

Potentially Important Food Plants of Nigeria



FOOD PLANT SOLUTIONS
ROTARY ACTION GROUP
Solutions to Malnutrition and Food Security



A Project of the Rotary Club of Devonport North,
District 9830 & Food Plants International

Potentially Important Food Plants of Nigeria

Dedication

This book is dedicated to the 3 billion hard working farmers and families around the world who cultivate these, and other, food plants for their own subsistence, and who help conserve them in their rich diversity for other people to enjoy.

Bruce French (AO), agricultural scientist, founder of Food Plants International and developer of the “Edible Plants of the World” database.

Preface

This guide is based on information from the Food Plants International (FPI) database developed by Tasmanian agricultural scientist Bruce French. The source material and guidance for the preparation of the book has been made possible through the support of Food Plants International, the Rotary Clubs of District 9830, particularly the Rotary Club of Devonport North who founded Food Plant Solutions, (previously the Learn&Grow project), and many volunteers who have assisted in various ways.

The selection of plants included in this guide has been developed by Lyndie Kite working in a voluntary capacity using the selection criteria developed by Food Plant Solutions. These selection criteria focus on the local plants from each of the main food groups with the highest levels of nutrients important to human nutrition and alleviation of malnutrition. It is intended as a **Draft Guide only** to indicate some important food plants that serve as examples for this purpose. Other important nutritious plants may be equally useful, and it is recommended that the FPI database be used to source information on the full range of plants known to occur in Nigeria. This guide has been developed with the best intention to create interest and improve understanding of the important local food plants of Nigeria, and on the understanding that it will be further edited and augmented by local specialists with appropriate knowledge and understanding of local food plants.

Food Plant Solutions was initiated by the Rotary Club of Devonport North to assist in creating awareness of the edible plant database developed by Food Plants International, and its potential in addressing malnutrition and food security in any country of the world. In June 2007, Food Plant Solutions was established as a project of Rotary District 9830, the Rotary Club of Devonport North and Food Plants International. The primary objective of the project is to increase awareness and understanding of the vast food resource that exists in the form of local plants, well adapted to the prevailing conditions where they naturally occur, and how this resource may be used to address hunger, malnutrition and food security. For more information, visit the website www.foodplantsolutions.org. More detailed or specific information on plants, including references to material by other authors, is available on DVD on request.

Disclaimer: This Field Guide has been produced using information from the “Edible Plants of the World” database compiled by Bruce French of Food Plants International. Although great care has been taken by Food Plants International and Food Plant Solutions, neither organisation, or the people involved in the compilation of the database or this Field Guide:

- makes any expressed or implied representation as to the accuracy of the information contained in the database or the Field Guide, and cannot be held legally responsible or accept liability for any errors or omissions
- can be held responsible for claims arising from the mistaken identity of plants or their inappropriate use
- assume responsibility for sickness, death or other harmful effects resulting from eating or using any plant described in the database or this Field Guide

Always be sure you have the correct plant, and undertake proper preparation methods, by consulting with specialist scientists or local users of the plant. The Food Plants International database, from which the information in this Field Guide is drawn, is a work in progress and is regularly being amended and updated.

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Introduction

Potentially Important Food Plants of Nigeria has been produced to provide information on approximately 40 edible plants that are known to grow in Nigeria. These plants come from all the major food groups and have been chosen because of their high nutritional value. Many of the plants in this book may be neglected and under-utilised plants. This means they may not be well known. However, because they are high in many beneficial nutrients, and they are already adapted to the environment, and therefore likely to require minimal inputs, they could be important food plants that are likely to be superior to imported foods and plants. Commercially grown plants may also be included in the book, but only if they are significant foods for household consumption. It is hoped people will become confident and informed about how to grow and use these plants as many local food plants provide very good quality food.

Growing food

Growing food to feed a family is, without doubt, one of the most important things anyone can do. The more interest you take in your garden and the more you learn about plants and how to grow them well, the more interesting and fun food gardening becomes.

A country with very special plants

The local food plants of most countries have not been promoted and highlighted in the way they deserve. Visiting a local food market will quickly show what a rich variety of food plants can be grown in this country. Good information about these plants is often still in the minds and experience of local farmers, and has not been written down in books. This can make it hard for the next generation of young people to find out how to grow them.

In many countries, some of the traditional food plants are only harvested from the wild and others are only known in small areas. Others have hundreds of varieties and are the main food for people in different regions. Information on all these plants, their food value and the pest and diseases that damage them is available in the Food Plants International database.

Getting to know plants

People who spend time in gardens and with their food plants get to know them very well. It is a good idea to learn from someone who grows plants well. Each plant grows best in certain conditions and there are often special techniques in getting it to grow well. For example, sweet potato will not form tubers if the soil is too wet, but it may still grow lots of green leaves. Taro will grow in light shade, but sweet potato will not. Ginger can grow in fairly heavy shade. Pruning the tips of betel leaf or pepper vines will cause more side branches to grow and therefore, produce more fruit. Stored yam tubers need special treatment if you want them to put out shoots early. There are lots of unique things about every plant and learning about these helps a good gardener produce more food.

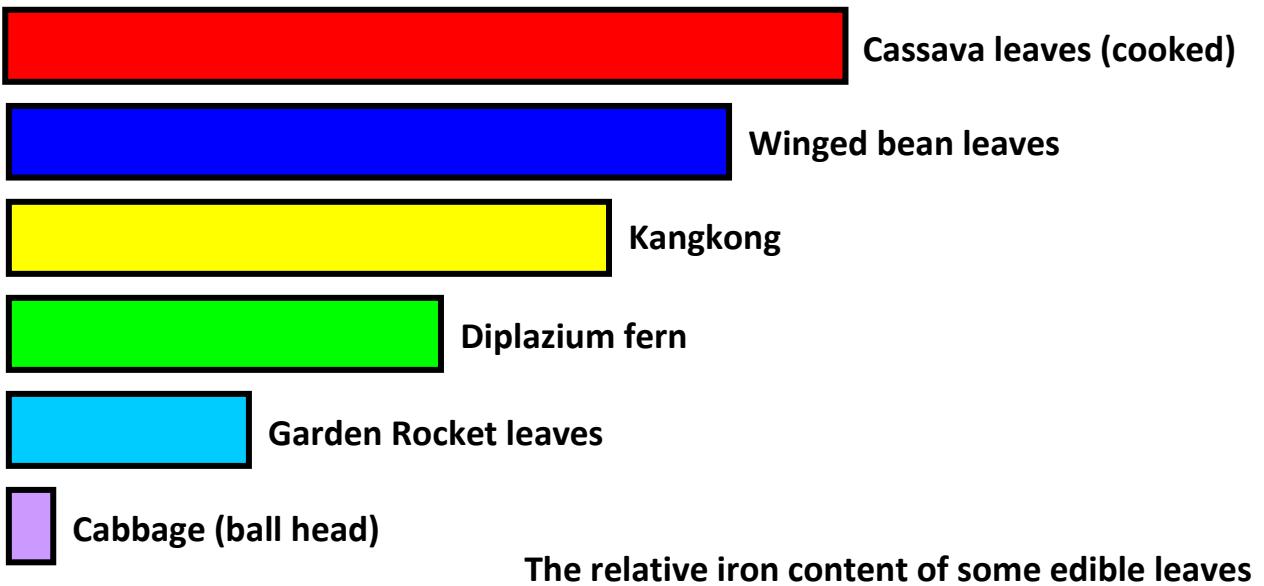
Naming of plants

Many food plants have local names, as well as a common English name. Every type of plant also has its own scientific name. Although the scientific name might not be widely recognised, this is the link by which people in different countries and with different languages can recognise the same plant. We know that many plants are grown in many different countries, but relying on local or common names, we might not recognise the same plant grown in different places. By using scientific names to accurately identify plants, we can get useful information from people in other countries. Wherever possible, plants in this book are named by their common English name and their scientific name.

Local food plants are often very good

People sometimes think that local food plants are not very special and that any food plant that is new or comes from another country must be a lot better. This is often not true. Many of the newer or introduced food plants, such as the round or ballhead cabbages, have very little food value. Many traditional tropical green, leafy vegetables and ferns have 10 times or more food value as ballhead cabbage or lettuce. It is important to find out more information about the food value of different foods if we want to eat well. Citrus fruit, such as lemons and oranges, are often grown for vitamin C that helps keep people healthy. These fruits do not grow well in the tropics - the common guava fruit has three times as much vitamin C and is loved by children. This is just one example that there are often much better choices of local foods with higher levels of important nutrients.

Our bodies need a variety of food plants to enable us to grow, stay healthy and have enough energy to work. Different foods are needed to provide energy, protein, vitamins and minerals. The following diagram highlights the iron content value of some traditional edible, tropical plant leaves, compared with cabbage. Iron is a nutrient that is very important for our bodies and especially our blood. People who are short of iron become anaemic and lack energy.



A healthy balanced diet

Good nutrition, or eating a healthy balanced diet, is really very simple. If people eat a wide range of food plants, their bodies will normally get a balanced amount of all the different nutrients they require. If a nutrient is lacking in one food plant, then they are likely to get it from another plant if they are eating a range of food plants. For this reason, everybody should eat a range of different food plants every day. The food group that is especially important for young people is the dark green leaves. Everyone should eat a good serving of dark green leaves every day. They have many vitamins and minerals, as well as protein. There are many spices or flavouring plants that can improve the taste of foods, but taste should be considered separately from food value.

Learning to cook well

Even though some nutrients in food can lose some of their value during cooking, it is normally much safer to cook all food plants, at least for a short time. Bacteria, which cause diarrhoea, can occur in gardens and on food plants. These are killed during cooking. Many plants in the tropics develop cyanide, a chemical that makes them bitter and poisonous. This happens often with cassava (tapioca, manioc) and beans, but can also occur in many other plants. Boiling the food for two minutes normally destroys cyanide and makes the food safe to eat. Some of the nutrients our bodies need (such as vitamin A for good eyesight) only become available when food is cooked in oil.

Learning to grow “wild” food plants

Many plants grow wild in the bush and are not cultivated by people. We can normally find someone who has taken an interest in them and has learned to grow them. This may be people from a different language group. It may be that in their area they have found better types than the ones that simply grow wild.

Saving better types of plants

If we simply allow plants to grow from seed, the improvements that have been made in finding sweeter or better types may get lost. Some fruit trees are like this and the fruit produced may not be sweet at all. It is often necessary to take cuttings from a tree to be sure the new plant is exactly the same as the old one. If the plants won't easily grow from cuttings simply by sticking a piece of the branch in the ground, there are other ways of helping these plants to form roots and start to grow. One good way is to make a small cut in the bark of a young branch and then wrap soil around the cut and cover it with plastic. With plants like guava, new roots will start to grow from this cut and grow into the soil wrapped around the branch. It can then be cut off and planted. This is called air-layering. A similar method is used with the roots of breadfruit. A shallow root is uncovered and a small cut made from which a new sucker will start to grow. This can be cut off and replanted.

Growing from cuttings and suckers

Many food plants are grown from cuttings and suckers. This is very important, as it allows all the different kinds of yams, taros, bananas, sweet potato and sugarcane to be continually grown and ensures the varieties are preserved. Each plant has its own special propagation method. It is important to use healthy planting material, as diseases can be spread in planting material.

Saving seed

Some food plants are grown from seed. Sometimes this is very easy as the seeds are large, store well, grow easily and grow the same as the original plant. It is more difficult with other plants. Many large fleshy seeds, such as breadfruit, need to be planted while still fresh as they do not store easily. Other seeds do not “breed true” or do not grow into new plants that are the same as the original plants. For example, the fruit may not be as large or sweet or have the same colour or taste. With many of these plants, it may be necessary to find ways of growing them from cuttings or other methods such as grafting. Some plants “inbreed” and get smaller or poorer. This happens when a plant self-pollinates or receives pollen from a close relative. Corn grown in small plots normally does this and the plants grown from seed grown in this situation get smaller and smaller each year. The seed needs to be saved from several different plants with different history and then mixed together before sowing. All the seeds on one cob are related and will inbreed. Some seeds develop a hard seed coat and need to be scratched, soaked in water, or even put into hot water, before they will start to grow. Saving local seeds is often a good idea as they are already adapted to local conditions. For example, seed saved from pumpkins grown locally will produce plants with less pest and disease damage than those grown from imported seed. *If you can't get seeds or planting material from local gardens – it is probably not a suitable local plant!*

Growing a garden of mixed plants

In nature, one variety of one plant never grows alone. There are always lots of different plants of different kinds and sizes, all growing together. Anyone who has ever walked into a tropical jungle will know this very well. The reason people all over the world want to save the rainforest is because it has so many different kinds of plants all growing together. Growing plants in a food garden in a way similar to how they grow in nature, as a mixed group of plants, is very good agriculture. Mixing plants in a garden usually gives more reliable food production, as any disease from one plant will wash off in the rain onto a different plant, where it cannot survive. Small plants fill the gaps and reduce the need for weeding.

Different types of plants for food security

There is another reason for growing a range of food plants in a local garden or around a village. If something goes wrong, like extreme insect damage to plants, some disease occurring in the garden, or a poor growing season, some plants will be more damaged than others. With a variety of plants, there will still be some food to eat until the other plants recover and grow again. Also, a wide variety of plants will mean that different ones will be maturing at different times, which helps ensure a continuous supply of food. There are shrubs that can be planted as edible hedges around houses, and fruit and nut trees that need to be planted as a gift for your children, several years before they will be able to enjoy them. Some nuts can be stored and eaten when other foods are not available. Most yams will store well for a few months.

Looking after the soil

Gardeners in traditional tropical agriculture usually move their gardens often by shifting to a new piece of land. There are usually three reasons for this:

- In the tropical lowlands, weeds can become a very big problem. There are usually a lot fewer weeds in the first year or two after clearing and burning the land, but weeds increase in the following years.
- Some of the nutrients in the soil are used each year and the soil becomes poorer and plants do not grow as well. There are ways of reducing this loss of nutrients.
- Very small worms called nematodes build up in the soil after a few years and get into the roots, especially of annual vegetable plants, and stop their roots working properly. For example, root knot nematode will cause the roots of plants like tomatoes and beans to become twisted resulting in poor growth of the plant.

Building up the soil

When a new garden has been cleared, it has lots of leaf mulch and other old plant material. This provides plant nutrients for new plants to grow. There is a simple rule for growing plants and improving the soil - "If it has lived once, it can live again." Any old plant material can provide nutrients for new plants to grow, but it must be allowed to rot into mulch or compost for this to happen. If this plant material is burnt, some nutrients, especially phosphorus and potassium ("potash"), get left behind in the ashes for new plants to use, although it also allows these important nutrients to be lost by being washed away by rain. But with burning other important nutrients, such as nitrogen and sulphur, get lost in the smoke and disappear from the garden and soil. These last two plant nutrients are especially important for growing green leaves and when their levels are low, plants grow small or pale green. When nitrogen is lacking, the old leaves of the plant go pale and fall off early, and when sulphur is lacking, the young leaves go pale. Wherever possible, old plant material should be covered with some soil to allow it to rot down and not simply dry out or get burnt.

Poor soils where crops won't grow

When soils are very acid (or sour), plants cannot get the necessary nutrients. Natural chemicals in the soil that are toxic to plants when present at higher levels become soluble, get into plants, and stop them growing. Adding limestone to these soils can improve them. Using compost will not make them less acid, but will keep the plant nutrients in the soil in a more readily available form that plants can use.

Soil nutrients

Plants need 16 different kinds of plant food or nutrients in different amounts to grow properly. A plant that has already been growing will have these nutrients in them and probably even have them in a balanced amount. That is why composting old plant material is so important. Plants usually show some signs or symptoms if any of these nutrients is running out.

One of the most common and important nutrients for plant growth is nitrogen, which actually comes from the air, but gets into plants through the soil. When plants are short of nitrogen, their older leaves often become yellow or pale. When grass family plants, like sugarcane and corn, are short of nitrogen, the centre of the oldest (lowest) leaves starts to develop a dry or dead V-shape. The plant cannot find enough nitrogen in the soil so it gets it from an old leaf to grow a new leaf. This causes the old leaf to die, forming a characteristic V-shape in the centre of the leaf. The plant does not get any bigger as an old leaf dies each time a new leaf is produced. Village farmers often walk through grassland before they clear it for gardens, looking to see if the grass leaves are dry and dead, because they know gardens on this soil won't grow well. It is necessary to use compost or legumes (such as beans) to put nitrogen back into the soil. Growing plants from the bean family (legumes) is the most efficient way to increase the level of nitrogen in the soil.

Corn is a good plant for indicating which nutrients are running short in the soil. If the older leaves go dry along the edges, the soil is running out of potash. If leaves that are normally green develop a bluish colour, the soil is short of phosphorus. Generally, leafy crops need lots of nitrogen, and root crops need lots of potash.

Making compost

Compost is old plant material that has been allowed to rot down into a fine, sweet smelling mulch that is full of nutrients that can be put back on the soil to grow new plants. Making good compost is very simple. A simple heap of plant material can be made in the corner of a garden or near a house. The composting process is carried out by small bacteria that live in the soil and feed on decaying plants. They break down old plant material into compost. These bacteria are living, so they need air, water and food. A good compost heap must have air, so don't cover it with plastic or put it in a container. This makes a foul smelling compost, as different bacteria that don't need air turn it into an acid mixture that preserves it. Good compost must have moisture, so keep the heap damp, but not too wet. The compost bacteria like a balanced diet, which means that both green material and dried material is needed to balance the carbon and nitrogen in the compost pile. If the compost material gets too dry and brown, it will not break down, and if it gets too green, it will go slimy. Using a little bit of compost from an old heap will make sure the right bacteria are there to start the whole process off. As soon as the plant material is broken down to a fine mulch it can be put onto the garden. It is best if it is dug in, but if it is regularly put onto the surface of the garden, worms will mix it into the soil.

