerous pods containing 8-10 grey small seeds. The plant regenerates successfully at the onset of the rains and therefore can last for several seasons in the garden.

Use: Leaves are edible.

Note: The vegetable is popularly called "nya-ICIPE" because nobody is fully aware of its origin hence the farmers associate it with the research institution. It is well adapted to Suba environmental conditions and several farmers have planted it. Its utilization is less expensive compared to other local vegetables that require a lot of milk or fresh butterfat for cooking.

Further documentation work is required from relevant scientists.



7: *Corchorus olitorius* (L)



Common name: Jute

Local names: Apoth (Luo)

Description: A herbaceous annual belonging to the family *Tiliceae* with shiny ovate-lanceolate leaves, 4-11 cm long. Capsule slender with pointed tip. It produces yellow flowers averaging 1cm long, green pods and black seeds. Seeds should not be sown within four months to avoid dormancy of the seeds. Apoth are native to Africa, and it grows voluntarily at the onset of the rains as a weed of arable land

in Suba. When cultivated, the seeds can be broadcast or sown along rows of 20 cm wide. Broad varieties with many side shoots require wider spacing of about 30 x 45 cm. Apoth responds well to manure. Pests and diseases are not usually problematic for apoth. Four landraces exist but the two pictured are the most preferred for cooking and marketing. Farmers usually harvest the top fresh shoots at approximately 15 cm above ground and allow new side shoots to develop. More frequent and intense plucking of leaves tends to prolong the vegetative phase.

Utilization: Leaves used as vegetable, either alone or in combination with mainly cowpeas or pumpkin leaves. The latter combination is a good weaning diet.

Preservation is a common practice with the older generation especially old women. A desired quantity of 'apoth' is uprooted and put in the shade to dry. Later they are arranged in small bundles which are tied together and kept in large clay pots sealed with cow dung to be used during lean periods. The preserved 'apoth' can last as long

as one year. During scarcity the dried vegetables are reconstituted, cooked and consumed.



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