

Potentially Important Food Plants of Cameroon



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

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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.

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 Cameroon. This guide has been developed with the best intention to create interest and improve understanding of the important local food plants of Cameroon, 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
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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

This book is designed as a simple introduction to the more common food plants of Cameroon. It is hoped people will take greater pride and interest in these plants and become confident and informed about how to grow and use them. Many of the local food plants that occur in every country are very good quality foods. Unfortunately, people often reject traditional food plants and grow more of the introduced vegetables, such as ballhead cabbage. These do not have the same food value as many traditional, tropical, dark green, leafy vegetables.

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.

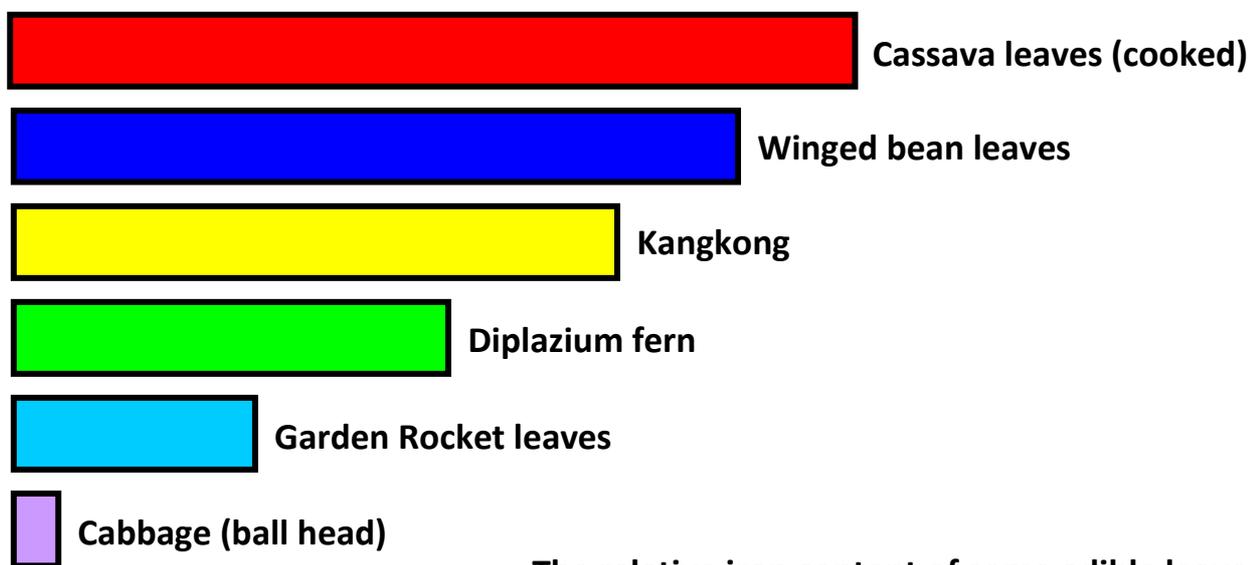
Naming of plants

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.



The relative iron content of some edible leaves

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.

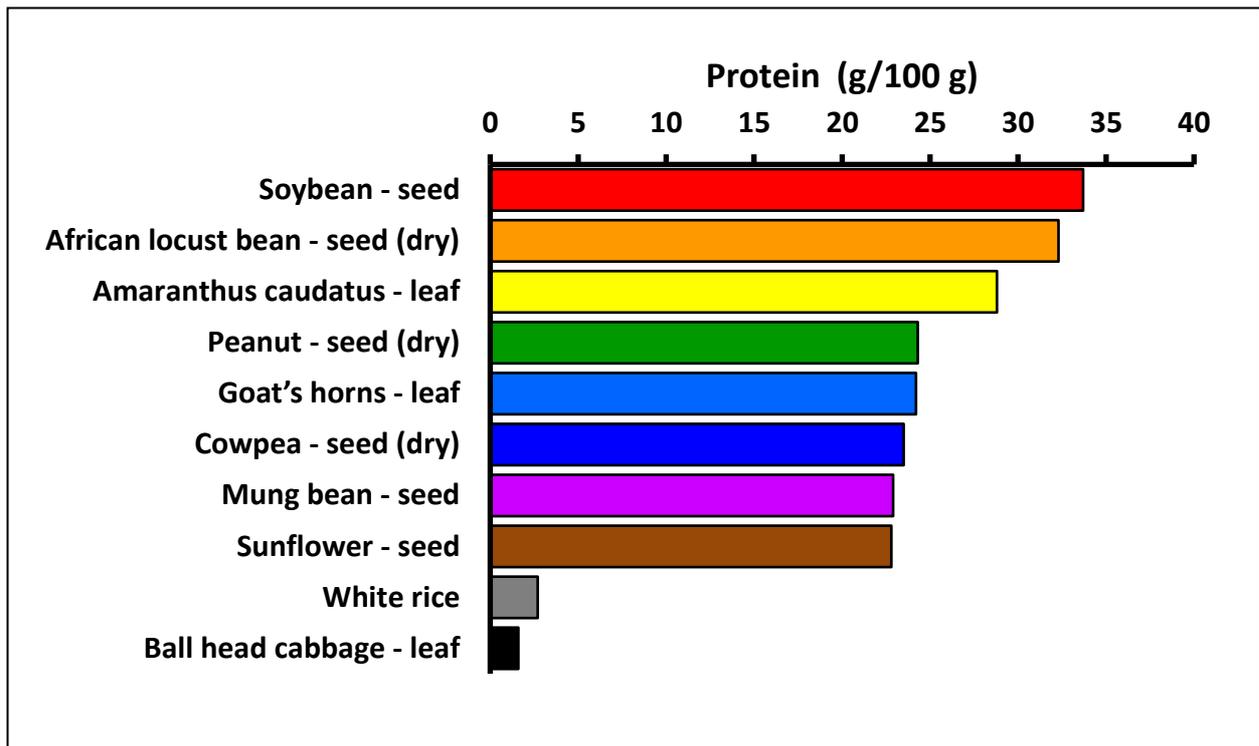
Pests

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 that 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.