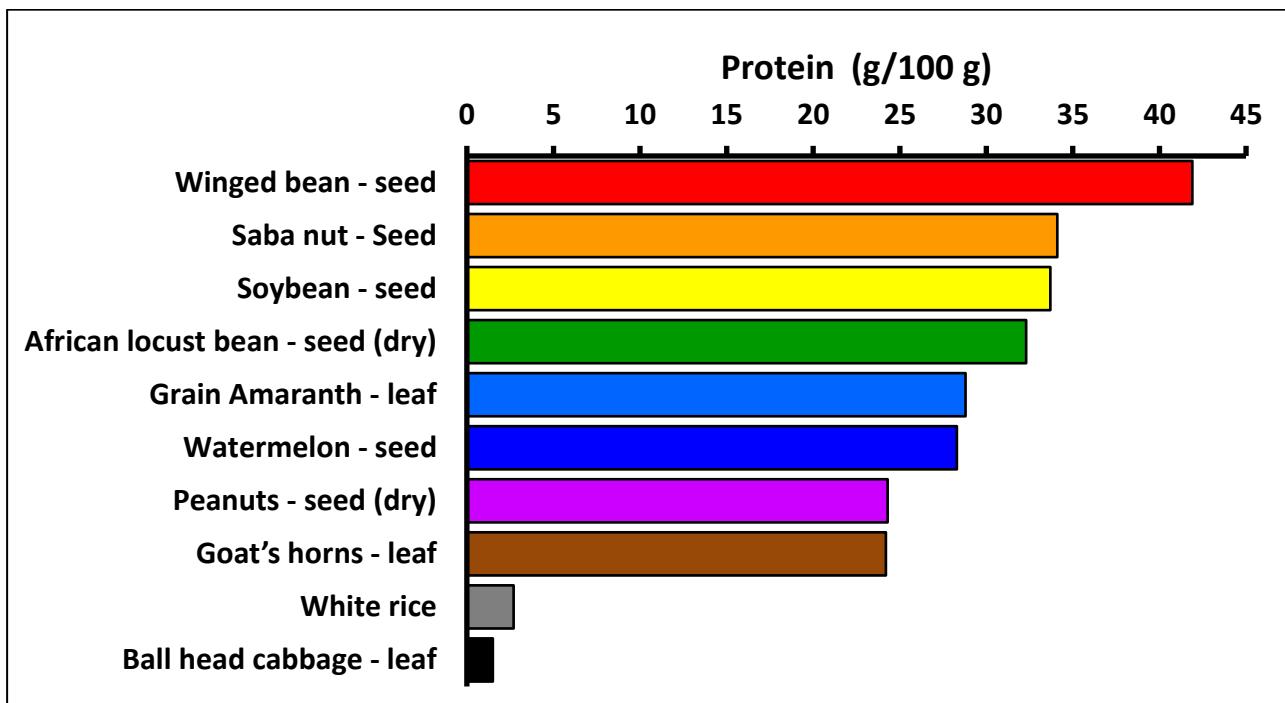
Pests

There are a large number of insects that enjoy sharing our food with us! We should not try to kill all these insects as they have an important role to play in keeping everything in nature in balance. What we need to do is to learn to manage these insects so we can all get some food to eat! Some insects are attracted to lights, and if the garden is near village lights some insects can cause a lot of damage. If large areas of one particular crop are planted, insects can breed more quickly and cause a lot of damage. As an example, insects called armyworms can breed up in large numbers on the shade trees of cacao and then move "like an army" into gardens. Some insects are large and breed slowly and can be picked off and removed. The large, green grubs with pointy tips that hide under taro leaves are best controlled by simply picking them off. Some insects, like taro beetles, can be a serious problem, but the young curl grubs of this insect are tasty if you catch and cook them. Some insects do not like sunlight. The very small moth than damages banana fruit is like this. Simply pulling off the leafy bracts over the banana fruit reduces the damage, as this lets sunlight in and the insect flies away. The best rule for reducing pest damage is to grow healthy plants, as they suffer less damage.

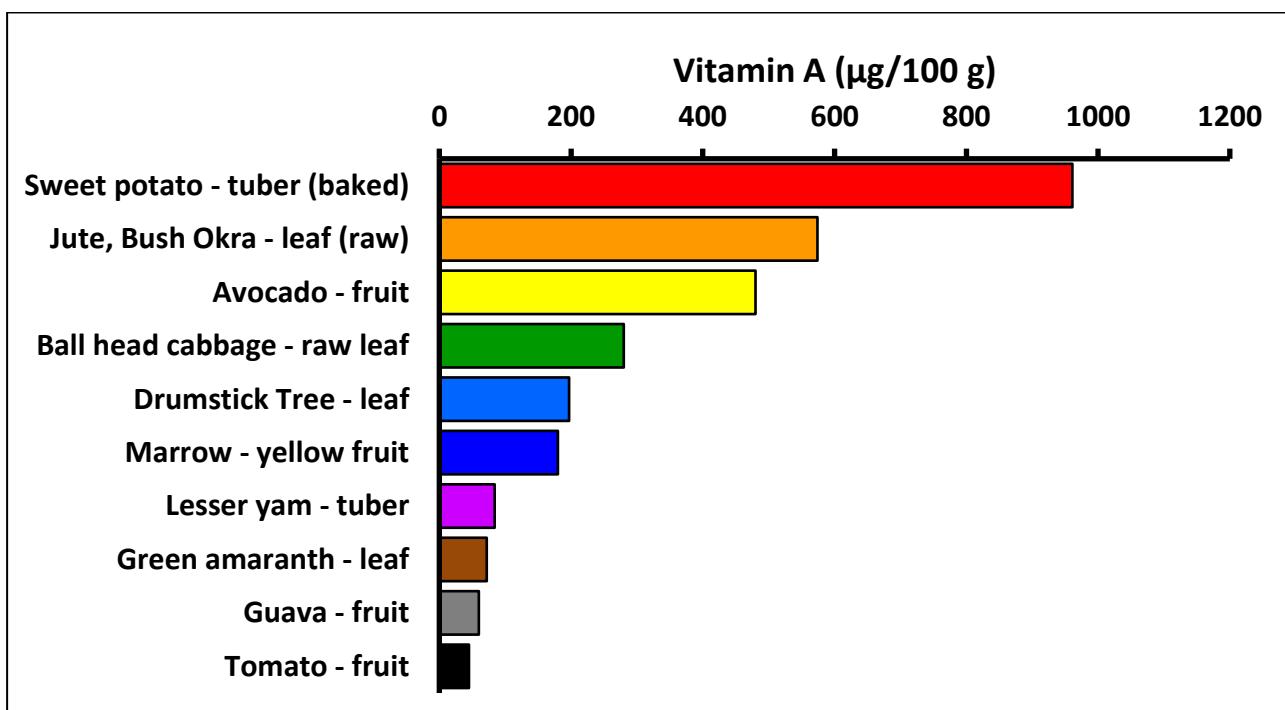
Diseases

The living organisms that cause disease are much smaller than insects. These disease organisms can often only be seen with a microscope. There are three main kinds of disease organisms - fungi, bacteria and viruses. Fungi are like the mushrooms we eat, only very much smaller. They usually make distinct dry spots on leaves and other plant parts. Fungi have spores that often blow in the wind. Bacteria are often smaller and live in damp places. They usually make plants go soft and squishy, and they may cause a smell. Bacteria are mostly spread with rain and in water. Viruses are very, very small and usually make irregular stripes and patterns on leaves and other plant parts. Viruses usually spread in planting material or in the mouths of small sucking insects. One common fungus disease on sweet potato causes the leaves to become wrinkled and twisted. It usually gets worse in old gardens and where soils are running out of nutrients. It doesn't affect all kinds of sweet potato to the same extent. The answer is not to stop the disease, but to improve the soil. The general rule is that healthy plants that are growing well will suffer less damage from disease.

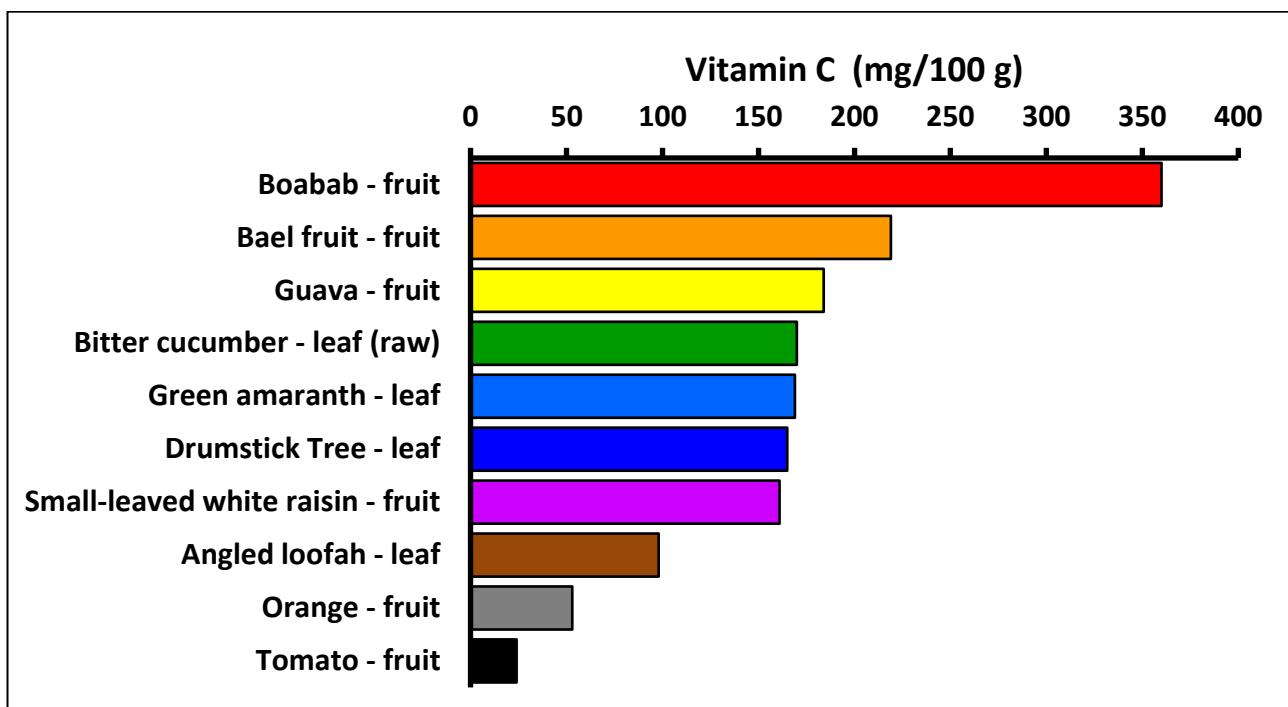
Food value charts for a selection of plants from Nigeria



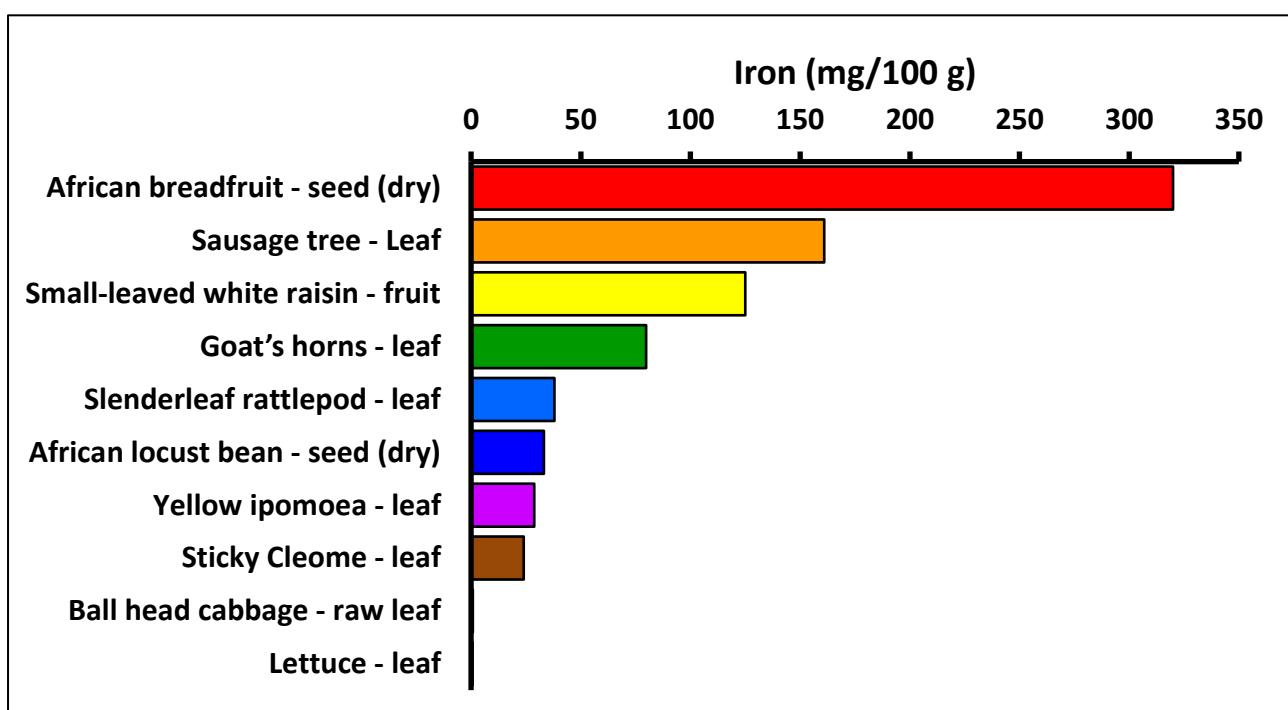
Protein helps the body repair cells and make new ones. Protein is also important for growth and development in children, teens, and pregnant women. Symptoms of protein deficiency include wasting and shrinkage of muscle tissue, and slow growth (in children).



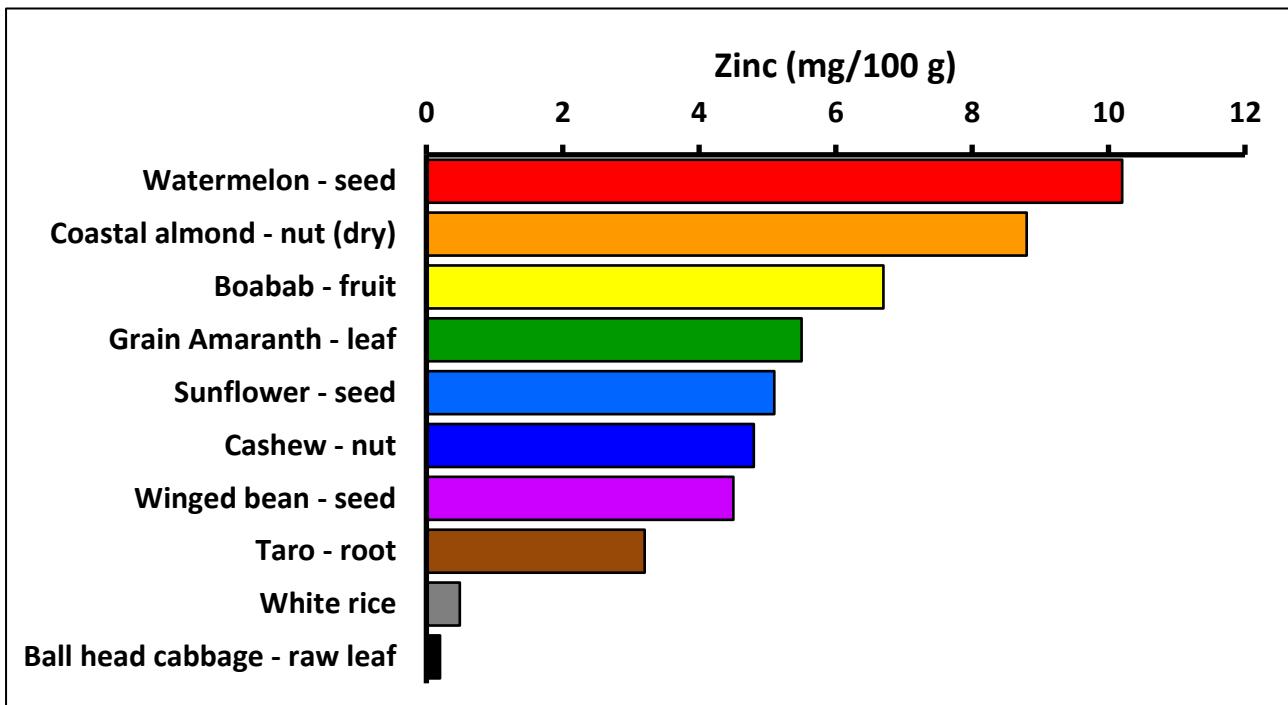
Vitamin A is very important for eyesight and fighting disease, particularly in infants, young children and pregnant women. People who are short of Vitamin A have trouble seeing at night.



Vitamin C helps us avoid sickness, heal wounds, prevent infections and absorb iron from food. Severe vitamin C deficiency increases the risk of scurvy with symptoms such as inflammation of the gums, scaly skin, nosebleed and painful joints.



Iron is important because it helps red blood cells carry oxygen from the lungs to the rest of the body. Low levels of iron cause anaemia, which makes us feel fatigued. Iron is also important to maintain healthy cells, skin, hair and nails. Iron is more available when Vitamin C is also present.



Zinc is particularly important for the health of young children and teenagers, and to help recovery from illness. It is needed for the body's immune system to work properly. It plays a role in cell division, cell growth, wound healing, and the breakdown of carbohydrates. Zinc is also needed for the senses of smell and taste. Zinc deficiency is characterized by stunted growth, loss of appetite, and impaired immune function.

Note regarding plant selection: In compiling these field guides, we acknowledge that some staple foods and commercial crops which are grown widely in the target country may be omitted. Such foods are often in the starchy staple category (e.g. rice, corn). This does not mean that they are not useful, but merely reflects a desire for the Food Plant Solutions project to concentrate on plants that are less well known and/or underutilised.

Starchy staples

English: Taro

Local:

Scientific name: *Colocasia esculenta*

Plant family: ARACEAE

Description: This plant has large flat leaves on the end of upright leaf stalks. It grows up to 1 m high. The leaf stalk or petiole joins the leaf towards the centre of the leaf. The leaves are 20 - 50 cm long. Near the ground a thickened rounded corm is produced. Around this plant there is normally a ring of small plants called suckers. Many different varieties occur. If left to maturity, a lily type flower is produced in the centre of the plant. It has a spathe 15 - 30 cm long which is rolled inwards. The flowers are yellow and fused along the stalk. There are many named cultivated varieties. Taro comes in two basic forms. The Dasheen type *Colocasia esculenta* var. *esculenta* and *Colocasia esculenta* var. *antiquorum* or the Eddoe type. The basic difference is the adaptation of the Eddoe type to storage and survival in seasonally dry places, while the dasheen type needs to be maintained in a more or less continuously growing vegetative stage.



Distribution: It is a tropical plant. Taro grows from sea level up to about 2,300 m altitude in the tropics. It grows well in humid places. It can stand damp soil and grow under light shade. It suits hardiness zones 9 - 12.

Use: The corms, petioles and leaves are all edible after cooking. The leaves are also dried and stored. Fresh leaves can be stored for 4 - 5 days. **Caution:** Some varieties burn the throat due to oxalate crystals.