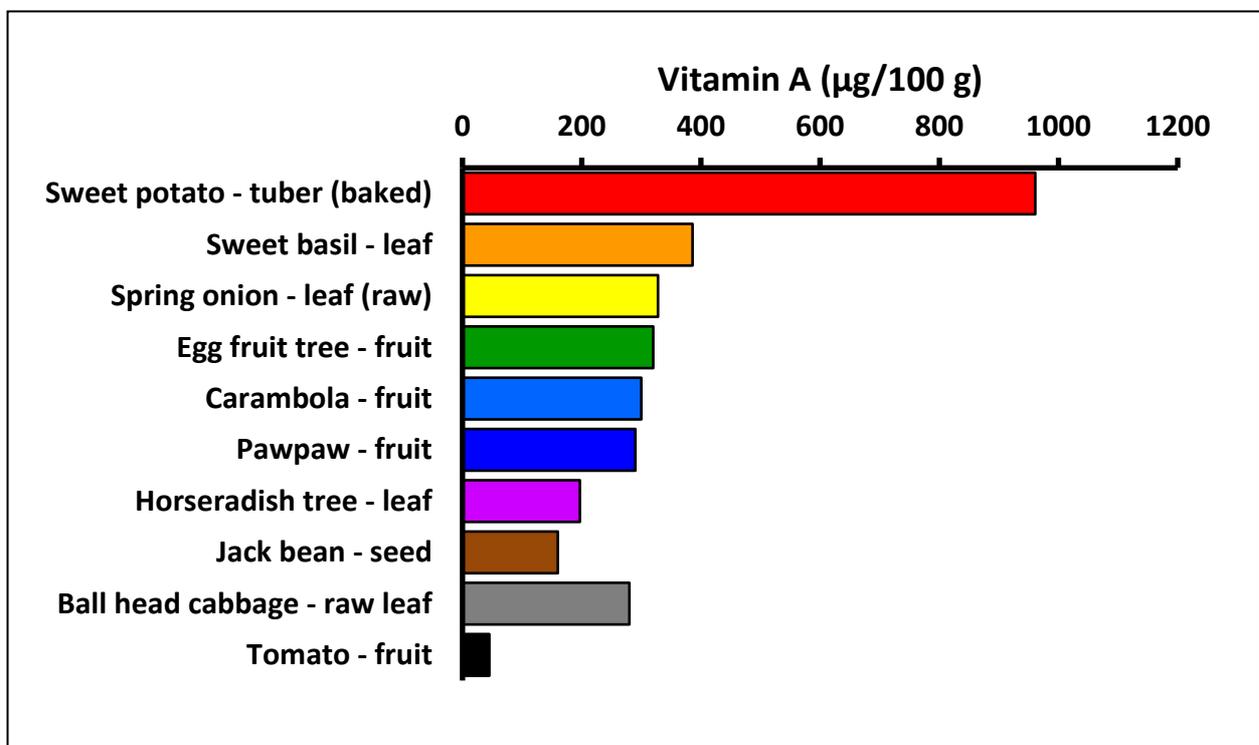
Diseases

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 squashy, 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.

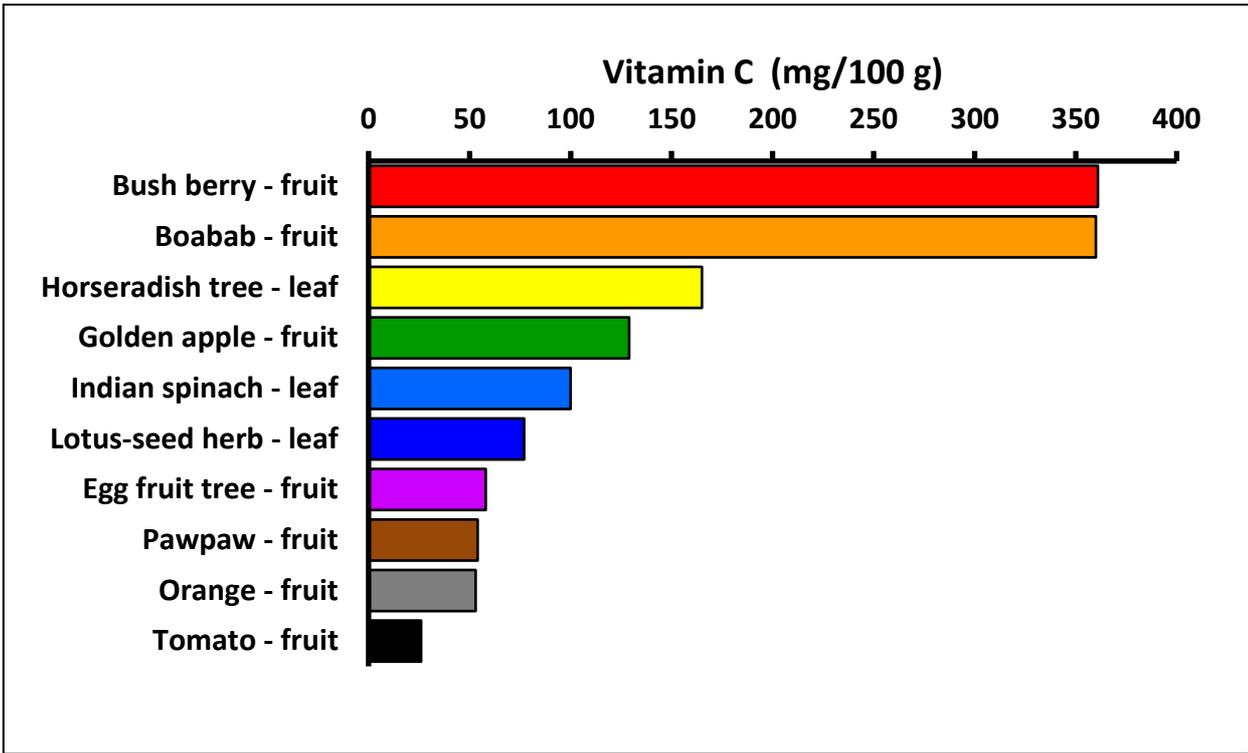
Food value charts for a selection of plants from Cameroon



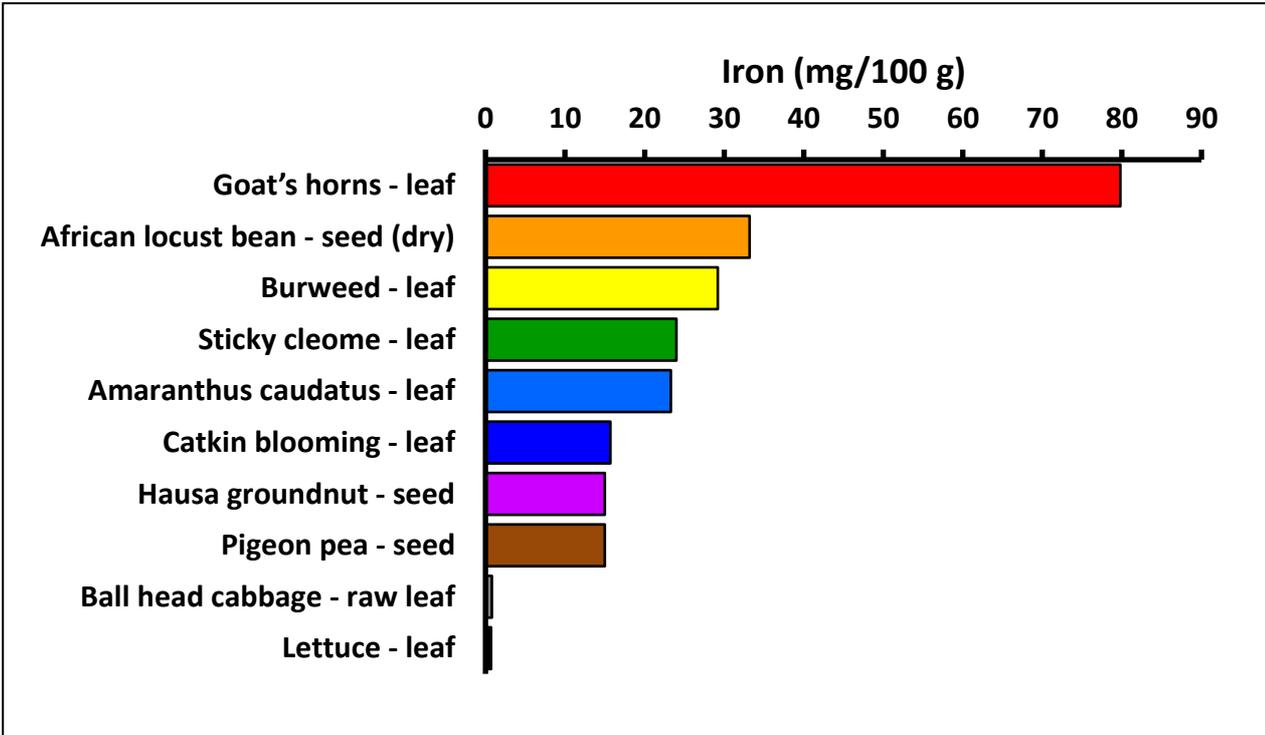
Protein helps the body repair cells and make new ones. Protein is also important for growth and development in children, teens, and pregnant women. Symptoms of protein deficiency include wasting and shrinkage of muscle tissue, and slow growth (in children).



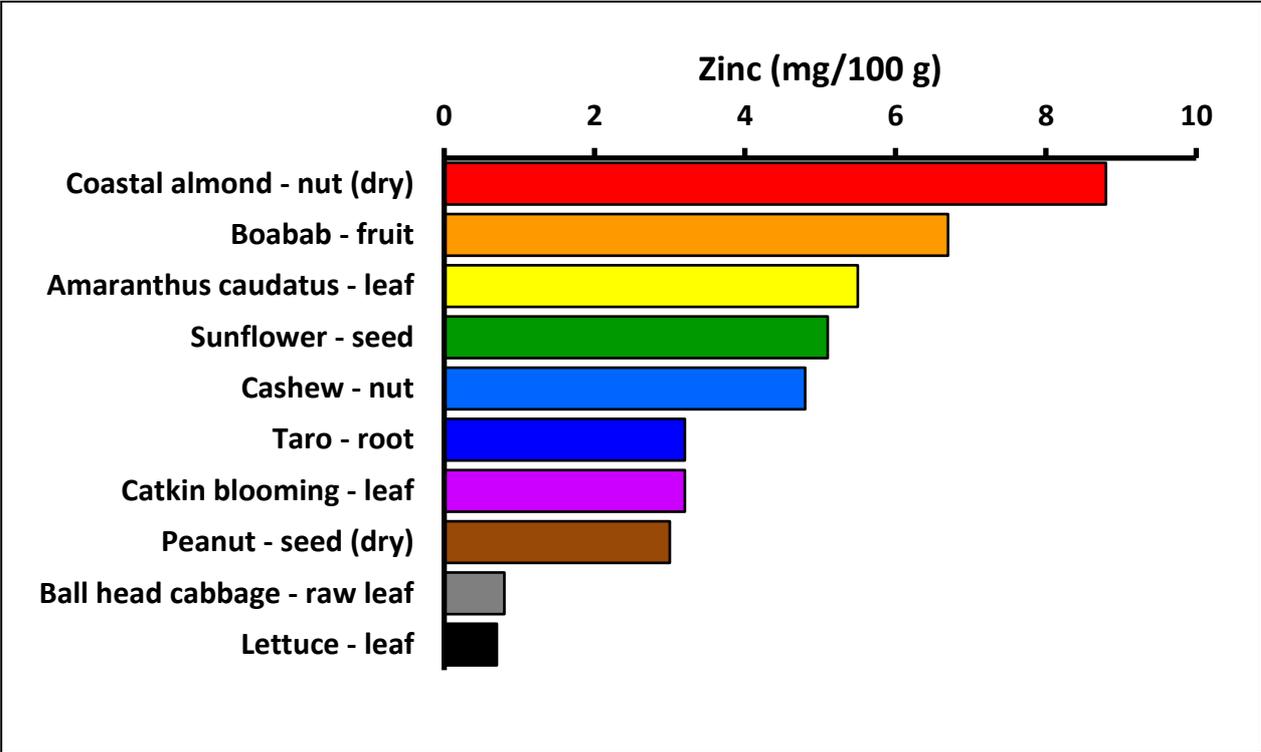
Vitamin A is very important for eyesight and fighting disease, particularly in infants, young children and pregnant women. People who are short of Vitamin A have trouble seeing at night.



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

Common name: Greater yam

Local:

Scientific name: *Dioscorea alata*

Plant family: DIOSCOREACEAE

Description: A long angular vine with square stems that twine to the right around support sticks. The stem does not have spines and is often coloured green or purple. The leaves are heart shaped and borne in pairs along the vine. The leaves vary in shape, size and colour with different varieties. Leaves can be 10 - 30 cm long by 5 - 20 cm wide. The leaf stalk is 6 - 12 cm long. The flowers occur in the axils (where the leaf joins the stem) of the upper leaves. The male flowers are in small heads along branched stalks. These can be 25 cm long and green. The female flowers are in shorter spikes. Many cultivated varieties do not produce fertile seed. The fruit are 3-winged and 2.5 cm long by 3.5 cm wide. The seeds, when they occur, have wings right around them. One large, but often irregular-shaped, tuber occurs under the ground. There are many different varieties. The tubers can vary in shape, size, colour, texture and other ways. Some varieties produce bulbils, or small bulbs, along the vine.



Distribution: It grows in many tropical countries, growing from sea level up to about 1,800 m in the tropics. Yams are most important in seasonally dry areas. They need a well-drained soil with reasonable fertility and are, therefore, often planted first in rotations. The maximum temperature is >30°C while the minimum is 20°C. The best temperature range is 25 - 30°C. Rainfall is often seasonal in yam areas and the maximum needs to be 14 - 20 weeks rain, with the best being 1,150 mm during the growing season. Yams can tolerate drought, but give best yields with high rainfall. The critical rain period is during the first 5 months. They cannot tolerate water-logging. Yams are influenced by the number of hours of sunlight. Short days (less than 10 - 11 hours of sunlight) favour tuber development. Yams suit hardiness zones 10 - 12.

Use: The tubers are boiled, baked or mumued (cooked in the ground).

Cultivation: For general food production, use top pieces of the tuber after they have sprouted, use a branched stick for supporting the vine, space plants about 1 m apart and choose a smooth round variety of yam. This makes harvesting easier, and peeling and food preparation quicker. Varieties that get less leaf spot disease and are less damaged by virus diseases give a more reliable yield. Tubers which are cut and stored in shady places until they form sprouts give improved yields over tubers that are left whole then cut into setts at planting. Because yam tubers have a period of dormancy, tubers do not normally commence regrowth for up to 5 - 6 months. This means they store, but cannot easily be used for out of season replanting. Dormancy, or inactivity, of the yam tubers can be broken using Calcium Carbide treatment for 5 hours, or by covering tubers with leaves of *Croton aromaticus* or *Averrhoa bilimbi*.

In some kinds, the bulbils that grow along the vine can be used for planting. By using staggered plantings of male and female plants, and then hand-pollinating the flowers, it is possible to get seeds to develop and these can be used to establish new plants. It is common practice in many areas to plant the yam piece upside down. The probable reason for this is to give the shoot and roots time

to develop and get established away from the sun and wind so that the plant does not dry out. People in yam areas have their varieties classified as to whether they are planted at the top or the bottom of the hole, and whether the shoot is pointed up or downwards. A planting depth of 15 cm is best. Normally top pieces give a higher yield than middle pieces of the tubers and these are better than bottom pieces. Top pieces of the yam tuber give earlier and more reliable shoots and the yams mature earlier. These top pieces are also the less attractive part of the tuber for eating, so they are preferred for planting. The larger the sett, the earlier it develops shoots and the larger the yield. Putting plants more closely gives smaller yams, but more total food. Closer spacing is normally used on lighter soils.

Yams should also have sticks to climb up. It is best to have a stick that is twisted or branched because the vine can slip down a very straight stick. Normally, a stick 2 m tall is sufficient. It needs to be a strong stick, firmly fixed in the ground. Yam varieties have varying types of vine growth. This affects where the stick needs to be placed. The fat, irregular yams can have the sticks near the mound, as a thick clump of vines and leaves soon develops. But, if a the stick is put beside the mound of one of the long ceremonial yams, the vine will often reach the top of the stick before it has produced more than a couple of leaves and will then fall back down to produce its leaves on the ground. The stick for these varieties often needs to be put at some distance from the yam hole. The tip can be picked off the vine if branching is wanted earlier.