Cultivation: Taro can be planted from cormels or from the top of the central corm. Other sections of the corm could also be used but this is not commonly done. Flowering of taro and seed production can lead to new cultivars. Flowering can be promoted by the use of gibberellic acid. The general growth pattern is for an increase in top growth, in terms of leaf number, leaf area and petiole length, to continue for about 6 months under tropical lowland conditions then for each of these to decrease and tuber storage to continue to increase. Corm weight increases significantly from 5 - 11 months. Starch content also increases with time but protein content declines over the corm development period.

Taro can be grown under flooded conditions but root rots develop if the water becomes stagnant. For flooded cultivation, the land is cleared, ploughed, cultivated and puddled. The aim is to get a field that is flat with embankments allowing the impounding of water. Planting is done into 2 - 5 cm of standing water.

For dryland taro, the soil is prepared by digging, unless a fresh bush fallow is used where the natural friability of the soil allows plants to be put into the undug soil in a small hole that is prepared. Plants are put into a hole 5 - 7 cm deep or deeper. Mulching to conserve moisture and reduce weed growth is beneficial. Setts from corms normally give higher yield than that from cormels. The greater leaf area and root production may be responsible for this. Setts of about 150 g are optimum.

The time of planting is primarily determined by the availability of moisture. Planting is done shortly after the rainfall has become regular, if seasonally distinct wet and dry occur. Higher rainfall, higher temperatures, and higher hours of sunlight, enhance production and determine seasonality of production.

Evapotranspiration for flooded taro averages about 4 mm per day, ranging from 1.5 - 7.2 mm, with a total of about 1,200 mm for the crop. Intermittent moisture can result in irregular shaped corms. Flooding has been found to be more effective than sprinkler irrigation, or furrow irrigation. Increased suckering, giving greater leaf area, seems to be the reason for this.

Taro is sensitive to weed competition throughout most of its growth, but it is more critical during early growth up to 3 - 4 months. About 7 - 9 weedings are required, to keep the crop clean under tropical lowland conditions, where flooding is not used. Due to the decrease in height and leaf area towards the end of the growth cycle when starch accumulation in the corms is maximum, weed competition and weed control are again significant. Mechanical weeding needs to be shallow to avoid damaging the superficial taro roots. A range of herbicides have been recommended in various situations.

Taro produces the highest dry matter yield under full sunlight, but it can still grow under moderate shade. Under shaded conditions it grows more slowly and develops fewer cormels. They require good moisture conditions and have little tolerance for drought. Taro residue has an allelopathic factor which can reduce the germination and growth of other plants, for example, beans.

Taro tends to demand high fertility, and is responsive to additional NPK fertiliser. Higher doses of K increases starch content and higher doses of N increases protein content. Both N and K applications increase oxalic acid content of the tubers.

Spacing affects total yield, and marketable, harvestable yield, of corms. Close spacing increases the corm yield per area, and the shoot yield per area, but decreases the corm yield per plant, and the contribution of sucker corms, to the yield. Where spacings of 30 cm x 30 cm are used, giving about 110,000 plants per hectare, a very large amount of planting material is required, which reduces the net return per unit of planting material. A spacing of 60 cm x 60 cm is more common. Wider spacings of 90 cm x 90 cm reduces overall yield.

Production: Crops mature in 6 - 18 months. Yields of 5 - 15 tonnes per hectare are probably average.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
root	66.8	1231	1.96	3	5	0.68	3.2
leaf	85.0	210	5.0	57	90	0.62	0.7
leaf stalk	93.0	101	0.5	180	13	0.9	-
leaf (cooked)	92.2	100	2.7	424	35.5	1.2	0.2

Starchy staples

English: Coconut

Local:

Scientific name: *Cocos nucifera*

Plant family: ARECACEAE

Description: Coconuts are produced on palm trees that grow to about 25 m tall. The unbranched trunk has ring-like leaf scars along it. It is swollen and surrounded by a mass of roots at the base. Dwarf varieties have been produced. The fronds are 2 - 6 m long and are divided along the stalk into strap shaped leaflets. The leaflets are 60 - 90 cm long and are narrow. Clusters of large fruit develop beneath the fronds. Male and female flowers are separate on the one stalk. Female flowers are near the base. Flowers are cream and covered by boat shaped bracts. Fruit are up to 25 cm diam. and are fibrous on the outside. The hard shell inside is filled with coconut milk and the white copra layer.



Distribution: Coconuts grow mainly in tropical coastal areas (occasionally up to 1,000 m altitude). Temperatures of 27 - 32°C are best with a daily range of 5 - 7°C. They need a minimum temperature of over 18°C to bear fruit. They require over 1,000 mm of rain/year and preferably 1,500 mm. Soils need to be well drained. Plants require full sunlight. Coconuts are salt tolerant and can tolerate soils with pH of 5 - 8.

Use: The liquid of fresh nuts can be drunk. The flesh can be eaten, as can the "apple" in sprouting nuts. The flesh is usually grated and used in cooking as "coconut" milk. The young shoots at the top of the palm (palm hearts) can be eaten, although this kills the palm. The sap from the flower stalk can be tapped for the sugary juice and oil can be extracted from the kernel.

Cultivation: Seeds of coconuts should be selected from regular bearing palms that produce more than 80 nuts per year. Selected nuts should be sprouted in a nursery. Seeds that have not germinated within 3 months are usually rejected. Seedlings are ready for transplanting when they have 3 - 4 leaves (about 1 year). The nut should be planted in a hole 0.6 x 0.6 m. A spacing of about 7 - 8 m is suitable.

Production: Early germinating nuts give early production in the field. They can commence production after 6 - 8 years, although best production occurs from 12 - 60 years. Trees can live for 100 years. Palms can produce 15 - 100 nuts per year. Fruit take about 1 year to be mature. Tapping the flower stalk can give 1 kg sap/day for 6 months. For palm heart production, plants are put at a close spacing of about 2 m and are ready to harvest in 2 years.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
flesh (dry)	12.2	2429	6.6	0	-	-	-
milk	84.9	1004	3.7	-	8	1.3	0.4
apple	84	310	1.3	-	5.0	0.7	-
flesh (fresh)	80.9	119	1.1	-	-	0.2	0.2

Starchy staples

English: Yellow nutsedge

Local:

Scientific name: *Cyperus esculentus*

Plant family: CYPERACEAE

Description: An upright grass-like sedge. It continues to grow from year to year. It is usually 30 - 90 cm tall. The shiny leaves are long and narrow. They are arranged on 3 rows around an angular stem. The leaves often have a pointed tip and are light green. The flowers are yellow spikes 1 - 1.5 cm long. There are many creeping underground stems (rhizomes). These spread out then end in a swelling. This tuber is round and 5 - 20 mm long. It has a thin brown skin and is crisp and nutty.



Distribution: A tropical plant that grows throughout the tropics and warm temperate zone. It is common in seasonally dry grasslands. It does not tolerate shade. High temperatures (27 - 30°C) and low nitrogen favours tuber production. It grows best in sandy soils with pH 5.5 - 6.5. It can tolerate salty soils. Day lengths of 8 - 12 hours favours tuber production. Day lengths of over 16 hours favour vegetative growth. It can grow in arid places.

Use: The tubers are eaten raw or baked. Sometimes they are ground into flour and boiled into a porridge. The oil from the tubers can be used for cooking. It is edible. The roasted tubers are used as a coffee substitute. The tubers are used as a source of potash for softening and flavouring green leafy vegetables.

Cultivation: Plants are grown from tubers. Tubers are soaked in water for 24 - 36 hours before being planted out. Sometimes tubers remain dormant but if they are chilled they grow better and produce more tubers. A spacing of 10 - 15 cm apart along rows 60 - 90 cm apart are suitable. Tubers should be placed 2.5 - 4 cm deep. The tubers are dug, washed and dried for 1 - 3 days before being sold or used.

Production: Yields of 800 - 900 kg per hectare of tubers are achieved on sandy soils. Yields of 8,000 - 14,000 kg per hectare are possible. Tiger nuts take 90 - 120 days to reach maturity.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
rhizome	36.5	1262	3.5	-	-	8.0	-
bulb	77.4	342	0.9	-	21	4.2	0.6

Starchy staples

English: Lesser yam

Local:

Scientific name: *Dioscorea esculenta*

Plant family: DIOSCOREACEAE

Description: A prickly, climbing yam with a spiny vine. It can climb 1.2 - 2.4 m high and spread 1.8 m across. The vine twines to the left. The leaves are round with a gap where the leaf stalk joins. They are almost heart-shaped. The leaf is about 12 cm long. This yam produces a cluster (5 - 20) of tubers under the ground. The tubers are often sticky when cut. In many varieties, there are sharp thorns just under the ground. The flowers are green, 4 mm across and borne on long slender spikes. These are singly in the axils of leaves. There are many different varieties.

Distribution: It grows in many tropical countries, from sea level up to about 1500 m, but mostly below 800 m. It cannot tolerate water-logging and needs a reasonably long rainy season and a loose, fertile soil. It does poorly on sandy soils and becomes mis-shapen in heavy clay soils. High levels of organic matter promote growth. It suits hardiness zones 9 - 12. Lesser yam is an important root crop for the tropical humid lowlands.

Use: The tubers are cooked and eaten.

Cultivation: Normally, small tubers (50 - 75 g) are planted, but cut portions of a tuber can be used. Using either the top or the bottom section of a tuber gives better establishment and yield than middle portions. Using larger tubers gives larger individual tubers and higher yields for individual plants. With a spacing of 30 cm between plants and 100 cm between rows, about 2,000 kg of planting material are used if 70 g tubers are used. Tubers are planted 8 - 12 cm below the ground. Plants can be grown from stem cuttings where a leaf and node are propagated under mist. This method is normally only used for increasing the amount of planting material of a selected variety. Planting in mounds assists drainage, improves aeration and makes harvesting easier. A spacing of 80 - 100 cm between plants is suitable. Planting is normally adjusted to fit in with the beginning of the rainy season. The growing season of 9 - 10 months is long and an extended wet season is therefore desirable. Stakes 2 m long are required. Lesser yams compete poorly in shade. Weed control is most critical during the first 3 months. As early growth of the plant is sustained from the tuber, fertilisers can be applied after planting. Added nitrogen fertiliser is more effectively used when plants are staked. Nitrogen is of more benefit for leaf growth in the early stages of plant development. Potassium is beneficial, although phosphorus applications often do not give significant responses, as lesser yams are efficient at extracting it from the soil.

Production: High yields can be obtained. Plants take about 9 months to reach maturity. In some varieties and under some conditions, leaves do not die-off and tubers must be harvested to avoid tubers rotting as new growth commences. Tubers need to be harvested and handled carefully. They must often be cut from the vine and can be washed and dried. Tubers will store for about 3 months under ventilated conditions above 15°C. Fungal growth and rots easily occur on cut or damaged surfaces under damp conditions. Tubers need to be peeled either before or after cooking.



Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
tuber	74.2	470	2.1	84	20	0.75	0.5

Starchy staples

English: Sweet potato

Local:

Scientific name: *Ipomoea batatas*

Plant family: CONVOLVULACEAE

Description: This is a root crop which produces long creeping vines. The leaves are carried singly along the vine. Leaves can vary considerably from divided like fingers on a hand, to being entire and rounded or heart shaped. Purple trumpet shaped flowers grow at the end of the vine. Fattened tubers are produced under the ground. There are a large number of varieties which vary in leaf shape and colour, tuber shape, colour, texture and in several other ways.



Distribution: A tropical and subtropical plant. They grow from sea level up to about 2,700 m altitude in the tropics. Plants can grow with a wide range of rainfall patterns and in different soils. Plants are killed by frost and can't stand water-logging. Plants grow well with temperatures between 21 - 26°C. It can grow with a pH between 5.2 - 6.8. Sweet potato are not tolerant to shading. It suits hardiness zones 9 - 12.

Use: Tubers are boiled or baked. They can be steamed, fried, mashed or dried. They can be fermented into alcoholic drinks. They can also be used in pies, cakes, puddings and candies and jams. They can be used in noodles. The chopped and dried tubers can be boiled with rice or ground into flour and mixed with wheat flour to make cakes or bread. The young leaves are edible.

Cultivation: Vine cuttings are used for planting. In grassland soils it is grown in mounds, ridges or other raised beds. In bush fallow, it is mostly planted in undug loose soils. It needs a sunny position. Tubers won't form if the ground is waterlogged when tubers start to develop. Sweet potato is grown by cuttings of the vine. About 33,000 cuttings are required per hectare. These weigh about 500 kg. Vine lengths of about 30 cm are optimum. As long as the vine is adequately inserted in the soil, the length of vine inserted does not significantly affect yield. Fresh sweet potato seeds germinate relatively easily and lead to continuous production of new cultivars under tropical conditions. Excess nitrogen restricts storage root initiation and therefore excess leaves are produced without significant tuber yield. Dry matter percentage increases with increasing age of the crop. Higher dry matter tubers are normally preferred.

Sweet potato are not tolerant to shading. Under shaded conditions, both foliage growth and storage root production are decreased. Some cultivars can be selected for increased production under mild shade but not heavy shade. The survival of cuttings at planting is also reduced under shaded conditions. Under shaded conditions, plant become more climbing and with fewer, larger leaves. With increasing shade, fewer tubers are produced and these grow more slowly. Sweet potato tends to be responsive to potassium fertiliser. Cultivars are often selected for yield under low fertility conditions.

Under lowland conditions in the tropics sweet potato tubers undergo active tuber enlargement from 6 - 16 weeks. Weed control is essential especially during early stages of growth. The rate of ground coverage by foliage varies greatly with growing conditions and cultivar, but once ground coverage has occurred, weed control is less of a problem. Sweet potato tuber initiation is subject

to aeration in the soil. Either heavy clay soils, waterlogged conditions or other factors reducing aeration can result in poor tuber production. For this reason, sweet potatoes are often grown on mounded beds. In well drained or high organic matter soils, digging or mounding is not as essential. Leaf scab (*Elsinoe batatas*) can significantly reduce yield especially in sites where leaf production is low due to low soil fertility. To reduce sweet potato weevil damage, plants need to be hilled or have the tubers well covered with soil. Cracking soils can allow the weevil access to tubers.

Production: The time to maturity ranges from 5 months to 12 months depending on the variety planted and the altitude at which it is being grown. Yields range from 6 - 23 t/ha.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
tuber (baked)	72.9	431	1.7	961	24.6	0.5	0.3
tuber (raw)	70.0	387	1.2	709	25	0.7	0.4
tuber (boiled)	72.0	363	1.1	787	15	0.6	0.3
leaf	86.3	168	3.9	105	58	2.9	-

Starchy staples

English: Floating rice

Local:

Scientific name: *Oryza glaberrima*

Plant family: POACEAE

Description: An annual grass. Most varieties have a reddish colour. It grows to 1.5 m tall but can be up to 5 m in some floating kinds. Dryland types often form tufts and floating rice often branches. The leaves are alternate and simple. The leaf sheath is 25 cm long. The leaf blade is 20 - 25 cm long and 6 - 9 mm wide. The flowers are in a compact group 25 cm long at the top of the plant. The fruit is a grain 9 mm long by 3 mm wide.



Distribution: It is a tropical plant that grows in swamps and on flood plains of savanna regions. It does best with temperatures of 30 - 35°C. It grows from sea level to 1,700 m altitude and can tolerate low soil fertility.

Use: The grain can be cooked and eaten, or ground into flour. This is sweetened with rice flour and honey for bread. It is fermented for beer.

Cultivation: Plants are grown from seed. Usually seeds remain dormant for a few months after harvesting. Seed usually emerge after 4 - 5 days. Seed are usually broadcast without using a nursery. The juvenile stage lasts for 3 weeks then tillering occurs for 3 - 4 weeks.

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	11.3	1538	7.4	-	-	3.4	-

Starchy staples

English: Sorghum

Local:

Scientific name: *Sorghum bicolor*

Plant family: POACEAE

Description: Sorghum is a millet grass. A mature sorghum plant resembles maize in its stature. Plants vary in height from 45 cm to 4 m. It is an annual grass with erect solid stems. The stems can be 3 cm across at the base. Prop roots occur at the base of the plant. There are numerous sorghum varieties. Some have one main stem while others produce multiple tillers. More tillers are produced when plants are widely spaced. The nodes on the stem are slightly thickened. Short types have up to 7 leaves while tall late varieties may have up to 24 leaves. The leaf blade can be 30 - 135 cm long. Leaves are bluish green and waxy. They have a prominent midrib. The large flower panicle can be 20 - 40 cm long. The flower occurs at the top of the plant. It can stick upright or bend over. The flower can be open or compact. Over 1,000 cultivated varieties occur in China.



Distribution: Sorghum is a tropical plant. It suits the savannah zones in the tropics and can tolerate heat and drought. It can recover from drought even as a seedling. It can tolerate water-logging. It can be grown on heavy or light soils. Sorghum requires short day lengths to flower. Many kinds are adapted to specific day length and rainfall patterns. It suits hardiness zones 9 - 12.

Use: Sorghum seeds are eaten as a cereal. Flour can be made from the grain and then used for porridge or other dishes. It is used for dumplings, fried cakes and drinks. It cannot be used for bread as it contains no gluten. The stems of some kinds are sweet and can be chewed. The grains can be popped and eaten. The sprouted seeds can also be eaten.

Cultivation: Sorghum seeds will germinate soon after harvest. The seeds also store well if kept dry and protected from insects.

Production: Grain is ready for harvest 4 - 8 weeks after flowering.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	-	1459	11.1	-	-	-	-

Legumes

English: Pigeon pea

Local:

Scientific name: *Cajanus cajan*

Plant family: FABACEAE

Description: An upright perennial shrubby legume that can live for 3 - 4 years. They can grow up to 4 m tall and spread to 1.5 m wide. It has a bushy appearance and a strong deep taproot. The root nodules are round and sometimes lobed. The leaf consists of 3 narrow, green leaflets which are silvery-green underneath. The end leaflet is larger with a longer leaf stalk. The pea shaped flowers are red and yellow and occur on branched flower stalks which stick upwards in the axils of leaves. Pods are long, straight and narrow, often with 4 - 8 seeds. Seeds

vary in shape, size and colour. The pods are slightly hairy. Pods are often 4 - 8 cm long and have a beak at the end. Pods are constricted between the seeds. Many varieties of pigeon pea occur. Some are dwarf and day length neutral.



Distribution: A tropical plant that requires a tropical or subtropical climate. Plants grow from sea level up to about 1,800 m in the tropics. They can tolerate drought and are suited to a drier climate. They can grow in places with less than 600 mm rainfall per year. They do less well in the wet tropics. They suffer in waterlogged soils and are damaged by frost. It can also tolerate heat. It will grow on poor soils cannot grow on salty soils. It can grow in arid places and suits hardiness zones 10 - 12.