Light influences the growth of the tubers. If the tubers have light on them often, due to cracks in the soil on hillsides, tubers are smaller. Compact soil or stones means the tubers may be exposed to sunlight. This needs to be avoided as it reduces yield. Yams must have plenty of air in the soil, so they will not normally grow on heavy clay soils or in areas with a lot of soil moisture. The soil can be improved for yam growing by putting leaves and other plant material in the planting hole, by making a mound above the hole, or by planting on a hillside. In some very loose sandy soils, yams can just be planted in flat, unmounded soils without digging a special yam hole, but these situations are not common.

Production: In most places, the yam growth and time to maturity is linked to seasonal rainfall patterns. They are mostly planted just before the first rains, where a 8 - 10 month rainy season exists. They give better yields in 6 - 8 month rainy season areas, where they are planted 3 months before the rains. Earlier planting requires larger sett size to withstand drying out. In drier grassland areas, mulching the mounds at planting means fewer plants die and more food is produced. The time to maturity ranges from 5 months on the coast, to 9 - 10 months at higher altitudes. Yams will store well for over 6 months in a dry, dark, well-ventilated shed. Greater yam is an important root crop of the seasonally dry, hot humid, tropics.

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	76.6	323	2.0	18	10	0.8	0.39

Starchy staples

Common name: 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

Common name: Country potato

Local:

Scientific name: *Plectranthus rotundifolius*

Plant family: LAMIACEAE

Description: Country potato is a small annual herb. It grows 15 - 30 cm tall. Its succulent stems can lie along the ground or curve upwards. The leaves are thick and have a smell like mint. The flowers are small and pale violet. Dark brown tubers are produced in clusters at the base of the stem. The tubers can be up to 20 cm long and 2 cm wide.



Distribution: Country potato is a tropical plant. It grows well in high rainfall areas with low night time temperatures. It is grown as a monsoonal crop.

Use: The tubers of country potato are commonly boiled and eaten but they can also be eaten raw. They can be added to curries, baked, or fried into chips, steamed, added to soups or stews or mashed and fried. The leaves are edible and can be used as a flavouring. The ripe fruit can also be eaten.

Cultivation: Country potato is grown from suckers from germinating tubers. The tubers are put in a nursery bed about 4 cm deep and 10 cm apart. Tubers germinate in 10 - 15 days once watered. These produce a cluster of sprouts which are then transplanted after about 3 months. The earth is heaped up around the plants to encourage tuber growth. Plant spacings of 20 cm apart in rows 90 cm apart are used.

Plants can also be grown from cuttings. It needs a well-drained, sandy loam. It cannot stand water-logging. In heavier soils, plants should be grown on ridges. Plants cannot stand cold, frost or drought. The best soil pH for optimal growth is 6.5 - 7.0.

Production: Crops reach maturity after about 5 - 6 months. This may be longer in colder places. Yields of 8 - 15 tonnes per hectare are average. Tubers should be harvested as soon as they are mature to avoid decay.

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	76	393	1.4	-	1.0	6.0	-

Starchy staples

Common name: 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 corms. 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

Common name: 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	-

Starchy staples

Common name: Hausa groundnut

Local:

Scientific name: *Macrotyloma geocarpum*

Plant family: FABACEAE

Description: An annual herb. The 10 cm long stems lie along the ground and form roots. The leaves are alternate and have 3 leaflets. The leaf stalk is erect and 25 cm long. The leaflets are 3 - 8 cm long by 2 - 2.5 cm wide. The flowers can be single or in pairs in the axils of leaves. The flowers are greenish white. The fruit are pods 0.5 - 2.5 cm long by 0.5 - 1 cm wide. These are forced into the ground as they develop. The pods contain 1 to 3 kidney shaped beans. The seeds are 5 - 10 mm long by 4 - 7 mm wide.



Distribution: A tropical plant that can grow in arid places.

Use: The seeds are cooked and eaten. They are boiled with salt and eaten with palm oil. They are also boiled in soup. Dried seeds are ground into flour and made into cakes and other dishes. The leaves are also cooked and eaten.

Cultivation: Plants are grown from seeds. Plants are often intercropped.

Production: Pods are harvested and then dried in the sun. The seeds are then thrashed from the pods. Yields of dry seeds can be 500 kg per hectare.

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	1461	19.4	-	-	15.0	-

Starchy staples

Common name: Finger millet

Local:

Scientific name: *Eleusine coracana*

Plant family: POACEAE

Description: An annual millet grass. It is robust and forms many tillers or young shoots from the base. It grows 40 - 120 cm tall. The stems are somewhat flattened and the leaves are narrow. The flower heads are made up of 2 - 7 finger like spikes, 1.5 cm across and 10 - 15 cm long. These in turn have about 70 smaller spikes. Each one of these smaller spikes has 4 - 7 seeds. The seeds are roughly rounded and 1 - 2 mm across. There are *coracana* and *africana* subsp.



Distribution: It is a very drought resistant tropical plant. For good yields, it needs good soil drainage and adequate moisture. It cannot stand water-logging. It is an important crop in areas where annual rainfall is 900 - 1,250 mm. It especially suits areas with long hot summers. It needs a minimum temperature above 18°C and does best where temperatures are above 27°C. It grows from sea level to 2,400 m altitude in Africa. It is a short day length plant and does best where day length is 12 hours. It can grow in arid places.

Use: The seed are eaten either roasted or ground into flour. This is used for porridge and flat bread. Alcohol is brewed from the grain. The leaves are also edible.

Cultivation: It is grown from seed. Often plants are grown mixed with sorghum or maize. Good soil preparation is needed to reduce weed competition. Seed can be broadcast or drilled. Young plants need to be weeded and thinned. Seed viability drops to about 50 % after 2 years. Spacings of 5 cm apart in rows 30 - 33 cm apart, or 10 - 12 cm apart in rows 25 cm apart are recommended. About 25 - 35 kg of seed per hectare are needed if seed are broadcast. 5 - 10 kg per hectare are required if seed are drilled. Using fertiliser can dramatically increase yield. 125 kg per hectare of sulphate of ammonia when plants are 15 cm high is used in Uganda.

Production: It is self-pollinating and pollination occurs over 8 - 10 days. Millet seed stores very well and can be stored without damage for 10 years. Often it is stored on the head. Yields of about 450 - 900 kg of dried grain per hectare are usual. This can easily be increased to 1,650 kg per hectare. Crops take 3 - 6 months until harvest.

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	11.7	1594	6.2	-	-	5.3	-

Starchy staples

Common name: Maize

Local:

Scientific name: *Zea mays*

Plant family: POACEAE

Description: A single stemmed annual plant that grows 2 - 3 m tall. The stem is solid and 2 - 3 cm across. It is a large grass family plant with prop roots near the base. Some forms produce tillers near the base. Seed roots feed the plant initially then casual side roots develop from the lowest node on the plant and continue supplying nutrients. Roots can go sideways for 1 m or downwards for 2 - 3 m. Leaves are produced one after another along opposite sides of the stem and there are 8 - 21 leaves. The leaf sheath wraps around the stem but opens towards the top



of the sheath. The leaf blade is 30 - 150 cm long and 5 - 15 cm wide. The leaf blade has a pronounced midrib and is often wavy along the edge. The male flower or tassel is at the top. The female flower is called the ear. It is on a short stalk in the axils of one of the largest leaves about half way down the stem. It produces a large cob wrapped in leaves. Cobs commonly have 300 - 1,000 grains. Normally only one or two cobs develop per plant.