Use: Young leaves, shoots and pods are eaten. The pods can be used in curries. The leaves and shoots as potherbs. Young seeds are cooked and eaten like peas. Ripe seeds are also cooked and eaten in soups and curries. Bean sprouts can be produced and eaten. Preparation of the seeds for dahl is somewhat complicated.

Cultivation: They are grown from seeds. It is best to sow seeds where the plants are to grow. Seeds normally germinate easily and well. Before sowing seed it helps to soak them in cold water for one day. Seeds store well if kept cool and dry. A spacing of 1.5 m x 1.5 m is suitable. Plants can be cut back and allowed to re-grow. Plants can also be grown from cuttings.

Production: Plants are fast growing. Pods are ready after 5 months. Mature seeds take about 8 months. Plants will often live for 3 - 4 years. Plants are cross pollinated by insects, or self pollinated.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	10.0	1449	19.5	55	-	15.0	-
pod (young)	64.4	477	8.7	-	-	2.0	-
seed (young, boiled)	71.8	464	6.0	2	28.1	1.6	0.8

Legumes

English: Soybean

Local:

Scientific name: *Glycine max*

Plant family: FABACEAE

Description: A small erect bean growing up to 60 cm tall. It grows each year from seed. Straggling kinds can occur. Stems, leaves and pods are softly hairy. The leaves have 3 leaflets. The leaflets have stalks. Flowers are small and white or blue. They occur in groups in the axils of leaves. The pods are broad, flat and hairy. Pods have 2 - 4 seeds. The seeds can be yellow to black.

Distribution: It is a temperate plant that suits lowland areas. It can be grown from sea level to 2,000 m altitude. Many varieties will not flower in the tropics (short days). It needs fertile soil. The best soil acidity is pH 5.5 - 7.0. It is damaged by frost.



Use: The young pods and ripe seeds are eaten. They are used for flour. The dried seeds are boiled or baked and used in soups, stews and casseroles. The seeds are used for oil. Toasted seeds are eaten like a snack. Strongly roasted seeds are used for coffee. Soy flour is used for noodles, and confectionary. The beans are fermented and used in a range of foods. Sometimes the young leaves are eaten. The seeds are also used for sprouts and for making cooking oil and soya sauce etc. Because soybean contains a trypsin inhibitor they should be cooked and even the sprouts should be lightly cooked.

Cultivation: It is grown from seed. Seeds need to be inoculated with bacteria before planting. Plants need to be about 20 cm apart.

Production: Plants flower about 8 weeks after sowing and pods mature about 16 weeks after sowing. Often plants are pulled up and hung up before threshing out the seed.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	9.0	1701	33.7	55	-	6.1	-
seed (immature)	68.0	584	13.0	16	27	3.8	0.9
sprout	79.5	339	8.5	1.0	8.3	1.3	1.0

Legumes

English: African locust bean

Local:

Scientific name: *Parkia filicoidea*

Plant family: FABACEAE

Description: A deciduous tree that grows up to 35 m tall. It has a spreading flat crown. The trunk has small rounded buttresses. The grey to yellow-brown bark can be scaly or smooth, and becomes dark and cracked with age. The bark has an orange coloured resin. The leaves are feathery. A leaf is made up of 6 - 9 pairs of leaflets each divided into 16 - 24 pairs of smaller leaflets. These are about 2 cm long and 5 - 8 mm wide. The flowers are small and in bright red club shaped heads. These hang down on stalks 30 cm long. The flower heads are up to 8 cm long. The fruit are dark brown to purple pods which hang down in clusters. They are 30 - 60 cm long and 2 cm wide with their stalk. The pod is narrowed slightly between the seeds. The seeds are red-brown in a dry, mealy, edible, yellow pulp.

Distribution: A tropical and subtropical tree of lowland rainforests. It grows in Africa in forests near streams. It occurs in sub-humid and humid places with an annual rainfall of 950 - 1,750 mm annually. It grows from 250 - 1,370 m above sea level. It can grow in arid places.



Use: The pods and the pulp are eaten. The seeds are boiled and fermented then eaten. This has a strong smell but is removed by frying or roasting. The seeds can also be powdered and used for flavouring soups and rice dishes. The leaves are cooked as used as a vegetable.

Cultivation: Plants can be grown from seed. The pod is crushed and the seed removed from the pulp. The seed they should be boiled briefly, then allowed to cool and soaked for 12 hours, before sowing.

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	7.0	1780	32.3	-	6	33.2	-
fruit	13.2	1263	3.4	-	-	3.6	-

Image accessed from http://farm8.staticflickr.com/7277/7804911110_92bcd0012a_b.jpg

Legumes

English: Winged bean

Local:

Description: A climbing perennial bean up to 4 m tall. It can re-grow each year from the fatted roots. Stems twine around supports or trail over the ground. Leaves have 3 leaflets 8 - 15 cm long with long leaf stalks. Flowers are blue or white and occur on the ends of branches from within the axils of leaves. Pods have wavy wings and are roughly square in cross section, 6 - 36 cm long with 5 - 30 seeds. Seeds can be white, yellow, brown or black and are bedded in the solid tissues of the pod. They are round and smooth with a small hilum. The root has large nodules.

Scientific name: *Psophocarpus tetragonolobus*

Plant family: FABACEAE



Distribution: A tropical plant that grows from sea level up to about 1,850 m altitude in the tropics. It normally only produces tubers at 1,200 - 1,850 m altitude. It needs a day length less than 12 hours. It will not produce flowers or pods at places far from the equator. The main areas of production are between 20°N and 10°S latitudes. It is ideally suited to the tropics including the hot humid lowlands. For maximum seed production, temperatures of 23 - 27°C are needed, and for tubers the temperatures should be 18 - 22°C. Winged beans grow on a wide variety of soils and on soils with pH from 3.6 - 8.0. They are sensitive to acid and waterlogged soils.

Use: Young leaves and pods, flowers ripe seeds and root tubers are edible. The seeds can be used to extract an edible oil.

Cultivation: Seeds are sown at the beginning of the rainy season. Seeds germinate and grow slowly for the first 3 - 5 weeks. For tubers, vines are pruned off at about 1 m high (or left unstaked) and some flowers are removed. Cultivation procedures vary slightly depending on which part of the plant is to be eaten. Short podded winged bean is used for tubers and long podded ones have poor tubers. Tuber production is not as efficient in tropical lowland conditions.

Production: The first green pods are ready about 10 weeks after sowing. Tubers are ready after 4 - 8 months. Seed yields of 1.2 tons/ha and tuber yields of 4 tons/ha are possible. A single plant can produce up to 75 pods. Dry bean yields of 45 - 330 g per plant can be produced depending on variety. Tuber yields of 5,500 - 12,000 kg per hectare have been produced. Seeds can contain a trypsin inhibitor which reduces protein digestibility. This inhibitor is destroyed by soaking seeds then boiling them well. Tubers can also contain this chemical and need to be well cooked.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	8.5	1764	41.9	-	-	15.0	4.5
pod (fresh)	92.0	105	2.1	-	-	-	-
leaf	95.0	197	5.0	809	30	6.2	1.3
seed (young)	87.0	205	7.0	13.0	18.3	1.5	0.4
root	57.4	619	11.6	-	-	2.0	1.4

Legumes

English: African yam bean

Local:

Scientific name: *Sphenostylis stenocarpa*

Plant family: FABACEAE

Description: A vigorous climbing vine. It grows 1.5 - 2 m high. The leaves have 3 leaflets. They are 14 cm long and 5 cm wide. The flowers are pink, purple or greenish-white. They are 2.5 cm long. They occur on stout stalks in the axils of leaves. The seed pods are smooth and 25 - 30 cm long by 1 - 1.5 cm wide. They are flat but have both edges raised. The seeds vary in shape, size and colour. They can be 1 cm long by 0.7 cm wide. They can be cream or brown. Small narrow tubers grow under the ground. They can be 5 - 7.5 cm long and weigh 50 - 150 g. The flesh is white and watery.



Distribution: It is a tropical plant that grows from sea level up to 1,800 m altitude. It grows in grassland and woodland and sometimes in marshy sites. It can grow in arid places.

Use: The pods, leaves, seeds and tubers are cooked and eaten. They are used in soups or with maize or rice. The hard seeds need to be soaked in water for 12 hours before cooking and being ground. The tubers are cooked and eaten.

Cultivation: It can be grown from seed or tubers.

Production: Tubers are ready for harvest about 8 months after planting.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	9.0	1470	19.2	-	-	-	-
seed (boiled)	67.9	542	3.8	-	-	-	-
tuber	64.0	542	3.8	-	-	-	-

Legumes

English: Mung bean

Local:

Scientific name: *Vigna radiata*

Plant family: FABACEAE

Description: An upright hairy bean plant which can grow to 1 m tall. It has many branches. The leaves have 3 leaflets, are dark green and grow on long leaf stalks. There are oval stipules at the base of the leaf. Flowers are pale yellow and small. They occur in bunches of 10 - 20 on the ends of long hairy flower stalks. Pods are black and straight. They do not have a beak. Pods contain 10 - 20 seeds which are usually green or golden yellow. They are smaller than black gram. The beans can be black. They have a flat white hilum. There are 2,000 varieties.



Distribution: A tropical and subtropical plant. The plant will grow from sea level up to about 2000 m in the tropics. It is drought resistant but can't stand water-logging. Plants are damaged by frost. They cannot stand salinity. Rainfall at flowering is detrimental. It requires a deep soil. Both short day and long day varieties occur. It can grow where annual temperatures are from 8 - 28°C. It can tolerate a pH from 4.3 - 8.1. It suits a drier climate and can grow in arid places. It suits hardiness zones 10 - 11.

Use: Seeds are eaten ripe, raw or roasted. They are added to soups and stews. They are also fermented. Young pods and leaves can be eaten. The seeds can be germinated for sprouts and used in salads and stir-fried dishes. The seeds are ground and used for starch to make noodles.

Cultivation: Plants are grown from seed. In some areas these are broadcast while for small plots often 2 - 3 seeds are sown in holes 50 - 60 cm apart. Seeding rates of 6 - 22 kg per ha are used in different locations. It normally requires phosphorus fertiliser for adequate growth. Seeds germinate in 3 - 5 days.

Production: Green pods are ready after about 2 months and ripe pods may take another 1 - 2 months. For ripe beans the whole plant is harvested and dried before threshing. Yields of 450 - 560 kg/ha of seeds are common.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	11.0	1432	22.9	55	4	7.1	-
seed (cooked)	-	439	7.0	2.4	1.0	1.4	-
seed (sprouted)	90.4	126	3.0	2	13.2	0.9	0.4

Legumes

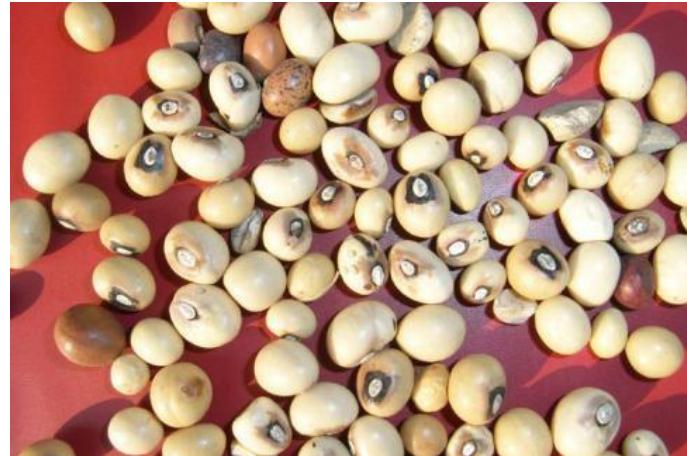
English: Bambara groundnut

Local:

Scientific name: *Vigna subterranea*

Plant family: FABACEAE

Description: An annual plant that can be either a bushy bush or a trailing plant. Often the creeping stems are near ground level. It often appears as if bunched leaves arise from branched stems near ground level. It has a well-developed taproot. The leaves have 3 leaflets. The leaf stalk is erect and thickened near the base. The end leaflet is slightly larger than the side leaflets. Leaflets are about 6 cm long by 3 cm across. The flowers are yellowish-white and occur in pairs. The flower/fruit stalk elongates after being fertilised and pushes into the soil. The fruit are pods which are round and have one seed. Some kinds have 3 seeds. This pod develops under the ground on a long stalk. The seeds are hard and are of many colours. Pods can be 3.7 cm long.



Distribution: It is a tropical plant that can grow in hot climates. It can also grow on poor soils. It does best with moderate rainfall and sunshine. It can tolerate drought. Long day-lengths can reduce or prevent pod development in some kinds.

Use: Seeds can be eaten fresh or roasted while immature. Mature seeds are hard so must be boiled before being used in cooking. Seeds can be dried and made into flour and used for baking. They can be popped like corn. The seeds are roasted as a coffee substitute. Young pods are cooked and used as a vegetable or in stews. The leaves can be eaten.

Cultivation: Plants are grown from seed. Plants are often put in rows 50 cm apart and with 15 cm spacing between plants. Ridges are formed to enable the pods to penetrate the soil. It is mostly grown intercropped with other plants. Soil should be light and friable and the seed bed loose and fine. Normally the whole plant is pulled up for harvesting. Any pods which become detached are harvested by hand. Pods are dried in the air before threshing.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	7.3	1572	18.4	-	-	4.6	2.2
seed (boiled)	66.4	578	7.7	-	-	1.4	1.1

Leafy greens

English: Grain amaranth

Local:

Scientific name: *Amaranthus caudatus*
Plant family: AMARANTHACEAE

Description: An annual plant which can be 2 m high and 45 cm across. The stems are angular and it can have a single stem or be branched. It is often limp in the upper parts. Plants are hairy at first but become smooth. Often they are tinged purple. Leaves are 2 - 4 cm long by 0.7 - 1.6 cm wide on a leaf stalk 0.5 - 1.5 cm long. Leaves can taper to a tip at the end. They can also thin towards the base. The veins are pale underneath. The flower clusters are in spikes on the side or top branches. The flowers are sometimes branched and can droop over. They can be 45 cm long. The fruit is oval. Seed are 1 - 1.3 mm across.



Distribution: A tropical plant. It can grow in warm temperate places. It cannot tolerate frost. Plants do best under high light, warm conditions and dry conditions. They need a well-drained soil. Some varieties can tolerate pH up to 8.5 and there is some salt tolerance. It can grow in arid places. In the Andes it grows between 500 - 3,000 m above sea level. It suits hardiness zones 8 - 11.

Use: The leaves and young plant are eaten cooked. They are also used in stir fries and added to soups. The seeds are ground into flour and used to make bread. **Caution:** This plant can accumulate nitrates if grown with high nitrogen inorganic fertilisers and these are poisonous.

Cultivation: Plants can be grown from seed if the soil is warm. Seeds are small and grow easily. Cuttings of growing plants root easily. Amaranths are mostly grown from seeds. The seeds are collected from a mature dry seed head of an old plant. These dry flower stalks are stored and then the flowers rubbed between the hands over the garden site. Collecting the seeds is fairly easy by banging flower heads on a mat or piece of cloth then the rubbish can be blown out of this mixture by dropping it and blowing gently as it falls. The very small seeds of these plants are scattered over the ashes or fine soil in fertile ground. Some types are self-sown.

Amaranthus seeds are very small. A thousand seeds weigh about 0.3 g. It is very difficult to sow such small seeds evenly over the ground. So there are a few different methods you can use to try and get the plants well-spaced. One way is to mix the seeds with some sand and then when you sprinkle this along a row it will only contain a few seeds among the sand. The other way is to throw the seeds over a small plot of ground which will be a nursery. After 2 or 3 weeks the seedlings can be transplanted into the garden bed where they are to grow. If the seeds are just scattered over the garden, the small seedlings can be thinned out and either eaten or transplanted to a different spot. Seedlings are transplanted when about 5 - 7 cm tall. Plants can be harvested when small by thinning out and either transplanted or eaten cooked. Plants can be harvested whole or have top leaves harvested several times. Harvesting begins after 4 - 7 weeks and can continue over 2 months.

A spacing of about 8 cm x 8 cm is used if the plants are to be harvested by pulling up the whole plant. If the harvesting is to be done by picking off the top leaves, a wider spacing is normally used.

When the tops are picked out 3 or 4 times over the life of the one plant, a spacing of about 30 cm x 30 cm is used.

As far as producing a large amount of food is concerned, the spacing is not very important. Having between 200 and 1,000 plants per square metre gives about the same total amount of food. The main thing that varies is the size of the leaves. Mostly people like larger leaves so a wider spacing of 8 cm to 10 cm for plants to be pulled out is suitable. For plants to be harvested by picking out the tops, they can be picked down to about 15 cm high. Picking lower makes the plant flower later, but it also recovers more slowly from picking.

Amaranths grow quickly. Seedlings come up above the ground in 3 - 5 days. They are 5 - 7 cm high and big enough for transplanting after about 20 days. The plants can be pulled out and used after 6 weeks. If they are harvested by picking out the tops, this can be started at 5 - 7 weeks and continued 3 - 4 times over the next 2 months.

Amaranths eventually stop producing leaves and grow flowers. Flowering occurs after about 3 months and seed can be collected about a month later. Amaranths are called day-length neutral plants because they still produce flowers at about the same stage, irrespective of whether there are many or few hours of daylight. Because flowering stops harvesting of leaves, it is a problem, but there does not seem to be any easy way of slowing down flowering. Flowering can be delayed a little by picking out the tops down to a lower level. Also it is made a little later if plants are grown in the shade. But lower picking and growing in the shade mean the plants produce less food, so there is no point. Plants need to be harvested and used when they are ready. If plants are left growing the amount of harvestable leaf gets less and the quality gets poorer.

Nitrogen deficiency shows as the oldest leaves near the bottom of the plant going yellow. This is because the plant needs more nitrogen to grow more new leaves at the top and there is not enough nitrogen in the soil for it to get it from there. So it reuses the nitrogen it used in the oldest leaves. These leaves therefore go yellow. Potassium deficiency shows as the edges of the oldest leaves going yellow. These shortages of nutrients could be corrected by adding some nitrogen or potash fertiliser but it is most likely too late for the current crop.

Production: Plants take 4-6 months from sowing to harvesting the seed, but up to 10 months in some Andean highland regions. Yields from 1-5 tonnes per hectare of seed are common. Yields of up to one kilogram of edible leaves have been harvested by pulling out plants from an area of one square metre. The young leaves or whole plants are eaten cooked. If plants are picked 3 or 4 times over 6-8 weeks then two kilograms of edible leaves can be harvested. From a plant that grows so quickly and is such good quality food this is a very high production.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	6.0	1034	28.8	33	-	23.3	5.5
seed	-	-	13	-	-	-	-

Leafy greens

English: Sticky cleome

Local:

Scientific name: *Cleome viscosa*

Plant family: CLEOMACEAE

Description: An erect annual herb about 0.3 to 1 m tall. It is sticky and has a rank smell. The leaves are made up of 3 - 5 leaflets each 1 - 3 cm long. The flowers are in leafy groups at the end of branches. The flower stalks are less than 1 cm long. The petals are yellow and 7 - 8 mm long. The fruit is a narrow capsule and gradually tapers near the tip. The stems and seed pods are hairy. The seeds are round, black and 1 mm across.

Distribution: It is a tropical plant found in waste places at low and medium altitudes. It is damaged by drought and frost. It can grow in arid places. It restricts the germination and growth of Pearl millet.

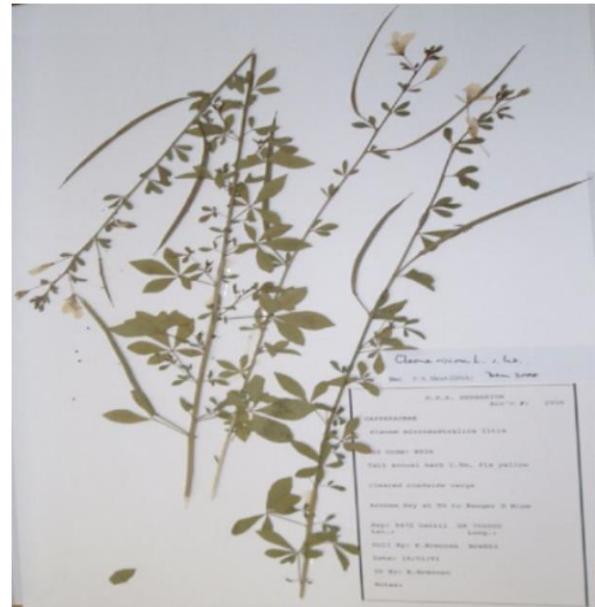
Use: The leaves are edible when cooked. The young fruit are eaten candied. Roasted seeds are used in curries and pickles. Seed oil is used for cooking. The leaves are soaked, fermented and used as a spice.

Cultivation: Plants are grown from seed.

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	80.4	-	5.6	-	-	24	-



Leafy greens

English: Slenderleaf rattlepod

Local:

Scientific name: *Crotalaria brevidens*

Plant family: FABACEAE

Description: A much branched herb. It lives for one or sometimes more years. It grows 2 m tall. The branches curve upwards and have soft hairs. The leaves are alternate. They have 3 leaflets. The leaf stalks are 2 - 6 cm long. The leaflets are narrow and 4 - 10 cm long by 1 - 2 cm wide. They are hairy underneath. The flowers are in a group at the top of the plant. These can be 50 cm long. There are many narrow flowers. They are yellow with red veins. The fruit is a narrow pod 4 - 5 cm long and 1 cm wide. It is slightly curved at the ends. There are many seeds that are 3 mm long and yellow to orange.



Distribution: A tropical plant. It grows between 500 and 2,700 m above sea level. It can grow in arid places.

Use: The tender leaves are cooked and eaten as a vegetable. They are cooked with potash and have peanuts added to improve the flavour. Leaves can be dried and stored for later use. **Caution:** It is bitter due to Pyrrolizidine alkaloids. If eaten with corchorus or with milk it is less bitter.

Cultivation: Plants are grown from seed. Seed germinate in 3 - 4 days. It responds well to natural compost and manures.

Production: Plants are ready for harvesting after 8 weeks. Harvesting can continue for 4 months.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	74.5	-	8.8	-	-	38	-

Image sourced from: <https://en.wikipedia.org/wiki/Crotalaria#/media/File:Rattlepod.JPG>

Leafy greens

English: Indian hemp

Local:

Scientific name: *Hibiscus cannabinus*

Plant family: MALVACEAE

Description: A herb that can grow from seed each year, or keep growing from year to year. It grows up to 3.5 m tall. It has a few sharp spines. The leaf stalk is 6 - 20 cm long. The leaf blade has 2 forms. The leaves lower on the stem are heart shaped and those higher on the stem have 4 - 7 lobes arranged like fingers on a hand. These lobes are sword shaped and 2 - 12 cm long by 0.6 - 2 cm wide. They have teeth around the edge and taper at the tip. The flowers are yellow, white or ivory and red at the base. They occur singly in the axils of leaves. They are large and up to 10 cm across. They have very short stalks. The fruit is a capsule about 1.5 cm across. The seeds are kidney shaped.



Distribution: A tropical plant. It is cultivated in South China. It can grow in well-drained sandy soils and in dry but seasonally waterlogged places. It grows from 1,500 - 2,100 m above sea level. It grows in areas with an annual rainfall of 500 - 635 mm. It can grow in arid places and suits hardiness zones 10 - 12. It grows in many African and Asian countries.

Use: The leaves are eaten cooked as a vegetable. They are also used as a substitute for tamarind for curries. They are used in soups. The leaves are cooked with the aid of potashes. The seeds are roasted and eaten. They are also fermented. The seeds yield an edible oil. The flowers are eaten cooked as a vegetable. The bark is sweet and is chewed by children.

Cultivation: It is usually grown from seeds but can be grown from cuttings. Seeds will last for about 8 months. Seeds germinate best at 35°C.

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	8.1	1785	20.2	-	-	-	-
leaf	79.0	280	5.5	34	-	12.1	-

Leafy greens

English: Yellow ipomoea

Local:

Scientific name: *Ipomoea obscura*

Plant family: CONVOLVULACEAE

Description: A slender trailing herb that lies along the ground. It can be a climber or twining. It has a taproot and can keep growing from year to year. The leaf stalks are 1.5 cm long. The leaf blades vary but are long and tapering to the tip with a broadly heart shape base. They are 4 cm long. The flowers occur singly or as a few together in the axils of leaves. The flowers are funnel shaped and 4 cm long and 3 cm across. They are pale yellow or white.

Distribution: It is a tropical plant. It grows up to 1,800 m above sea level. It grows in woodland, grassland, savannah and coastal sands. It can grow in arid places.

Use: The leaves are cooked and eaten as a relish. The leaves are added to soup.

Cultivation:

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	56.6	569	8.8	-	-	28.8	1.1

Image sourced from: https://en.wikipedia.org/wiki/Ipomoea_obscura



Leafy greens

English: Sausage tree

Local:

Scientific name: *Kigelia africana*

Plant family: BIGNONIACEAE

Description: It is a tree which loses many leaves during the year. It grows 9-18 m high. The crown is rounded. The trunk is short and straight and about 80 cm across. It often branches from the base. The branches spread out and the secondary branches hang down. The bark is dark grey and smooth but flakes off in patches. The leaves are compound leaves growing in threes. They occur at the ends of branches. They are light green. The flowers occur on long rope like stalks. These can be 2-3 m long. The flowers are trumpet like. The flowers are on long sprays which hang downwards. The flowers point out and upwards. The petals are bright red with yellow veins. The flowers are 6-8-15 cm long. They have an unpleasant smell. The fruit is like grey green "sausages". These are 30-60 cm long and 10 cm across. The stalk remains hanging on the tree. The seeds are inside the pulp.



Distribution: It grows in warm subtropical and tropical areas. It grows in wet savannah. It is also found naturally along rivers in moist rainforest. It suits humid locations. It occurs between 1,100 and 3,000 metres altitude in Uganda. In Kenya it grows from sea level to 2,200 m altitude and in areas with rainfall between 500-1,500 mm per year. It cannot stand heavy frosts. It can grow in arid places.

Use: CAUTION: Both the ripe and unripe fruit are poisonous. The fruit pulp and bark are used for making beer. The seeds are used as a famine food after baking. The fruit are used with sugar to make drinks. The flowers are used in a sauce.

Cultivation: Plants are grown from seed. Seeds germinate poorly and slowly. Plants grow naturally from seeds. Seeds should be sown fresh. It can be grown from large cuttings.

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	85.4	226	54	0.8	-	-	-
leaf	-	-	-	-	-	161	-

Leafy greens

English: Balsam apple

Local:

Scientific name: *Momordica balsamina*

Plant family: CUCURBITACEAE

Description: A pumpkin family plant that can grow each year from seed, or keep growing from year to year. The leaves have 1 - 5 cm long stalks. The leaves are 4 - 7.5 cm across by 4 - 7 cm wide. They may be round or have 3 - 5 lobes like fingers on a hand. The lobes are narrowly sword shaped and have dots on both surfaces. The flowers are yellow and grow separately with male and female on the same plant. The fruit are oval but narrowed towards both ends. They are smooth or warty. They are smaller than *Momordica charantia*.

Distribution: A tropical plant that grows in tropical and sub-tropical places. It usually grows on sandy soils near rivers. It grows to 300 m altitude in Pakistan, to about 600 m in Nepal and 1,600 m in Africa. It can grow in arid places.



Use: The young fruit are boiled or fried as a vegetable. They are also eaten raw. They are used in stews and pickled. They are used as a flavouring. The young leaves and tendrils are used as a potherb. The seeds are eaten after steeping in salt water and cooking. **Caution:** The ripe fruit cause diarrhoea.

Cultivation: Plants are grown from seed or tubers. It climbs over fences and huts.

Production: It produces from August – October in Rajasthan in India.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	89.4	121	2.0	-	3.6	2.6	1.0
leaf	89.4	-	3.0	-	-	12.7	0.9

Image accessed from http://upload.wikimedia.org/wikipedia/commons/e/ef/Momordica_balsamina_006.JPG

Leafy greens

English: Goat's horns

Local:

Scientific name: *Sida cordifolia*

Plant family: MALVACEAE

Description: An erect, woody shrub that grows about 0.4 - 1 m high. It keeps growing from year to year. It is covered with short and long hairs that make the plant feel soft. The leaf stalk is 1 - 2.5 cm long. The leaves are one after the other and heart shaped at the base. They are toothed at the edge and 1.5 - 4.5 cm long. The flowers are yellow and occur in the axils of the leaves. The fruit are about 6 - 8 mm across and have 20 fine bristles on the top.

Distribution: A tropical plant that grows in open waste places in the tropics and sub-tropics. It is common and widely distributed in the Philippines. It grows in hot arid places with a marked dry season. It grows in places with an annual rainfall below 520 mm. It grows in dry sandy soils and can grow in salty soils. It grows below 1,100 m altitude. It can tolerate shade and can grow in arid places.



Use: The leaves are edible when cooked.

Cultivation:

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	6.6	1296	24.2	-	-	79.8	-

Image accessed from

[http://upload.wikimedia.org/wikipedia/commons/f/f4/Sida_cordifolia_\(Bala\)_in_Hyderabad,_AP_W_IMG_9420.jpg](http://upload.wikimedia.org/wikipedia/commons/f/f4/Sida_cordifolia_(Bala)_in_Hyderabad,_AP_W_IMG_9420.jpg)

Fruit

English: Boabab

Local:

Scientific name: *Adansonia digitata*

Plant family: BOMBACACEAE

Description: A large tree. It grows up to 25 m tall. It loses its leaves during the year. The branches are thick, angular and spread out wide. The trunk is short and stout and can be 10 - 14 m around. Often the trunk has deep grooves or is fluted. The bark is smooth and grey but can be rough and wrinkled. The leaves spread out like fingers on a hand. There are 5 - 9 leaflets. Often the leaves are crowded near the ends of branches. The flowers are large and 12 - 15 cm across. The petals are white and the stamens are purple. The fruit hangs singly on a long stalk. The fruit has a woody shell. This can be 20 - 30 cm long and 10 cm across. Inside the fruit are hard brown seeds. They are about 15 mm long. The seeds are in a yellow white floury pulp. The pulp is edible. The thick roots end in fattened tubers.



Distribution: It is a tropical plant that grows in the lowlands. It grows in the hot dry regions of tropical Africa, such as the Sahel. It survives well in dry climates. It grows where rainfall is 100 - 1,000 mm a year. It can tolerate fire. It grows where the annual temperatures are 20 - 30°C. In most places it grows below 900 m altitude but occasionally grows to 1,500 m altitude. It requires good drainage. It can grow in arid places and suits hardiness zones 11 - 12.

Use: The young leaves are eaten as a cooked vegetable. The dried leaves are also used to thicken soups. The fruit pulp is eaten raw. It is also used for a drink. The flowers are eaten raw or cooked. The seeds can be eaten fresh or dried and ground into flour then added to soups. They yield a cooking oil. The shoots of germinating seeds are eaten. The young tender roots are eaten. The fattened root tubers are cooked and eaten. The bark is eaten and the dried leaves are used as flavouring. In Ethiopia, the plant is used to treat kidney, gastric and respiratory conditions.

Cultivation: Trees are grown from seed. The seed remain viable for several years but before planting the seeds must be treated to break the hard seed coat, by soaking the seeds in hot water for several minutes or by cutting the seed coat. Seeds that float in water should not be used. Seeds can be planted in nurseries in plastic bags then transplanted after 6 months. Plants can also be grown from cuttings.

Production: Trees grow quickly reaching 2 m in 2 years. Trees produce fruit after 2 - 15 years. The plant is pollinated by bats, insects and winds. Trees can last 600 or more years. Fruit can be stored for about a year.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
nut (dry)	7.8	1832	33.7	-	-	13.9	-
fruit	16.0	1212	2.2	-	360	7.4	6.7
leaf	77.0	290	3.8	-	50	-	-

Fruit

English: Bael fruit

Local:

Scientific name: *Aegle marmelos*

Plant family: RUTACEAE

Description: A medium sized tree that grows 3 - 12 m tall and spreads 2 m across. The stem is erect and thorny. The aromatic leaves are green, with 3 leaflets and generally sword shaped. It loses its leaves. The flowers are yellowish-white and have a strong sweet smell. They contain both sexes and occur in clusters. The fruit is large and with a hard shell about 3 mm thick. It is 8 - 10 cm across and is yellow-green when ripe. The edible pulp is reddish or orange. The fruit is made up of small cells (about 15) each with woolly seeds.



Distribution: A tropical plant that prefers rich well drained soils in an open sunny position. It suits tropical or warm places. It appears to do best where there is a distinct dry season. It is drought and frost tender. A hot dry summer is best. It can tolerate some alkalinity and saline soils. It can grow in arid places.

Use: The fruit are eaten raw. They are also used to make drinks. The fruit are often sliced and dried. Marmalade can be made from ripe pulp. They can also be pickled or used in jams and jellies. The young shoots and leaves can be eaten raw in salad. They are also used in chutneys. The flowers are used to make a drink. **Caution:** There are reports that leaves make women sterile or cause abortions.

Cultivation: It is grown from seed. Seed are taken from freshly picked ripe fruit. Seedlings are planted out after one year. It can be grown from root offshoots. They are best grown using patch budding. Trees are spaced 6 - 9 m apart. Trees can be pruned to have 4 - 6 strong branches. Suckers should be removed. It can also be grown from root suckers or air layering.

Production: It is slow growing. Trees produce in 3 - 4 years. Full production is gained after 15 years. Fruit are produced throughout the year. Fruit should be picked and not allowed to drop. There can be 200 - 400 fruit per tree. Fruit ripen in the dry season and can be ripened off the tree. Trees can continue bearing for 50 years. The fruit can be stored for 2 weeks at 30°C and for 4 months at 10°C.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	58	577	2.3	0.13	219	0.55	-

Fruit

English: Watermelon

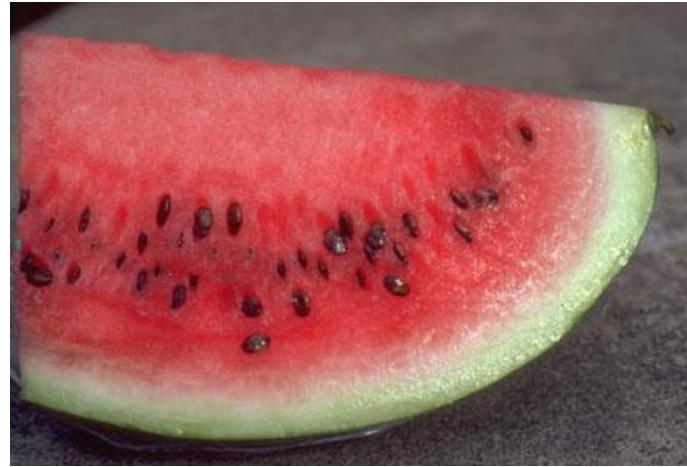
Local:

Scientific name: *Citrullus lanatus*

Plant family: CUCURBITACEAE

Description: An annual climber, with deeply divided leaves and tendrils along the vine. It trails over the ground and has hairy, angular stems. The leaves are on long leaf stalks. The leaves are deeply divided along their length. These leaf lobes are rounded and can themselves be divided. The leaves are 5 - 20 cm long by 2 - 12 cm across. The tendrils are divided. The plant has separate male and female flowers on the same plant. The flowers are pale yellow and smaller than pumpkin flowers. The flowers occur in the axils of leaves. The male flowers appear first.

Fruit are large and round or oval. They can be 60 cm long. Fruit have a hard smooth skin. Several fruit colours and shapes occur. They often have a dark green mottle, or blotches. The fruit has reddish, juicy flesh and black or red seeds. The seeds are oval-shaped and smooth.



Distribution: It grows in most tropical and subtropical countries. It grows best on the coast in the tropics, but will grow up to about 1000 m altitude. It will not stand water-logging and does well on sandy soils. Plants are frost-sensitive. Seed will not germinate below 21°C. Temperatures between 24 - 30°C are suitable. Fruit are sweeter in arid warm areas. It suits hardiness zones 10 - 12.

Use: The fruit is eaten raw when ripe. Small, unripe fruit can be cooked as a vegetable. The skin is sometimes candied in vinegar and eaten with fish. Seeds are also eaten. They are dried, soaked in salt water, then roasted. Oil is extracted from the seeds. Very young leaves are occasionally eaten. It is a popular fruit.

Cultivation: They are suitable mainly for the dry season. A spacing of 1.5 - 2 m is suitable. They grow easily from seed. They do best when fully exposed to the sun. Seed can be dried and stored. If too much vegetative growth occurs, picking out the tip to produce side branches will produce more fruit.

Production: Harvesting commences after 4 - 5 months. The main fruit season is November to January. The ripeness can be determined by tapping the fruit to get a dull sound. The part of the fruit on the ground changes from green to light yellow and the tendril near the base of the fruit becomes dry when ripe. Fruit yield can be 45 - 60 t/ha.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	94.0	92	0.4	20	5	0.3	0.1
seed	5.1	2330	28.3	-	-	7.3	10.2

Fruit

English: Small-leaved white raisin

Local:

Scientific name: *Grewia tenax*

Plant family: MALVACEAE

Description: A shrub that grows up to 2 m tall. It often lies along the ground. The leaves are small and nearly round. They are 5 cm long. They have 5 main veins. The tip of the leaf is pointed and the edge has teeth. The lower leaf surface has hairs. The flowers are white and occur singly. They are 2 cm across. They are on long slender branches. The fruit are orange-red, smooth and edible. They have 1 - 4 lobes. They are the size of a small maize grain.