Distribution: A warm temperate plant. Seeds need a soil temperature of more than 10°C to germinate. It grows best at less than 1,800 m altitude in the equatorial tropics. It is grown in most areas of Asia and has been grown from sea level to 3,300 m in the Americas. It tends to be grown in areas too dry for rice but wetter than for millets. Maize must have over 120 days frost free.

Use: The cobs are eaten cooked. The dried grains can be crushed and the meal can be used for breads, cake, soups, stews etc. Pancake like tortillas from corn have been a staple food in Central America. Maize is cooked and prepared in many different ways - boiled, roasted, dried, steamed and other ways. Corn oil is used in salads and cooking. Young tassels are cooked and eaten. The pollen is used in soups. The fresh silks are used in tortillas. The pith of the stem can be chewed or made into syrup. Sprouted seeds can be eaten.

Cultivation: It is grown from seeds. It is normal to plant one seed per hole at 1 - 2 cm depth. A spacing of about 30 cm between plants is suitable. Seed should be saved from gardens of over 200 plants and the seed from several cobs mixed to avoid inbreeding depression.

Production: In warm, moist soil, seeds germinate in 2 - 3 days after planting. Cobs are harvested when the grains are full and the tassel is just starting to turn brown. This is normally about 50 days after fertilization. It is sweetest eaten soon after harvesting. Drought and unfavorable weather can result in the silks of the female flowers emerging after the pollen has been shed. This results in poorly pollinated cobs.

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 (mature)	10.4	1528	10.0	100	4	4.9	2.2

Legumes

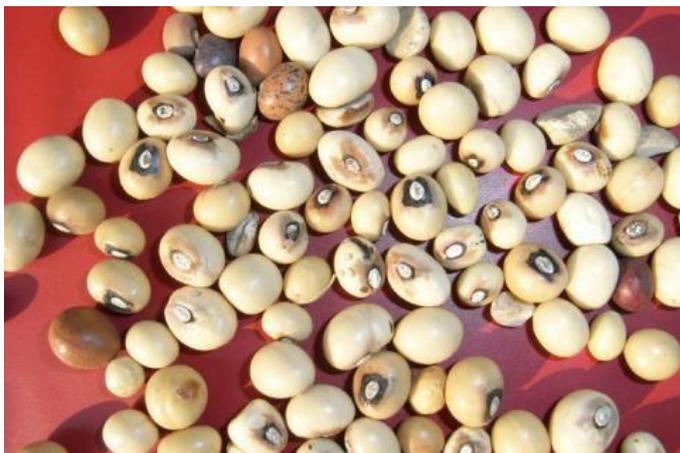
Common name: Bambara groundnut

Scientific name: *Vigna subterranea*

Local:

Plant family: FABACEAE

Description: An annual plant that can be either a bunchy 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

Legumes

Common name: 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

Common name: 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

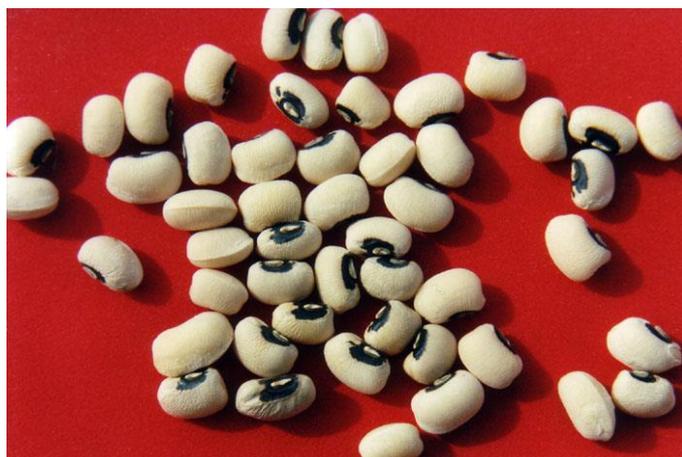
Common name: Cowpea

Scientific name: *Vigna unguiculata subsp. unguiculata*

Local:

Plant family: FABACEAE

Description: A creeping bean type plant with straight firm pods. There is a deep tap root and many branches occur from it in the surface of the soil. The root nodules are large and round. The leaves have 3 leaflets. The end leaflet can be 12 - 16 cm long. The side leaflets are asymmetrical. The stipules at the base of the leaf are large and with spurs at their base. Flowers occur often in pairs on the end of long flowering shoots. Only 2 - 4 flowers in each stalk produce pods. Flowers are white, yellow or blue. They are large and showy. The pods are about 15 cm long. The seeds are white except for a dark scar.



Distribution: It grows in tropical and subtropical climates. It grows from sea level to 1,800 metres altitude in the tropics. Plants can stand high temperatures. Some kinds can tolerate drought. They are sensitive to cold and killed by frost. Plants germinate with a temperature between 11.5 - 15.5°C. The best growth occurs between 20 - 35°C. They can grow on a range of soils providing they are well drained. They are a short day plant. They do well in the semiarid tropics. It will not tolerate acid or alkaline soils. It grows in areas with an annual rainfall between 280 - 410 mm. It can grow in arid places.

Use: The young leaves, young pods and ripe seeds are all eaten. They can be steamed, boiled, stir-fried etc. The leaves can be dried and stored. The dried seeds are used in soups and stews. They are ground into flour or fermented. The seeds are also used for bean sprouts. Roasted seeds are used as a coffee substitute.

Cultivation: It is grown from seeds. Seeds remain viable for several years if carefully stored. A seeding rate of about 20 kg per ha is suitable and seed are sometimes broadcast then thinned.

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)	11.2	1189	23.5	-	1.5	6.4	-
seed (young, boiled)	75.5	406	3.2	79	2.2	1.1	1.0
leaf	88.4	143	4.2	36	35	4.7	0.3
young pod + seed (boiled)	89.5	142	2.6	45	17.0	0.7	0.2
leaf (boiled)	91.3	92	4.7	29	18	1.1	0.2

Legumes

Common name: 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

Common name: Lablab bean

Local:

Scientific name: *Lablab purpureus*

Plant family: FABACEAE

Description: A climbing bean which can have vines 1 - 5 m long. It keeps growing from year to year. The stems can be smooth or hairy. Leaves are made up of 3 almost triangular leaflets. The leaflets are 5 - 15 cm long and 3 - 14 cm wide. The side leaflets are somewhat asymmetrical. Often the plants are flushed purple. The flowering clusters are 5 - 20 cm long. Flowers are often white but can vary from red to blue. The pods are flattened, pointed and up to 12 cm long and 2 cm wide. They can be green, purple or white. Inside there are 3 - 5 white or dark seeds. Seed pods have a wavy margin. The seeds are 0.5 - 1.5 cm long. (This bean is similar to Lima bean but the keel of the flower is not spirally twisted, the pod ends more bluntly with a long thin style at the end and the hilum on the seed is longer.)



Distribution: It is a tropical and subtropical plant. It mostly grows between 750 and 2175 m altitude in the tropics. It is drought resistant and can grow in quite low rainfall areas. Some varieties are short day and some are long day kinds. It suits hardiness zones 9 - 12.

Use: The young pods, ripe seeds and young leaves are edible, cooked. Flowers can be eaten raw, steamed or added to soups and stews. Dried seeds can be cooked as a vegetable. The seeds can also be sprouted then crushed and cooked. The large starchy root is edible. **Caution:** Many types can be poisonous. They should be boiled and the cooking water thrown away.

Cultivation: Seeds are sown at 30 x 60 cm spacing near stakes or trees. About 20 kg of seed per hectare are required. Fertilising with nitrogen and potash until flowering is recommended.