Distribution: A tropical plant that grows in arid zones. It occurs in very dry woodland and semi-desert scrub. It grows on rocky and gravelly soils. It grows in the Sahel. It is often near temporary pools. It grows in areas with over 200 mm rainfall. It can tolerate salt. In East Africa it grows between sea level and 1,500 m altitude.

Use: The fruit are eaten fresh and raw. They are also dried for eating later. They are added to grains in porridge. A drink is made by soaking the fruit overnight then pressing, sieving and sweetening the juice. The seeds are edible.

Cultivation: Plants can be grown from seeds.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit (dry)	9.2	1157	5.5	-	-	-	-
fruit	59.1	-	4.5	-	161	125	-

Image accessed from:

[http://www.southern-african-plants.net/photocollection/batch005/medium/G/TILLIACEAE_Grewia_tenax_Arandis_20090215_072_\(1\).jpg](http://www.southern-african-plants.net/photocollection/batch005/medium/G/TILLIACEAE_Grewia_tenax_Arandis_20090215_072_(1).jpg)

Fruit

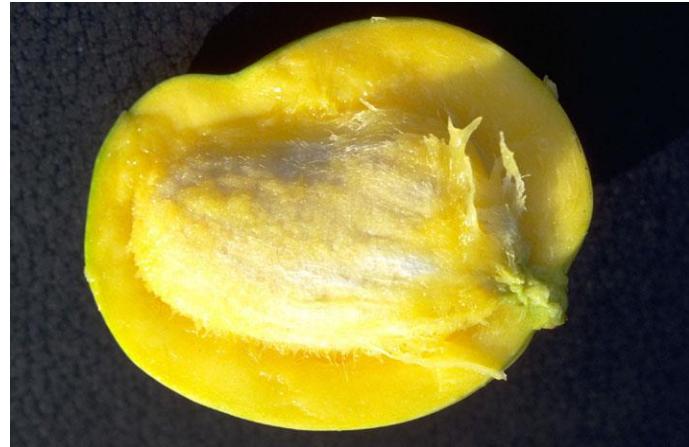
English: Mango

Local:

Scientific name: *Mangifera indica*

Plant family: ANACARDIACEAE

Description: An erect, branched evergreen tree. It can grow to 10 - 40 m high and is long lived. (Trees grown by vegetative means are smaller and more compact.) Trees spread to 15 m across. It has strong deep roots. The trunk is thick. The bark is greyish-brown. The leaves are simple and shaped like a spear. Some kinds of mangoes have leaves with a wavy edge. They can be 10 - 30 cm long and 2 - 10 cm wide. They are arranged in spirals. The leaf stalk is 1 - 10 cm long and flattened. Leaves are often brightly coloured and brownish-red when young. These tender leaves which are produced in flushes become stiff and dark-green when mature. The flower stalks are at the ends of branches. They are 10 - 50 cm long and branching. Up to 6,000 flowers can occur on a stalk. Most of these are male and up to 35% have both male and female flower parts. Fruit are green, yellow or red and 2.5 - 30 cm long. The fruit hang down on long stalks. The outside layer of the seed is hard and fibrous and there is one seed inside. Several embryos can develop from one seed by asexual reproduction. The fruit shape and colour vary as well as the amount of fibre and the flavour. India has many varieties and they cannot tolerate humidity.



Distribution: A tropical and subtropical plant. It grows in the lowlands. It grows from sea level up to 1300 m altitude in the tropics. It does best in areas below 700 m and with a dry season. Rain and high humidity at flowering reduces fruit set. It thrives best where temperatures are about 25°C but will grow with temperatures from 10 - 42°C. Temperatures of 0°C will damage young trees and flowers. Low temperatures (10 - 20°C) at flowering time will reduce fruiting. As temperatures get lower due to latitude or altitude, fruit maturity is later and trees become more likely to only have good crops every second year. Mangoes can grow on a range of soils. In wetter areas soils with less clay are better. They can withstand occasional flooding. A soil pH of 5.5 - 6.5 is best. Soils with pH above 7.5 cause plants to develop iron deficiency. It grows in the Sahel. It can grow in arid places. It suits hardiness zones 11 - 12.

Use: Ripe fruit are eaten raw. Unripe fruit is pickled. Seeds can be eaten cooked. They are boiled or roasted. They are made into meal by powdering. Young leaves can be eaten raw or cooked. Amchur is made from the dried unripe fruit. This is used in curries, and pickles and chutneys. The seed kernels are used for famine food in India. They are boiled, roasted or soaked to remove the bitterness. **Caution:** The sap from the tree or fruit can cause skin problems with some people.

Cultivation: Trees are grown by planting fresh seed and they can be transplanted. Mangoes vary in their ability to breed true from seed. When more than one seedling emerges from the seed some of these are asexual and breed true. Clean seed germinate best if they are treated at 50°C for 20 minutes, then planted on their edge with the round bulge upwards and near the soil surface. The husk around the seed should be removed. Seeds germinate in 3 - 6 weeks. The strongest growing seedlings from this seed are used and the others thrown away. The seedlings from the folds of the seed are vegetative while the seedling from the centre of the seedling near the stalk end may be sexual and show variation from type. Other seeds only produce one seedling and these normally

vary and can be different from the parent tree. Plants can be propagated by budding, or by grafting using in-arching. This is not easy and care is required. In wetter places, flowers need to be protected with fungicides to enable fruit to form. If organic manure is used this should not be directly in the planting hole nor immediately against the new plant. Young transplanted seedlings need regular watering. A spacing of 6 - 12 m between plants is used. Wind protection is advisable to prevent fruit rubbing and getting damaged. Trees should only ever be lightly pruned as fruit develop on new growth and heavy pruning can reduce flowering. Flowering can be brought about by foliar sprays of potassium nitrate.

Production: Seeds germinate after about 20 days. Seedling trees produce after 4 - 6 years and increase in production up to 20 years. Trees often bear better each second year. Rain at flowering reduces fruit setting. Fruiting is at the end of the year. Fruit take 4 - 5 months to mature. Fruit vary in weight from 200 - 1,000 g. Trees can produce one million flowers but only 500 fruit. Trees last for many years.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	83.0	253	0.5	54	30	0.5	0.04
leaf	82.1	226	3.9	-	60	2.8	-

Fruit

English: Maroola plum

Local:

Scientific name: *Sclerocarya birrea*

Plant family: ANACARDACEAE

Description: A shrub or tree. It grows 9 m high and spreads 6 m wide. It can be 15 m tall. It loses its leaves during the year. The crown is dense and rounded. The bark is grey and finely cracked. The leaves have leaflets along the stalk. The leaves are near the tips of the branches. The edges of the leaflets can be wavy. Plants are separately male and female. Female flowers are reddish and on long stalks at the ends of branches. The fruit are oval or round and 3 - 4 cm long. They are green but turn yellow as they ripen. The skin is tough and leathery. The pulp is juicy and white. There is one large stone. There are some subspecies.



Distribution: A tropical plant. It grows in the lowlands. It grows in equatorial Africa. It grows in dry areas. It grows in the Sahel. It can grow in arid places. It grows in Miombo woodland in Africa.

Use: The fruit are eaten. The juice is also fermented to produce a cider-like drink. The oily kernel is eaten.

Cultivation: Plants can be grown by seeds but the seeds do not easily germinate. They need to have a hole cut in the hard seed coat or put into sulphuric acid. The seeds can be soaked overnight in water before planting. It can be grown from cuttings and root suckers. Using fertilizer, manure and early irrigation reduce the survival and growth of young plants. They are adapted to low fertility and seasonal rainfall.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
kernel	3.9	2704	28.3	-	-	0.4	-
fruit	87.0	226	0.5	-	-	-	-

Image sourced from: www.plantzafrica.com

Fruit

English: Avocado

Local:

Description: A small to medium sized tree that normally grows 8 - 10 m tall, but can reach 25 m. The leaf stalk is 1.5 - 5 cm long. Leaves are entire, oval and 5 - 40 cm long. Flowers are greenish, small and on the ends of branches. Clusters of flowers may contain 200 - 300 flowers. Normally only 1 - 3 fruit develop from each cluster. The fruit is round or pear shaped, and 7 - 20 cm long. The fruit are greenish-yellow with some red coloration. The fruit has greenish-yellow flesh and a large round seed. There are 3 named races - West Indian, Guatemalan and Mexican.

Distribution: A subtropical plant that grows from sea level up to 2,250 m in the tropics. It cannot stand water-logging. Branches are easily damaged by wind. It needs a frost free location or where frosts are rare. West Indian varieties thrive in humid, tropical climates, freeze at or near 0°C and can stand some salinity. Mexican types come from dry subtropical plateaus and thrive in a Mediterranean climate. They are hardy to -7° C. They are salt sensitive, have the smallest fruits and the thinnest skin. The best daytime temperature is 25 - 33°C. Guatemalan types come from cool, high-altitude tropics and are hardy to -3° C. It does best with neutral or slightly acid and well aerated soil. Growth is disrupted when soil temperature is below 13°C. It needs high humidity at flowering and fruit set. It can grow in arid places.

Use: The fruit pulp is eaten raw or cooked. It is used in salads, soups, sandwiches, spreads, ice cream, tortillas and wine. The fruit is mixed with sugar and water to make a drink. Oil is extracted from the flesh and is used in salad dressing. The leaves can be used for tea sweetened with sugarcane juice. Toasted leaves are used to season stews and bean dishes.

Cultivation: Plants are often grown from seed. Seeds remain viable for 2 - 3 weeks. Fresh seed held at 25°C day to 15°C night will germinate in 3 weeks. It is best to propagate vegetatively. Tip cuttings, layers and grafts can be used. Because different types have pollen at different times of day, a mixture of trees which have pollen and flowers receptive at different times gives best fruit set. Although trees will grow in shade, they need sun for fruiting. The leaves do not rot easily and can accumulate under trees. Other plants cannot be grown under avocado trees.

Production: Seedlings grow quickly and continuously in warm, moist conditions. Seedlings bear after 5 - 8 years. Grafted trees can fruit in 1 - 2 years. A good tree produces 400 - 600 fruit each year. A fruit can weigh 50 g - 1 kg. In the subtropics, trees often produce 2 main flushes of fruit per year. From fruit set to maturity can take 6 - 12 months. Fruit ripen off the tree in 4 - 14 days. For the Mexican types, the fruit weigh less than 250 g and they ripen 6 - 8 months after flowering.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	74.4	805	1.8	480	11	0.7	0.4



Fruit

English: Guava

Local:

Scientific name: *Psidium guajava*

Plant family: MYRTACEAE

Description: A small evergreen tree 8 - 10 m tall with smooth, mottled bark which peels off in flakes. It is shallow rooted and branches close to the ground. The branches are four-angled. The leaves are opposite, dull green, and somewhat hairy. They are oval and somewhat pointed at both ends, 15 cm long by 2 - 5 cm wide with short leaf-stalks. The showy flowers are white and borne in loose, irregular arrangements of 1 - 3 flowers that grow in the axils of leaves on new growth. The petals are 1.5 - 2 cm long. Both self and cross-pollination occurs. The fruit are rounded and 4 - 5 cm long. They are green, turning yellow when ripe. The skin is firm and encloses a pink, or nearly white, sweet-smelling, edible pulp with many seeds. In better selected varieties, the skin and the seeds are fully edible. Fruit vary from very acid to very sweet.



Distribution: A native to Central and South America, it grows in most tropical countries. Guava thrives in humid and dry tropical climates and does best in sunny positions. It is killed by frost and fruits better where there is a cooler season. Temperatures near 30°C are best. It grows in open areas and secondary forests, and can become weedy in some conditions. It prefers a well-drained soil with good organic matter, but can stand brief water-logging. A soil pH of 5 - 7 is best, but can tolerate a pH from 4.6 - 8.9. Trees cannot tolerate salty conditions. It suits hardiness zones 9 - 12.

Use: The fruit are eaten raw and can be used for jams and jellies. Half-ripe fruit are added to help the jelly set. The young leaves are eaten raw or cooked. It is an attractive and nutritious fruit.

Cultivation: They are mostly grown from seed but seedling trees vary in quality. Seeds remain viable for a year or longer, and usually germinate in 2 - 3 weeks, but can take 8 weeks. Trees can be propagated by budding or grafting, and by layering, root cuttings or stem cuttings if hormones are used. Tips are used for stem cuttings and grown under mist at 28 - 30°C with bottom heat. Suckers can be used. Vegetative propagation preserves better fruit types. Trees self-sow in the lowland tropics. As fruit are produced on new season's growth, pruning does not greatly affect fruiting. Trees should be managed to give the maximum number of vigorous, new shoots and can be pruned for shape. Trees can be grown at 2.5 m within rows and 6 m apart between rows.

Production: Seedling trees begin to bear 2 - 3 years after transplanting. Pruning back the tips slightly increases fruit production. Tree-ripened fruit taste best. Ripening after picking can be hastened by placing them in a brown paper bag with a banana or apple. Mature fruit which have not changed colour can be stored 2 - 5 weeks at temperatures of 8 - 10°C and relative humidity of 85 - 95%. Mature fruit ripen in 2 - 3 days at normal temperatures and will keep for 7 days.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	77.1	238	1.1	60	184	1.4	0.2

Fruit

English: Indian jujube

Local:

Scientific name: *Ziziphus mauritiana*

Plant family: RHAMNACEAE

Description: A medium sized thorny tree that loses many of its leaves during the year. It grows up to 12 m tall. The bark is grey, brown or pale red. Branches and the under surface of the leaves are densely hairy when young. The thorns arise from the base of the leaves. The leaves are alternate and simple. They are finely toothed. They can be oval or round and 8 cm long by 5 cm wide. The flowers are green and have a scent. They occur as 3 - 5 flowers together. The flowers are 1 - 2 cm long and on slender branches. The sweet fruit are small, oval and yellow or brown. They are 2 - 5 cm long and 2.5 cm wide. The fruit are green when young and turn yellow or brown when ripe. The pulp is fleshy, acid and edible. The fruit have one seed imbedded in the flesh in a hard stone. The fruit wrinkle on drying. Many varieties exist.



Distribution: A tropical plant that grows well on sandy soils. It can survive droughts. It grows rapidly in dry places such as the Sahel. It can tolerate temperatures up to 44°C as well as periodic frosts once the trees are mature. It grows best when the mean annual temperature is 22 - 30°C. It thrives in hot dry climates. It needs adequate water during the fruiting season. It can grow at elevations up to 1,000 m in the tropics but does best below 600 m. It grows in areas with annual rainfall of 150 - 900 mm and is most common where annual rainfall is 300 - 500 mm. It does not like excessive humidity for fruiting. It will grow on a range of soils but deep sandy loams with a pH of 7 or slightly higher are best. It can tolerate some salinity and waterlogging and can grow in arid places. It grows in most tropical and sub-tropical countries.

Use: The fruit is eaten fresh, dried, in jelly or candied. They can be used in jellies, preserves, chutney, sauces, and drinks. The unripe fruit are pickled. Young leaves are cooked and eaten. They are also used in soups. Seed kernels are eaten. The roasted seeds are used as a coffee substitute. The fruit are used to make an alcoholic drink.

Cultivation: Plants are grown from seed. The hard seed coat makes them difficult to germinate. The shell can be carefully cracked and seed should be sown fresh. They can be soaked for 50 hours or put in concentrated sulphuric acid for 6 minutes to improve germination. Seed can be sown in plastic bags then transplanted after 18 - 24 weeks. It does not transplant easily so direct planting is best. Grafting can be used. It is also budded onto the rootstocks of wild species. Light pruning during the dry dormant season is recommended to train the tree. Regular pruning in the hot dry season encourages new growth. A spacing of 6 - 12 m is recommended. For larger fruit better varieties are grafted into rootstocks of *Ziziphus nummularia* or *Ziziphus jujuba*.

Production: A budded tree fruits after 4 years and produces for 50 years. Seedling trees take a year longer to fruit. Yields of 80 - 130 kg of fruit per tree per year occur. Fruit development takes 4 - 6 months. As fruit does not all ripen at once several harvests are needed. Unripe fruit do not ripen after picking.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	77.0	360	0.8	21	71	0.4	0.4
fruit (dry)	17.4	1201	4.3	-	-	-	-

Vegetables

English: Green amaranth

Local:

Scientific name: *Amaranthus viridis*

Plant family: AMARANTHACEAE

Description: An erect smooth branched herb without thorns that grows 30 - 60 cm tall. It grows from seeds each year. The stems are slender. The leaves are broad near the base and narrow near the top. Usually the leaves have notches. Leaves are 1 - 3 cm long with exceptionally long petioles. The flowers occur in the angles of the leaves and the seeds are small and brown or black. The spikes are not bristly.

Distribution: It is a tropical plant but also grows in temperate places. It is common in open waste places and can grow in arid places.

Use: The young leaves and seeds are cooked and eaten. The harvested leaves can only be stored for 2 - 3 days.

Cultivation: It can be grown from seed or cuttings. Seeds grow easily.



Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	87.3	-	4.5	72	169	6.0	-

Vegetables

English: Jute

Local:

Scientific name: *Corchorus olitorius*

Plant family: MALVACEAE

Description: An annual plant. It is upright, branching, and slightly woody. Plants vary in height, shape, leafiness and hairiness. Plants grown for leaves are usually only 30 cm tall. They also have many branches. Leaves are shiny and have leaf stalks. The leaves have teeth along the edge. The tips of the lowest leaves in each side, have long bristle like structures. Small clusters of yellow flowers grow in the axils of the leaves. The fruit are ridged capsules. They can be 7 cm long. These have partitions across them between the seeds. A ripe capsules contains 180 - 230 seeds. The seeds are dull grey and with four faces and one long point. Each seed has one pale line along it.



Distribution: A tropical plant. It is mostly coastal, below 250 m altitude. Temperatures of 22°-35°C are suitable. It can stand both drought (2 - 3 weeks) and water-logging, except when young. A well-drained soil is best. They require humus-rich soils. A soil pH of 5.5 - 7.0 is best, but they can grow in soils with pH up to 8.5. They also need adequate moisture for good leaf production. A rainfall of 1,000 mm is suitable. A high relative humidity (80 - 90%) is best. It produces seeds when day lengths are short. It grows in most African and Asian countries.

Use: The young leaves and stem tops are eaten cooked. They are slimy unless fried. They are also used to make a thick soup. Leaves can be sun dried, pounded to flour, then stored for a long time.