Production: Young pods are ready 4 - 6 months after planting and seeds 6 - 8 months. Pods are often harvested over 2 or 3 years. Pollination and seed setting are reduced in cold weather.

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)	10.0	1428	22.8	-	-	9.0	-
seed (young)	86.9	209	3.0	14	5.1	0.8	0.4
pod (fresh)	86.7	203	3.9	-	1.0	2.4	-

Legumes

Common name: Jack bean

Scientific name: *Canavalia ensiformis*

Local:

Plant family: FABACEAE

Description: A perennial climber, although short kinds do occur. Often it is a more bushy plant than the sword bean. Plants grow up to 1.5 m long. Stems can be hairy. Leaves have 3 leaflets. The leaflets are oval and 5.7 - 20 cm long by 3.2 - 11.5 cm wide. The leaf tends to be wedge shaped at the base. The leaf stalks are 2.5 - 11 cm long. Flowers are red/purple. They occur on flower clusters 5 - 12 cm long and with flower cluster stalks which are 10 - 34 cm long. The individual flower stalks are 2 - 5 mm long. Pods are long and sword shaped. Pods can be 15 - 35 cm long. Seeds are white with a light brown hilum half as long as the seed. Seeds are 2 cm long, by 1 cm across.



Distribution: It grows in tropical and subtropical places. It requires a fairly high temperature (15° - 30°C). It will possibly grow up to 900 m altitude. It is fairly drought resistant and also has some resistance to water-logging and salt in the soil. It can tolerate shade. It can tolerate pH from 4.5 - 8.0 but does best at about 6.1. The optimum mean annual temperature is 14.4° - 27.8°C. Seed germinate between 24 - 27.5°C. It is a short day plant growing well with a day length of 10 - 12 hours of sunlight. It can grow in arid places.

Use: The leaves and top shoots are eaten. The very young pods are boiled and eaten. The flowers can be eaten. The young seeds are eaten boiled, roasted, or peeled and cooked. The seeds are also fermented. The ripe seeds are roasted and used as a coffee substitute. **Caution:** The ripe seeds can contain poison and need to be well cooked and the water changed before eating. They are also often left under running water or fermented.

Cultivation: It is grown from seeds. Seeds need to be 2 cm deep. A spacing of about 60 cm is suitable. Plants preferably need a support to climb over. It benefits from a fertile soil but adding nitrogen depresses yield.

Production: Green pods are produced in 3 - 4 months, but ripe seeds need 6 - 9 months. Yield of seeds can range from 700 - 5,400 kg/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
seed	10.0	1423	20.4	160	-	4.9	-
pod (fresh)	88.0	155	2.4	-	-	-	-

Legumes

Common name: 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

Leafy greens

Common name: Lotus-seed herb

Local:

Scientific name: *Alternanthera sessilis*

Plant family: AMARANTHACEAE

Description: A low lying and spreading plant which has many branches. It continues to grow from year to year. It has a strong taproot. The stem and branches are up to 60 - 100 cm long and near the ends there are 2 lines of hairs along the stem. The leaves are smooth and attached to the stem without a stalk. They are opposite. The leaves are 1 - 10 cm long and 0.2 - 2 cm wide. The flowers heads are white and 5 - 7 mm long. They grow along the plant and do not have flower stalks. It flowers all year round. The fruit are oval and compressed on the side. The seed is about 1.5 cm across. When plants are growing in water the stems become hollow and the plants float.



Distribution: A tropical plant. It grows in the lowlands and the highlands. It occurs in most tropical places. It is common in waste land at low and medium altitudes in Cameroon. It can grow in arid places. It is best in alkaline soil. It can grow in seasonally water logged soils and near rivers and ditches.

Use: The leaves and tender tips are cooked and eaten. They are used in soups. It is also used to prepare a cool drink. The harvested leaves can only be stored for 2 - 3 days.

Cultivation: It can be grown by dividing the underground stem. It can also be grown from sections which root at their nodes. It can be grown by seed.

Production: The first harvest of leaves can be taken 50 - 60 days 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
leaf	89.3	109	4.5	57	77	-	-
shoot	-	-	5.0	577	-	16.7	-

Image sourced from: commons.wikimedia.org

Leafy greens

Common name: 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 recollected 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

Common name: 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 Cameroon. 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)

Leafy greens

Common name: Burweed

Local:

Scientific name: *Triumfetta rhomboidea*

Plant family: MALVACEAE

Description: A herb or small shrub that keeps growing from year to year. Plants can be 1.5 m tall. The bark is tough and fibrous. The younger stems and leaves and flowers are densely covered with hairs. The leaves are alternate and the edges of the leaves have teeth. The lower leaves have 3 lobes. The flowers occur in small clusters opposite the axils of leaves. The stalks carrying the flowers are 20 - 40 cm long. There are 5 yellow petals. The fruit are brown and hairy and covered with hooked spines. They are round and about 5 mm across. They contain 2 - 4 seeds. The fruit cling to clothing.



Distribution: A tropical plant. It grows naturally in grassland and re-growth situations. It is more common in tropical places with seasonal rainfall. It grows in savannah woodland and in palm groves. It grows up to 1,280 m above sea level. It can grow in arid places.

Use: It is eaten as a pot-herb in times of scarcity. The roots are eaten 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	78.4	284	4.2	-	-	29.2	-

Image accessed from:

http://www.phytoimages.siu.edu/users/paraman1/2_15_10/Upload15Feb10/077TriumfettaRhomboidea.jpg

Leafy greens

Common name: 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.

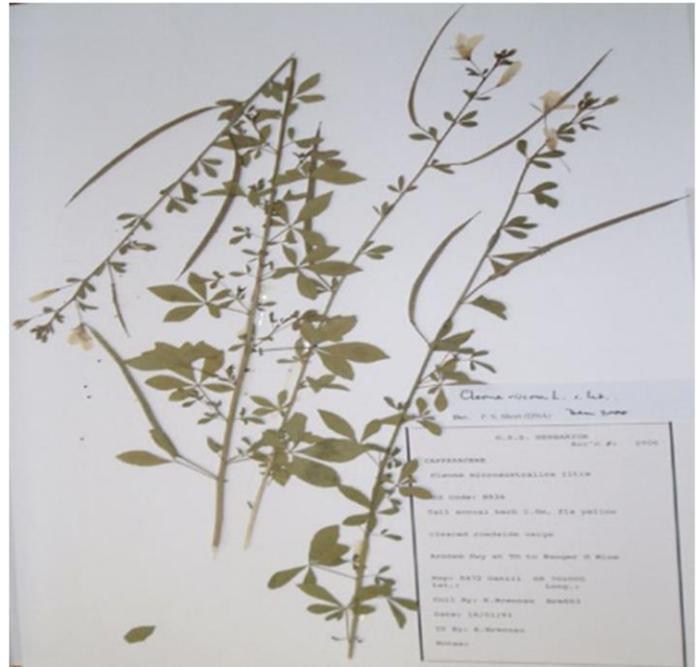
Use: The leaves are edible when cooked. The young fruit are eaten candied. Roasted seeds are used in curries and pickles. Seed oil is used for cooking. The leaves are soaked, fermented and used as a spice.

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

Common name: Vegetable kenaf

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 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.

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

Common name: Indian spinach

Local:

Scientific name: *Basella alba*

Plant family: BASELLACEAE

Description: An annual or perennial climbing herb with thick fleshy leaves. The vine is smooth and juicy and can be 10 m long. It branches freely. The vine and leaves can be red or green. The leaves are fleshy and pointed at the tip. They can be 8 - 18 cm long and 8 - 10 cm across. They are carried alternately along the vine. Leaves can be heart shaped or oval. It has white, pink or red flowers in short spikes which are in the axils of the leaves. The fruit are round and soft. They can be red, white or black and are 6 - 8 mm across. The seeds are round and black.



They are 3 mm across. (Often the ones with heart shaped leaves are called *Basella cordifolia*, the ones with a red stem *Basella rubra* and the short day flowering dark green kind *Basella alba*.)

Distribution: A tropical plant. It occurs mostly in the tropical lowlands and is best below 500 m but will grow up to about 1,600 m. in the equatorial tropics. It will grow quite well in the temperature range 15 - 35°C. It does not like water-logging but can survive 4 - 12 weeks drought once well established. It requires adequate water during the growing season. The best pH is 5.5 - 7.0. It cannot tolerate salty conditions. Flowering does not occur with day lengths over 13 hours.

Use: The young shoots and leaves are eaten cooked. They are somewhat slimy. In soups and stews the mucilage can be used as thickening. The purple colour of fruit is harmless and is used to colour vegetables and agar-agar. Some lemon juice added to the dye enhances the colour. The leaves can be eaten raw in salads or cooked like a vegetable. The leaves are used to make tea and can also be dried and stored. The seeds can be crushed to use as an edible dye for jellies.

Cultivation: It can be sown from seeds or cuttings. Seeds germinate in a few days. Sticks can be provided for support, or it can grow over fences and stumps. If seeds are used, 3 kg of seed will sow one hectare. They are best sown in a nursery and transplanted. A spacing of 1 m is suitable. Plants grown from seed are more productive than those grown from cuttings. When cuttings are used, 20 - 25 cm long cuttings are suitable. Where the plant grows over light soil it can root at the nodes and continue growing. Partial shade, rich fertile soil and adequate moisture favour abundant leaf production. It is responsive to nitrogen fertiliser. Light shade gives bigger leaves. It requires a trellis to climb over. Frequently picking of the bud encourages branching.

Production: It is 4 - 6 weeks until the first harvest. It grows reasonably well on poor soils and is fairly resistant to pest and disease. Leaves will only store for one day at 20 - 30°C. Yields of 40 kg of leaves from a 10 metre square bed is possible over 75 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
leaf	85.0	202	5.0	56	100	4.0	-

Leafy greens

Common name: Catkin blooming

Local:

Scientific name: *Opilia amentacea*

Plant family: OPILIACEAE

Description: A shrub or woody climber. It grows off other trees and plants. It grows to 4 - 10 m tall and has stems 20 cm across. The bark is rough and light grey. It has furrows along it and is corky. The aerial branches often hang downwards. The leaves are fairly smooth and leathery. They are 5 - 14 cm long by 2 - 5 cm wide. The midrib is prominent underneath the leaf. The leaf has a pointed tip. The leaf stalk is 0.3 - 0.7 cm long. The new leaves are bright shiny green. The base of the leaves is slightly curved backwards. The flowers are very small and yellow green. They are star shaped. They have a sweet scent. Many flowers occur together on short stalks around a central stem. These occur in the axils of leaves and are 2 - 3.5 cm long. The white-fleshed, edible fruit can occur singly or in clusters and are oval and fleshy. They are 1.5 - 3 cm long by 1.2 - 1.8 cm wide. They are pale yellow or orange when ripe. They have one seed inside. The seed is 21 mm long by 15 mm wide.



Distribution: A tropical plant. They are often on sandy soil. They need fresh water so are often near streams. It can grow in arid places.

Use: The fruit are eaten fresh. **Caution.** If eaten in large quantities, the fruit can irritate the lips and tongue. Leaves are cooked as a vegetable.

Cultivation: It can be grown from fresh seed. The seed need to be placed on the ground surface, not buried.

Production: It fruits in the wet season. In Tanzania, leaves are collected from April to November.

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	9.2	-	14.8	-	3.9	15.7	3.2

Image accessed from:

http://www.westafricanplants.senckenberg.de/images/pictures/opil_opilia_amentacea_rvbli_4_1163_e5e841.jpg

Fruit

Common name: 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.

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

Common name: Carambola

Local:

Scientific name: *Averrhoa carambola*

Plant family: OXALIDACEAE

Description: A small, evergreen tree, growing 6 - 12 m tall. The trunk of the tree is short and crooked, and has branches near the base. The bark is smooth and dark grey. A leaf is made up of 2 - 11 leaflets, with a leaflet at the end. The leaves are darker and more shiny on the top surface. The flowers are small (8 mm long), red and white, and in clusters on the small branches. The fruit are star-shaped with five or six angled ridges. They are yellow and up to 16 cm long and 9 cm wide. The flesh is white. There are one or two shiny light brown seeds, about 1 cm



long, in the bottom of each lobe. Some carambola have short styles (female flower parts) and these types need to be cross-pollinated by insects. This means two types need planting. Long style types can fertilise themselves. Fruit flavour can vary from very sour to very sweet.

Distribution: It has been taken to many tropical countries. Carambola needs a warm tropical climate, so it is mostly seen in the coastal lowlands below about 500 m altitude. It will grow up to 1,200 m in the equatorial tropics. Mature trees can tolerate slight frost. It can grow on several different types of soil. The soil should be well-drained. It will grow on alkaline soils, but is better in acid soils. It cannot tolerate water-logging. It is suited to moist places, but performs better in areas where there is some dry season rather than in places with heavy, constant rain. Trees are fairly wind-resistant, providing the winds are not cold. Trees are stressed by temperatures near 0°C as well as above 37°C. It suits hardiness zones 10 - 12.

Use: Fruit can be eaten raw or used for drinks. They are used in curries. They can be used for souring dishes. They are also used for jams, jellies, preserves and pickles. **Caution:** The fruit contain soluble oxalates.

Cultivation: Trees are grown from seed. Seeds grow easily, but only a small number of seeds are fertile. Well-developed seeds should be chosen. Seeds are planted in a seed bed and planted out when 15 - 20 cm high. Because seeds are produced by cross-pollination, variation is common. It is therefore better to use budding or grafting. Taking buds off good trees, or grafting twigs from them onto 1 year old seedling roots, is the most common method. Air-layering can also be used, although it is difficult. A spacing of 6 m x 6 m is suitable. Trees need to be grafted if sweeter kinds of fruit are to be selected. Because the seeds are covered by a fatty layer, washing them with soap improves the germination.

Production: Seedling trees fruit after 4 - 5 years. They can produce 400 fruit per tree. Flowers open after 14 - 21 days and fruit mature after 14 - 15 weeks. Trees live for a long time. Flowers and fruit can be found on the tree at most times of the year, although there are often 2 or 3 main flushes of flowering and fruiting. Fruiting tends to be seasonal, about March to May in the southern hemisphere. Trees do not require pruning or any special care once established. Flowers are cross-pollinated by bees, flies and other insects. Hand-pollination does not help much with fruit set. Once ripe, fruit will keep for 7 - 20 days, but can be stored longer at 12°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	90.8	149	0.5	300	40	1.0	0.1

Fruit

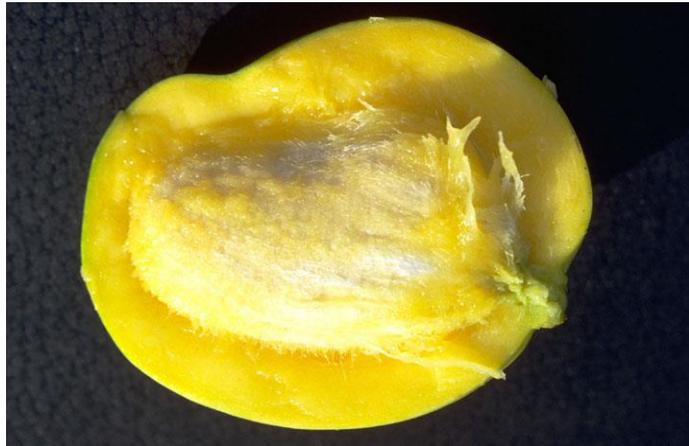
Common name: Mango

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 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