Cultivation: Plants grow from seed, and they can be transplanted. Seeds are often broadcast into fine seed beds at the beginning of the wet season. Mixing the small seeds with sand makes it easier to sow them evenly. Often seeds are slow to start growing. This can be overcome by soaking them in hot water. A spacing of 20 - 30 cm between plants is suitable. For vigorous varieties this could be increased to 45 - 50 cm. Seeds are saved from pods for re-sowing.

Production: First leaves can be harvested after 5 - 6 weeks. Tips about 20 - 30 cm long are picked. Production of edible green tips, is not large. 7 - 8 kg of leaf tips can be harvested from 3 - 8 pickings over 3 - 4 months. Seeds can be collected after 13 - 15 weeks. If seeds of a particular variety are desired, it is necessary to grow these plants 16 m away from other plants, to avoid cross pollination. Seeds can be stored for 8 - 12 months in well-sealed jars.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf (raw)	80.4	244	4.5	574	80	7.2	-
leaf (cooked)	87.2	155	3.4	156	33.0	3.1	0.8

Vegetables

English: Pumpkin

Local:

Scientific name: *Cucurbita maxima*

Plant family: CUCURBITACEAE

Description: A pumpkin family plant. It is a creeping vine with tendrils. It is an annual plant. The stems are soft and round in cross section. The leaves are large and hang loose. They are dark green and kidney shaped. The edges of the leaves are entire. There are large nodes at the base of the leaf. The tendrils are fairly stout and are divided half way along their length into many branches. Male flowers are carried on long upright stalks. The 5 petals are united into a long yellow tube. The female flowers are larger than the male and are fewer in number and carried on shorter stalks. The fruit varies in size, colour and patterns on the skin. They can be round, oval or flattened, with yellow, orange or green skin. The surface can be smooth or rough and warty. The flesh is yellow and edible. The seeds are in the centre. The seeds are white or brown. They are flattened but plump and have a slanting scar at the top. The seeds are edible. (*C. moschata* does not have hairy stems but has fruit with a thickened stalk near where it joins the fruit.) There are a large number of cultivated varieties.



Distribution: A subtropical plant that grows from sea level to 2,400 m altitude. They need a fertile soil. *C. moschata* is better suited to coastal areas. They are frost sensitive but better suited to cooler areas than *C. moschata*. It can grow in arid places. It suits hardiness zones 8 - 11.

Use: The young leaf tips are eaten cooked. They can also be dried and stored. The fruit can be eaten cooked. They are baked, boiled, fried, steamed or mashed. They are used in pies and cakes. The seeds are edible, raw or roasted. They are also ground into a meal. The male flowers are eaten after removing the stamen and calyx.

Cultivation: They are grown from seed. Usually 2 or 3 seeds are planted together in a mound. The distance apart depends on the cultivar. Some kinds are better for leaf tips. It is good to save seed of adapted varieties.

Production: Fruit are ready for harvest after about 3 - 4 months. Seed can be saved from fruit for re-sowing, but as pumpkins cross-pollinate, different types become mixed.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	6.9	2264	24.5	38	1.9	14.9	7.5
fruit	69.6	439	1.4	-	-	-	-
leaf	88.0	160	4.9	260	28	2.5	0.9
flower	88.7	107	1.4	173	14	0.8	0.1

Vegetables

English: Marrow

Local:

Scientific name: *Cucurbita pepo*

Plant family: CUCURBITACEAE

Description: A bristly hairy annual vine in the pumpkin family. It has branched tendrils. The stems are angular and prickly. The leaves are roughly triangular. The leaves have 5 lobes which are pointed at the end and are toothed around the edge. Male and female plants are separate on the same plant. Male flowers are carried on long grooved flower stalks. Female flowers are borne on shorter more angular stalks. The fruit stalks have furrows along them but are not fattered near the stalk. The fruit vary in shape, size and colour. Often they are oval and yellow and 20 cm long by 15 cm wide. The seeds are smaller than pumpkin and easy to separate from the tissue. The scar at their tip is rounded or horizontal, not oblique. There are a large number of cultivated varieties.



Distribution: A subtropical plant. They are more suited to drier areas. They are frost sensitive, and grow best with day temperatures between 24 - 29°C and night temperatures of 16 - 24°C. It suits tropical highland regions. It suits hardiness zones 8 - 11.

Use: The young fruit are cooked and eaten. They can be steamed, boiled or fried. They are used in pies, soups, stews and cakes. The young leaves and the ripe seeds can also be eaten cooked. The seeds are dried, salted and toasted and eaten as a snack food. The seeds can also be pressed to produce oil. The sprouted seeds are used in salads. Flowers and flower buds can be eaten boiled. They can be dried for later use.

Cultivation: They are grown from seeds. The seeds germinate after one week. They can be grown from cuttings. They are best planted on mounds. A spacing of 2 - 3 m between plants is needed. Hand pollination assists fruit setting. Plants can also be grown from cuttings as plants root at the nodes.

Production: The first usable immature fruit are ready 7 - 8 weeks after planting.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	3.7	2266	29.4	-	-	7.3	-
leaf	89.0	113	4.0	180	80	0.8	-
fruit (mature)	92.0	105	1.6	17	16	2.4	-
fruit	91.3	102	1.1	-	12	0.8	0.2
yellow fruit	92.0	97	1.0	180	8	1.4	-
immature fruit (raw)	92.0	92	1.5	-	9	0.4	0.1

Vegetables

English: Angled loofah

Local:

Scientific name: *Luffa acutangula*

Plant family: CUCURBITACEAE

Description: A herb of the pumpkin family plant. It is an annual climber with square stems. They have 4 - 7 branched tendrils which attach to objects helping the plant to have a climbing habit. Leaves are pale green, hairy and shallowly five lobed. The leaves have a bad smell when rubbed. Male and female flowers are separate. Male flowers are in clusters, female flowers singly (ratio 43:1) Flowers open late in the afternoon and stay open during the night. The flowers are yellow. Fruit can be up to 40 cm long and with 10 long ridges. It is green-brown outside and white inside. Three varieties have been distinguished.



Distribution: A tropical plant. It grows from sea level to 500 m altitude in the hot humid tropics. It won't tolerate excessive rainfall so does best in drier areas or in the dry season in wetter areas. Day temperatures above 25°C are suitable. Some varieties require short day length. Adding additional nitrogen fertiliser can stimulate female flower formation in short day varieties. In Nepal it grows from 1,000 - 1,600 m altitude. It can grow in arid places.

Use: The immature fruit are cooked and eaten as a vegetable. The ridges are removed with a vegetable peeler. The fruit are boiled, steamed or stir-fried. They can be added to soups, stews and curries. The leaves are edible. They can be eaten in salads or cooked as a vegetable. The flower buds are dipped in batter and sauteed. Mature seeds are roasted, salted and eaten as a snack.

Cultivation: Seeds are sown direct at 40 cm by 80 cm spacing and need stakes to climb. Because seeds can have a hard coating, soaking seed in water for 24 hours before planting can assist germination. 5 kg of seed per hectare are required. The plant benefits from full sunlight. Good soil fertility is beneficial. The soil needs to be well drained and adequate organic matter helps. Pinching out the growing tips when plants are 1.5 - 2 m long can promote fruit development. Hand pollination once female flowers develop helps fruit set. This is best done in the evening.

Production: Immature fruit are ready 6 - 10 weeks after planting. On maturity the fruit become bitter and inedible. Fruit do not store well so are harvested when they are to be used.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	94.6	71	0.7	-	-	0.5	-
leaf	89.0	-	5.1	-	98	11.5	-

Vegetables

English: Bitter cucumber

Local:

Scientific name: *Momordica charantia*

Plant family: CUCURBITACEAE

Description: A pumpkin family plant. It is a slender annual climber with flowers of both sexes on the one plant. It has simple tendrils and vines can be 4 m long. It has bright green lobed leaves 5 - 12 cm long on thin leaf stalks 3 - 10 cm long. The flowers have a sweet smell and 5 small, yellow petals. Fruit are green when young and orange when ripe. The fruit have a lumpy appearance, with ridges along its length and when fully ripe burst open. It has bright red covering on the seeds inside. The seeds are pale brown and 10 - 16 mm long and 7 - 10 mm wide.

Considerable variation in the fruit occurs between varieties.



Distribution: A tropical plant that grows from sea level up to about 500 m and will probably grow to 1,000 m altitude in tropical regions. They require a well-drained soil preferably rich in organic matter. Seeds do not germinate below 15°C. Plants grow best with temperatures of 18 - 35°C. A soil pH of 6.5 is best. It suits hardiness zones 9 - 12.

Use: The young bitter fruit are cooked and eaten. They are boiled, stuffed, fried or pickled. They are used in soups, stews and stir-fried dishes. The seed mass of the ripe fruit is used as a food flavouring. The leaves are also cooked and eaten as a flavouring. The tender shoots and leaves are sometimes eaten. **Caution:** The leaves are considered to cause diarrhoea and vomiting.

Cultivation: Plants are grown from seed. For large scale plantings, 6 - 7 kg of seed are required for planting one hectare. Seeds are planted at 50 cm spacing in the place where the plants are to grow and need a stick to climb up. Often plants are grown on raised beds 2 m apart with 0.5 m between plants. The seed has a hard seed coat and germinates slowly. Soaking seeds for 24 hours before sowing gives a quicker more even germination. Regular watering is required.

Production: Fruit are ready to harvest 45 - 55 days after planting. Fruit should be harvested when young and tender. Once fruit have begun to change colour to yellow they are past maturity for eating. Early removal of young fruit also ensures continuous fruit setting. This can allow 6 - 8 successive pickings of fruit. Fruit on the plant are sometimes wrapped in paper to prevent fruit fly damage. Seed well stored can remain viable for 4 - 5 years. The young bitter fruit are cooked and eaten. The fruit is blanched or soaked in salt water to reduce the bitter taste.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	8.6	2020	18.6	-	-	-	-
leaf (raw)	84.7	252	5.0	44	170	7.1	0.3
leaf tip (boiled)	88.7	146	3.6	173	57	1.0	0.3
fruit	93.6	105	1.2	-	-	0.2	-
pod (boiled)	94.0	79	0.8	11	33	0.4	0.8
pod (raw)	94.0	71	1.0	380	84	0.4	0.8

Vegetables

English: Drumstick tree

Local:

Scientific name: *Moringa oleifera*

Plant family: MORINGACEAE

Description: A small, soft-wooded tree that grows 9 - 12 m tall. The tree loses its leaves during the year. The bark is grey, thick, corky and peels off in patches. The leaves are pale green and the leaf is divided 3 times. The whole leaf is 30 - 60 cm long and the leaflets are usually oval and 1 - 2 cm long. The leaflets are jointed with a gland near the joint. The flowers are pale yellow. They occur in long sprays 30 cm long. Each flower has 5 petals and of these one is erect and 4 are bent backwards. The fruit is a long capsule 30 - 100 cm long by 2 cm wide. The seed capsules are up to 45 cm long. They are roughly triangular in shape. The seeds have 3 wings. Often the fruiting kinds are grown as annual plants.



Distribution: A tropical and subtropical plant. They suit the dry lowland areas and grow up to 1,350 m altitude in the tropics. They are not hardy to frost. They cannot tolerate water-logging. A pH of 6 - 7.5 is suitable. It can grow in arid places. It suits hardiness zones 9 - 12.

Use: The young tops and leaves are eaten cooked. They are eaten as pot herbs or used in soups and curries. They can be dried and stored for later use. The very young long pods are eaten cooked, especially in curries and soup. They are also pickled. The young seeds are eaten roasted or fried. Sometimes the roots are used as a horseradish substitute. A gum from the bark is used as seasoning. The bark is used for tea. The roots, leaves, flowers and fruits are eaten cooked in water and mixed with salt and chili peppers. The oil expressed from the seeds is used in salads.

Cultivation: It is best to grow plants from 1 metre long cuttings but they can be grown from seed. They can be used as a hedge and pruned regularly to produce more leaves. Properly dried seed can be stored for a long time in sealed containers in a cool place. Normally perennial types are grown from cuttings and annual types are grown from seed.

Production: Trees are fast growing. They can be pruned or topped. With one variety the tree flowers and fruits continuously while with the other variety there are flowers and fruit once per year. The fruit ripens 3 months after flowering. Annual types produce fruit 6 months after planting. Leaves are best dried in the shade to retain more of their Vitamin A.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	76.4	302	5.0	197	165	3.6	-
flower	84.2	205	3.3	-	-	5.2	-
leaf (boiled)	87	189	4.7	40	31.0	2.0	0.2
pod (raw)	88.2	155	2.1	7	141	0.4	0.5
seed	6.5	-	46.6	-	-	-	-

Vegetables

English: Chinese taro

Local:

Scientific name: *Xanthosoma sagittifolium*

Plant family: ARACEAE

Description: A herb that grows up to 2 m tall with a short stem and large leaves at the top. A corm grows at the base of the plant, and produces about 10 flask-shaped cormels, each 15 - 25 cm long. They get wider towards the tip. The oval leaf blade is 50 - 75 cm long with a vein around the edge and has triangular lobes at the bottom. The flower is produced below the leaves. The large bract around the flower is pale green and about 20 cm long. The bases of the bract overlap. The closely arranged spike of flowers is about 15 cm long. The smaller female part is at the bottom of the spike and the larger male part towards the top.



Distribution: It grows in many tropical countries and suits tropical rainforest regions. It can tolerate high rainfall and light shade. It does well in regions with an annual average temperature of 26°C and a well distributed rainfall of 1,400 - 2,100 mm during the growing season. It grows from sea level up to about 2,000 m. Soils need to be well-drained, but moist with a pH of 5.5 - 6.8.

Use: Cormels, or small corms, are eaten roasted or boiled. Main corms are often fed to pigs. Young leaves can be eaten after cooking.

Cultivation: The top piece of the main central corm or stem is normally planted. Pieces weighing 1.5 kg are often used. It can also be grown by using the small side corms which may weigh 0.3 kg, or pieces of the corm can be used as long as they have some buds on them. These are often pre-sprouted before planting. To multiply large amounts of planting material and still achieve acceptable yields, the latter method of using sections of the main corm works well. In crop growth, an axillary bud is produced in the axil of each leaf but only some of these develop into cormels. Often 10 or more cormels develop per plant into cormels 15 - 25 cm long.

Production: The crop grows for about 9 months, although may be left for 12 months before harvest. Crops can be planted at any time of the year, but are often planted to make best use of natural rainfall. The middle of the dry season should be avoided. Naturally loose or well cultivated soils are needed. The water table must be at least 45 cm below the soil surface. *Xanthosoma* taro grows better in good soils with plenty of nitrogen. It can be grown in poorer soils and still give satisfactory yield. It can grow in shade and is inter-cropped under cacao and coconuts. Yield is reduced, but it is still worth doing if no other land is available. Weed control is important. The corms can be harvested without digging out the whole plant by carefully digging soil away from the plant and breaking off small corms. The main stem is then covered to produce a new crop. The corms store well under dry, cool, well-ventilated conditions. The corms will also remain in good condition if they are left growing in the ground and just harvested when needed.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
root	67.1	559	1.6	5	13.6	0.4	0.5
leaf	90.6	143	2.5	160	37	2.0	-
shoot	89.0	139	3.1	-	82	0.3	-

Nuts, seeds, herbs and other foods

English: Tallow tree

Local:

Scientific name: *Allanblackia floribunda*

Plant family: CLUSIACEAE

Description: A tree that grows up to 30 m tall. The trunk is straight and the bark is dark brown. The branches are slender and drooping and are often in rings. The leaves are 10 - 25 cm long and 3.5 - 7.5 cm wide. They are rounded at the base and taper to the tip. The flowers are large and white, pink or red. They have a fragrant smell. The fruit are sausage-shaped pods 45 cm long and 12 cm across. They hang on the ends of short branches. They taper towards each end. They are brown and roughly fleshy with grooves along them. They contain 50 - 100 red-brown seeds. The seeds are about 4 cm by 2 cm and irregular in shape. They have flattened surfaces and are in a pink pulp.

Distribution: It is a tropical plant that grows in central African forests.

Use: The fat of the seeds is eaten.



Cultivation: It is best grown vegetatively. Leafy stem cuttings can be used but it may take 25 weeks before significant roots form. Plants can be grown from seed but the germination rate is low and trees take a long time to fruit.

Production: The kernel is about 62% of the seed by weight.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	6.0	2709	3.6	-	-	-	-

Image sourced from:

<http://tropical.theferns.info/plantimages/a/a/aa7a13d9586fb53180fa04bb1f749fa99c060956.jpg>

Nuts, seeds, herbs and other foods

English: Cashew

Local:

Scientific name: *Anacardium occidentale*

Plant family: ANACARDIACEAE

Description: An evergreen tree, with spreading branches, growing 7 - 14 m tall. The canopy can spread to 12 m. The roots grow deeply and spread widely. The shiny leaves are pale green and large. They are 10 - 15 cm long by 6 - 8 cm wide. They have fine veins. The flowers are produced on the ends of the branches. They are red in colour. The kidney-shaped nut is about 3 cm long and is borne below the "apple" which is really a fleshy stalk.



Distribution: It is a tropical plant that suits the lowland tropics but will grow up to about 1,200 m altitude. It only bears well in dry areas because of blight of the flowers. It grows best in temperatures of 22 - 26°C. A rainfall of 1,750 mm per year is considered suitable but good yields have been obtained with rainfall of 750 mm. It can grow on poor soils but needs good drainage.

Use: The fleshy "apple" is edible but acid until very ripe. It is used for jams, drinks, candy, chutney and pickles. The nut is eaten after roasting. The young shoots and leaves are edible. They are picked during the rainy season and eaten fresh with hot and spicy dishes. **Caution:** The oil of the nut can blister the skin until roasted. The apple is used to make spirits.

Cultivation: It is usually grown from seeds. Seeds germinate poorly and slowly. Only nuts which sink in water (or a solution of 150 g of sugar in a litre of water) should be planted. Seeds are sun dried for 2 - 3 days to improve germination. Seeds can be sown in a nursery then transplanted, or more commonly, are sown directly. Trees are spaced 7 - 10 m apart. The crop is cross pollinated mostly by insects. For good production, complete fertiliser or appropriate organic material should be applied. Pruning to shape the tree is often undertaken in the first 2 - 3 years. Cashews are often planted scattered in gardens or amongst other trees. Clearing under the tree prevents fire and makes finding nuts easier. Allowing nuts to fall before harvesting ensures only ripe nuts are collected. Resin in the cashew nut shell can damage hands and discolour the nuts. Roasting the nuts before removing the kernel avoids this.

Production: Trees commence bearing after 3 years. Fruit production is seasonal, normally October - January. Mature nuts are produced in 2 - 3 months. Yields of 80 - 200 kg of nuts per hectare are normal. Trees reach maximum production after 10 years and last for about 100 years.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
nut	4.0	2478	17.5	-	-	2.8	4.8
leaf	69.9	418	5.2	-	-	-	-
fruit	84.7	213	0.8	0.12	265	1.0	0.2

Nuts, seeds, herbs and other foods

English: Peanut

Local:

Scientific name: *Arachis hypogea*

Plant family: FABACEAE

Description: Peanuts grow on spreading bushy plants up to about 40 cm high. The leaves are made up of 2 pairs of oppositely arranged leaflets. Flowers are produced in the axils of the leaves. Two main kinds of peanuts occur. The runner kind (Virginia peanut) has a vegetative or leafy branch between each fruiting branch and therefore produces a spreading bush. The bunch type (Spanish-Valencia peanuts) produces fruiting branches in a sequence one after the other along the branches. They grow as a more upright plant and grow more quickly. Pods are produced on long stalks which extend under the ground and they contain between 2 - 6 seeds. The stalk or peg from the flower grows down into the soil and then produces the pod and seed under the ground. The flowers need to be no more than 18 cm from the soil surface for the seed pod to develop underground.



Distribution: Peanuts grow in tropical and subtropical areas. They grow well from sea level up to about 1,650 metres in the equatorial tropics. They require temperatures of 24 - 33°C. Plants are killed by frost. They need a well-drained soil and cannot stand water-logging and often require raised garden beds. Peanuts need 300 - 500 mm of rain during the growing season. Dry weather is needed near harvest.

Use: The seeds can be eaten raw, cooked or sprouted. They are boiled, steamed, roasted, salted or made into peanut butter or flour. The young leaves and unripe pods are edible after cooking. An edible oil is extracted from the seeds. The remaining meal can also be eaten.

Cultivation: Peanuts require soil with good levels of calcium and boron or they produce empty pods. Peanuts have nitrogen fixing root nodule bacteria and therefore can give good yields in soils where nitrogen is low. The nuts are normally removed from the shell before planting and are sown 2 - 3 cm deep, with 10 cm between plants and 60 - 80 cm between rows. The soil needs to be weeded and loose by the time the flowers are produced to allow the peg for the seed pods to penetrate the soil.

Production: Flowering can commence in 30 days and it takes 3.5 - 5 months until maturity. Peanuts are harvested by pulling out the plant when the top of the plants die down. After harvesting, they should be left to dry in the sun for 3 - 4 days. Virginia peanuts have a longer growing season and the seeds need to be stored for 30 days before they will start to re-grow.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	4.5	2364	24.3	-	-	2.0	3.0
seed (fresh)	45	1394	15	-	10	1.5	-
leaf	78.5	228	4.4	-	-	4.2	-

Nuts, seeds, herbs and other foods

English: Desert date

Local:

Scientific name: *Balanites aegyptiaca*

Plant family: ZYGOPHYLLACEAE

Description: A small, spiny, evergreen tree that grows 6 - 15 m tall. It produces a rounded crown of tangled thorny branches. The patterned bark is dark brown or grey. It becomes corky and cracked with age. The branches are stiff and brittle and have stout, single spines up to 8 cm long. The thorns are soft at first then become woody. The leaves occur as distinctive pairs of grey-green leaflets. They are 2.5 - 6 cm long by 1.5 - 4 cm wide and are leathery and slightly hairy. The leaves are slightly different shape in each half. There are 4 - 6 prominent veins which are clearly seen on the underside of the leaf. The flowers are in small, hairy clusters. They are 1.4 cm across. They are yellow-green and have a sweet smell. The fruit is yellowish-green and 5 cm long by 2.5 cm wide. The fruit are date like. Both ends of the fruit are rounded. There is a hard pointy seed about 4 cm long by 2 cm wide. The flesh around the seed is yellow and bittersweet. The seed is easily separated from the flesh.



Distribution: A tropical plant that is found all over Africa. It grows in the lowlands and Miombo woodland in Africa. It occurs from arid to sub-humid areas. It suits hot, dry areas, such as the Sahel. It grows from sea level to 2,000 m altitude. It prefers valley soils but will grow on a range of soils. It suits a rainfall of 200 - 800 mm. It needs an average temperature of 20 - 30°C.

Use: The nut or seed is used to make meal. The seeds are boiled in several changes of water then eaten with sorghum. A yellow edible oil is produced by the seeds after long boiling. The fruit and dried pulp are eaten. The fruit is bitter unless very ripe. The fruit are used for syrup and alcoholic drinks. The leaves and flowers are eaten as a vegetable. The resin from the cut bark is chewed. The fruit can be used to treat water supplies to kill the snail hosts of Bilharzia, and the water-flea which carries Guinea worm disease.

Cultivation: It is grown from seed, either in a nursery in pots, or direct. Root suckers can also be used. There are 600 - 1,200 seeds per kg. Seed removed from the fruit can be stored for a year. Seed should be sown vertically with the stem end down for best results. Seeds germinate in 1 - 4 weeks. Soaking the seed helps them germinate. They can be soaked in cold water for 2 days with the water being changed after 24 hours. Seedlings are slow growing but root suckers are faster.

Production: Trees produce after 5 - 8 years. Fruit mature in 60 days. In Tanzania, fruit are collected between April and June. A good tree can produce 10,000 fruit in one year. Ripe fruit can be sun dried and stored. Seed kernels can be 60% oil.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	63.5	249	10.5	-	-	4.9	0.4
nut (dry)	5.0	2286	23.0	-	-	7.0	-
fruit (dry)	19.0	1150	5.0	-	-	3.1	-
fruit	64.0	510	2.2	-	-	-	-

Nuts, seeds, herbs and other foods

English: Sunflower

Local:

Scientific name: *Helianthus annuus*

Plant family: ASTERACEAE

Description: An upright annual plant that ranges in height from 1 - 4 m. It has a strong tap root. Plants are mostly unbranched, but may have some branches. The stems are hairy. The leaves are large and oval to heart shaped with teeth around the edges. They are roughly hairy and mid to dark green. Leaves can be 10 - 40 cm long by 5 - 20 cm wide. The leaf stalk is long. The flowers are yellow and daisy like, and 9 - 20 cm across. Sometimes they are tinged red or purple.



Distribution: A temperate plant that suits the highlands of the tropics and can stand a light frost. It needs a well drained, rich soil. It is drought and frost resistant. Sunflowers grow from the equator to 55°N latitude. It does not suit the wet tropics. It cannot tolerate very acid soils. It can grow in arid places. It suits hardiness zones 4 - 11. It is widely distributed in many environments.

Use: An edible oil is extracted from the seeds and used for cooking. Sometimes seeds are eaten raw or roasted. The seeds can be ground into a meal for use in bread and cakes. They are also dried, roasted and ground and used as a coffee substitute. The seeds are boiled with water and honey to make a drink. The germinated seeds are fermented into a yogurt or cheese.

Cultivation: Plants are grown from seed. Only well-filled seed should be planted. It is easy to save your own seed as dry seed stores well. A plant spacing of 1 m by 0.5 m is suitable. Seeds are sown at a depth of 2 - 4 cm. Mature heads are collected by hand, dried and then threshed.

Production: Time to maturity is usually 4 - 5 months. Seeds are ready to eat when the flower starts to wither.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	5.4	2385	22.8	5	1.4	6.8	5.1

Nuts, seeds, herbs and other foods

English: Saba nut

Local:

Scientific name: *Pachira glabra*

Plant family: MALVACEAE

Description: A tropical plant. It is native to Central America. It grows on alluvial plains and lowland rainforests. It suits humid locations.

Distribution: A small tree. It grows 17 m high. The trunk is bright green. The leaves have 5 - 7 leaflets. The leaves have long leaf stalks. The flowers come out at night. They have light green strap-like petals. The stamen are white and curved. The fruit is a green capsule 12.5 cm long. It contains many large seed. It is like a cocoa pod. There are 10 - 24 seeds.



Use: The seeds are eaten fresh, boiled or roasted.

Cultivation: Plants are grown from seed. Cuttings or air-layering can also be used. The seeds are harvested from the fruit once they are open. Seeds are sown when fresh. They germinate in 5 - 10 days. The rate of germination is high. Seedlings can be transplanted into the field in 4 months.

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	66	-	34.1	-	-	-	-

Image sourced from:

<https://zoom50.wordpress.com/2010/10/06/sabamoney-tree-pachira-glabra/>

Nuts, seeds, herbs and other foods

English: Coastal almond

Local:

Scientific name: *Terminalia catappa*

Plant family: COMBRETACEAE

Description: A large tree, up to 25 - 40 m tall. It loses its leaves during the year. The trunk can be straight or twisted. There can be buttresses up to 3 m tall. The branches lie horizontally and come out in layers. The leaves are long, smooth and shiny, with an abrupt point at the tip and a rounded base. Leaves tend to be near the ends of branches. Leaves can be 17 - 29 cm long and 10 - 15 cm wide. Young leaves have soft hairs. The leaves turn red and fall off twice a year. Flowers are greenish-white and in a spike at the end of the branches. The lower flowers on a spike are female, and the others are male. The fruit is about 6 cm long by 3 - 4 cm wide, thick and flattened, with a flange around the edge. The fruit are green and turn red when ripe. The pulp is edible.



Distribution: It grows on beaches in almost all tropical countries in the world, including Solomon Islands. It is a tropical plant, and sometimes cultivated as a shade tree. The tree is common in lowland areas particularly on sandy or rocky beaches. Seeds are spread by bats and sea water, as well as being planted by people. It is common along streets in coastal towns. It will grow from sea level up to about 800 m altitude. Plants are frost-susceptible. It can tolerate drought. It suits hardiness zones 11 - 12.

Use: The kernel of the fruit is eaten raw. An edible oil can also be extracted.

Cultivation: Plants can be grown from seed. Seeds can be stored dry for a year or more. Seeds germinate freely and most seeds grow. Insects can badly damage the leaves of young seedlings.

Production: It is fast growing. Nut production is seasonal.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
nut (fresh)	31	1810	15.9	-	4	4.6	4.9
nut (dry)	4.2	2987	20.0	-	2	6.3	8.8

Nuts, seeds, herbs and other foods

English: African breadfruit

Local:

Scientific name: *Treculia africana*

Plant family: MORACEAE

Description: An evergreen tree. It grows to 15 - 30 m tall. It can grow up to 50 m tall. It has a dense spreading crown. The trunk is fluted. The bark is dark grey and smooth. It is thick and produces a white latex when cut. This later turns rusty red. The leaves are simple and alternate. They are very large. Leaves can be 30 cm by 14 cm or larger. They are dark green and smooth above but paler and slightly hairy underneath. The leaves are tough. They have 10 - 18 pairs of clear veins. The leaf stalk is 1.5 cm long and the leaf tip is pointed. Young leaves are red or yellow. The flower heads are rounded ad a yellow-brown. They are 2.5 - 10 cm across. Male and female flowers are usually separate. Flowers can grow in the axils of leaves or on older wood down to the trunk. The fruit is a compound fruit. It is rounded and very large. It can be 30 - 45 cm across. It grows on the trunk and main branches. Inside there are many orange seeds about 1 cm across. They are in a spongy pulp. The outer fruit surface is covered with pointy growths.



Distribution: A tropical plant. It suits hot, tropical lowland climates. It grows in forests near rivers. It can grow in swampy areas. It grows from sea level up to 1,500 m in Uganda or 1,200 m in Tanzania.

Use: The seeds can be dried, fried and eaten. They are also boiled, roasted or ground into flour. The flour is used in soups and nut milk. An edible oil can be extracted from the seeds.

Cultivation: Plants are grown from seed. Seed can be planted in pots then transplanted or they can be sown direct. There are about 5,000 seeds per kg. Seeds will only store for a few weeks but seed treatment is not needed before sowing.

Production: The tree is fairly fast growing. A fruit can weigh 12 kg.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	9.2	1555	12.6	-	-	320	-

Nutritional values of food plants by plant Family

Plant Family	Scientific name	Common name	Edible part	Moisture %	Energy kJ	Protein g	Vit A µg	Vit C mg	Iron mg	Zinc mg	Page
Amaranthaceae	<i>Amaranthus caudatus</i>	Grain Amaranth	leaf	6.0	1034	28.8	33	-	23.3	5.5	27
Amaranthaceae	<i>Amaranthus viridis</i>	Green amaranth	leaf	87.3	-	4.5	72	169	6.0	-	47
Anacardaceae	<i>Sclerocarya birrea</i>	Maroola plum	fruit	87.0	226	0.5	-	-	-	-	42
Anacardiaceae	<i>Anacardium occidentale</i>	Cashew	nut	4.0	2478	17.5	-	-	2.8	4.8	58
Anacardiaceae	<i>Mangifera indica</i>	Mango	fruit	83.0	253	0.5	54	30	0.5	0.04	40
Araceae	<i>Colocasia esculenta</i>	Taro	root	66.8	1231	1.96	3	5	0.68	3.2	10
Araceae	<i>Xanthosoma sagittifolium</i>	Chinese Taro	root	67.1	559	1.6	5	13.6	0.4	0.5	55
Arecaceae	<i>Cocos nucifera</i>	Coconut	flesh (dry)	12.2	2429	6.6	0	-	-	-	12
Asteraceae	<i>Helianthus annuus</i>	Sunflower	seed	5.4	2385	22.8	5	1.4	6.8	5.1	62
Bignoniaceae	<i>Kigelia africana</i>	Sausage tree	Leaf	-	-	-	-	-	161	-	33
Bombacaceae	<i>Adansonia digitata</i>	Boabab	fruit	16.0	1212	2.2	-	360	7.4	6.7	36
Cleomaceae	<i>Cleome viscosa</i>	Sticky Cleome	leaf	80.4	-	5.6	-	-	24	-	29
Clusiaceae	<i>Allanblackia floribunda</i>	Tallow tree	seed (dry)	6.0	2709	3.6	-	-	-	-	57
Combretaceae	<i>Terminalia catappa</i>	Coastal almond	nut (dry)	4.2	2987	20.0	-	2	6.3	8.8	64
Convolvulaceae	<i>Ipomoea batatas</i>	Sweet potato	tuber (baked)	72.9	431	1.7	961	24.6	0.5	0.3	16
Convolvulaceae	<i>Ipomoea obscura</i>	Yellow ipomoea	leaf	56.6	569	8.8	-	-	28.8	1.1	32
Cucurbitaceae	<i>Citrullus lanatus</i>	Watermelon	seed	5.1	2330	28.3	-	-	7.3	10.2	38
Cucurbitaceae	<i>Cucurbita maxima</i>	Pumpkin	fruit	69.6	439	1.4	-	-	-	-	49
Cucurbitaceae	<i>Cucurbita pepo</i>	Marrow	yellow fruit	92.0	97	1.0	180	8	1.4	-	50
Cucurbitaceae	<i>Luffa acutangula</i>	Angled loofah	leaf	89.0	-	5.1	-	98	11.5	-	51
Cucurbitaceae	<i>Momordica balsamina</i>	Balsam apple	leaf	89.4	-	3.0	-	-	12.7	0.9	34
Cucurbitaceae	<i>Momordica charantia</i>	Bitter cucumber	leaf (raw)	84.7	252	5.0	44	170	7.1	0.3	52
Cyperaceae	<i>Cyperus esculentus</i>	Yellow nut sedge	rhizome	36.5	1262	3.5	-	-	8.0	-	13
Dioscoreaceae	<i>Dioscorea esculenta</i>	Lesser yam	tuber	74.2	470	2.1	84	20	0.75	0.5	14
Fabaceae	<i>Arachis hypogaea</i>	Peanut	seed (dry)	4.5	2364	24.3	-	-	2.0	3.0	59
Fabaceae	<i>Cajanus cajan</i>	Pigeon pea	seed	10.0	1449	19.5	55	-	15.0	-	20
Fabaceae	<i>Crotalaria brevidens</i>	Slenderleaf rattlepod	leaf	74.5		8.8	-	-	38	-	30
Fabaceae	<i>Glycine max</i>	Soybean	seed	9.0	1701	33.7	55	-	6.1	-	21
Fabaceae	<i>Parkia filicoidea</i>	African locust bean	seed (dry)	7.0	1780	32.3	-	6	33.2	-	22
Fabaceae	<i>Psophocarpus tetragonolobus</i>	Winged bean	seed	8.5	1764	41.9	-	-	15.0	4.5	23
Fabaceae	<i>Sphenostylis stenocarpa</i>	African yam bean	seed	9.0	1470	19.2	-	-	-	-	24
Fabaceae	<i>Vigna radiata</i>	Mung bean	seed	11.0	1432	22.9	55	4	7.1	-	25
Fabaceae	<i>Vigna subterranea</i>	Bambara groundnut	seed	7.3	1572	18.4	-	-	4.6	2.2	26
Lauraceae	<i>Persea americana</i>	Avocado	fruit	74.4	805	1.8	480	11	0.7	0.4	43
Malvaceae	<i>Corchorus olitorius</i>	Jute, Bush Okra	leaf (raw)	80.4	244	4.5	574	80	7.2	-	48
Malvaceae	<i>Grewia tenax</i>	Small-leaved white raisin	fruit	59.1	-	4.5	-	161	125	-	39

Plant Family	Scientific name	Common name	Edible part	Moisture %	Energy kJ	Protein g	Vit A µg	Vit C mg	Iron mg	Zinc mg	Page
Malvaceae	<i>Hibiscus cannabinus</i>	Indian hemp	leaf	79.0	280	5.5	34	-	12.1	-	31
Malvaceae	<i>Pachira glabra</i>	Saba nut	Seed	66	-	34.1	-	-	-	-	63
Malvaceae	<i>Sida cordifolia</i>	Goat's horns	leaf	6.6	1296	24.2	-	-	79.8	-	35
Moraceae	<i>Treculia africana</i>	African breadfruit	seed (dry)	9.2	1555	12.6	-	-	320	-	65
Moringaceae	<i>Moringa oleifera</i>	Drumstick Tree	leaf	76.4	302	5.0	197	165	3.6	-	54
Myrtaceae	<i>Psidium guajava</i>	Guava	fruit	77.1	238	1.1	60	184	1.4	0.2	44
Poaceae	<i>Oryza glaberrima</i>	Floating rice	seed	11.3	1538	7.4	-	-	3.4	-	18
Poaceae	<i>Sorghum bicolor</i>	Sorghum	seed	-	1459	11.1	-	-	-	-	19
Rhamnaceae	<i>Ziziphus mauritiana</i>	Jujube tree	fruit	77.0	360	0.8	21	71	0.4	0.4	45
Rutaceae	<i>Aegle marmelos</i>	Bael fruit	fruit	58	577	2.3	0.13	219	0.55	-	37
Zygophyllaceae	<i>Balanites aegyptiaca</i>	Desert date	nut (dry)	5.0	2286	23.0	-	-	7.0	-	60



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