Common name: Cape gooseberry

Local:

Scientific name: *Physalis peruviana*

Plant family: SOLANACEAE

Description: A perennial herb that grows 45 - 90 cm tall. They are often grown as annuals. It is hairy and slightly branched. The spreading branches are purplish and ribbed. The leaf blade is 6 - 15 cm long by 4 - 10 cm wide. The leaves are heart shaped at the base and taper to the tip. They are slightly wavy and toothed along the edge. The flowers occur singly and hang down in the axils of leaves. The flowers are white with violet anthers and slightly spotted petals. The fruit is a berry 1 - 1.5 cm across. They are orange-yellow or pale brown. This is inside an inflated husk. The seeds are yellow and 2 mm across. There are several named cultivated varieties.



Distribution: A temperate plant that grows in the tropical highlands. It suits warm climates and does best in warm sunny conditions. It needs well drained soil. Plants are not killed by a slight frost but it grows best free from severe frosts and strong winds. It can grow in arid places and suits hardiness zones 8 - 10.

Use: The ripe fruit are eaten fresh or cooked. They are used for jam. They can be dried, preserved, stewed, pureed, or used in pies, cakes, jellies and sauces. Roasted seeds are pickled. The leaves have been used instead of hops in beer. The leaves are also used as a potherb.

Cultivation: Plants are grown from seed that is broadcast over the soil. Seeds should be sown 1.5 cm deep in loose soil. Seed germinate irregularly. Plants should be spaced 45 cm apart. In the tropics, plants keep growing from year to year, but in the subtropics they regrow from seed each year. Plants can be grown from softwood cuttings from the upper parts of the shoots. Seedlings can be transplanted.

Production: Plants produce fruit in 1 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
fruit (mature)	84.2	201	2.0	36	30	1.5	-

Fruit

Common name: Egg fruit tree

Local:

Scientific name: *Pouteria campechiana*

Plant family: SAPOTACEAE

Description: A tree that can grow grows up to 30 m tall, but commonly about 8 m tall. It is evergreen and has an open crown. The branches are mostly horizontal. The leaves are oval but taper towards both ends. They can be 6 - 25 cm long by 2.5 - 8 cm wide. They are shiny and bright green. The leaves are clustered near the ends of the twigs. The leaf stalks can be 5 - 25 cm long. The small flowers grow in clusters of 2 - 5 on young wood. The flowers have a scent. The fruit is round, slightly pointed at the end, orange-yellow and up to 10 cm long. The skin is thin, tough and waxy. The flesh is orange and has a musky smell. The seeds are about 2 - 3 cm long, dark brown and shiny. There are often 1 - 3 seeds per fruit.



Distribution: It is a tropical and subtropical plant that suits the coast and is damaged by frost. It can grow up to 1,400 m in the tropics. It will grow on fairly poor soils but does better on fertile well drained soils. It can tolerate reasonably dry periods. It suits hardiness zones 10 - 11.

Use: The fruit is eaten fresh or made into ice cream. The skin and seeds are removed. It is not good cooked but is used instead of pumpkin in pie. It is used in cakes, pies, custards and puddings. It is used in fruit cups, ice cream and milk shakes. It is often eaten with lemon juice. It can also be eaten with pepper and salt.

Cultivation: Trees are normally grown from seed. Seed need to be planted fresh and germinate in 2 - 3 weeks. Seedlings can be planted out after one year. A spacing of 4 m is suitable. It benefits from mulching due to the shallow root system. Plants can also be grafted and grown by air-layering. A spacing of 7 - 8 m is suitable. Trees should be lightly pruned to give 4 - 5 well spaced branches.

Production: Seedlings and grafted trees grow quickly. It begins bearing at 3 - 5 years old. Grafted trees produce a year or so earlier. Fruit are harvested when they develop their full yellow colour. Fruit should be clipped when mature and ripened at room temperature for 3 - 10 days. Putting a little salt on the end of the fruit stalk hastens ripening. Fruit ripen 5 - 6 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	60.6	580	1.68	320	58	0.92-	

Fruit

Common name: Pawpaw

Local:

Scientific name: *Carica papaya*

Plant family: CARICACEAE

Description: A tropical fruit that grows 3 - 5 m tall and only occasionally has branches. The stem is softly woody with scars from fallen leaves along it. There is a clump of leaves at the top of the plant. The leaves are large (50cm wide) deeply lobed and on leaf stalks up to 90cm long. Trees can be male, female or bisexual. Male flowers - small, white, on long stalks, no fruit. Female (round fruit) and bisexual flowers (long fruit) - short stalks, round fruit. There are three forms of long fruit. The seeds are black.



Distribution: It grows from sea level up to about 1,700 m altitude in the equatorial tropics. In cooler regions they have to be planted but in humid tropical regions are commonly self-sown. Sunlight allows germination when forest is cleared. It cannot stand frost. It needs a night temperature above 12°C and won't tolerate water-logging, plants die after 48 hours in standing water. It needs a pH between 5 - 8 and suits hardiness zones 11 - 12.

Use: Fruit can be eaten ripe and raw. Green fruit can be cooked as a vegetable. The young leaves can be eaten cooked, but are bitter. The flowers and the middle of the stem can be eaten. Papayas contain papain which is a meat tenderiser. The dried seeds can be used as a spice.

Cultivation: Pawpaw seeds grow easily and plants grow quickly. Fresh seeds can be used. If dry seeds are used they should be soaked before planting. Seeds should be sown when temperatures are 24 - 30°C. They need a reasonably fertile soil. Seeds can be sown directly or the seeds can be put in a nursery and the seedlings transplanted. Seeds in a nursery should be sown 1 - 2 cm deep. Seedlings can be transplanted when they are about 20 cm high. Plants should be about 3 m apart. Continuous fruit production depends on fertility, temperature and moisture being adequate to maintain active growth. The fruit is produced year round but the growth and development rate decreases with temperature. The size and quality of fruit declines at lower temperatures. Pollination is by wind and insects and is not normally limiting. Normally cross and self-pollination both occur. Seeds are dispersed by birds, bats and people and remain viable for a few months.

Production: Seeds emerge in 2 - 3 weeks. Vegetative growth before flowering is 4 - 8 months. One or more fruit grow per leaf axil, about every 1 - 2 weeks under good growing conditions. With good growth, 100 fruit can be produced from one plant in a year. Pollination to maturity is about 2 - 3 months. On the coast in tropical equatorial regions, pawpaws start producing fruit after about 4 - 5 months, but in the highlands this may take 12 - 18 months. The first fruit are ready 6 - 11 months from planting. Tree life is about 2 - 3 years, although they may live for 10 - 12 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
leaf	75.4	378	8.0	-	140	0.77	-
fruit	88.0	163	0.5	290	54	0.4	0.18
fruit (unripe)	92.1	109	1.0	-	-	0.3	-

Fruit

Common name: Bush berry

Local:

Scientific name: *Maesobotrya barteri*

Plant family: PHYLLANTHACEAE

Description: A shrub or small tree that grows to 10 m high. The trunk is crooked. It produces its flowers and fruit along the trunk. The edible fruit are succulent and black/purple. They are oval and 1 cm long.

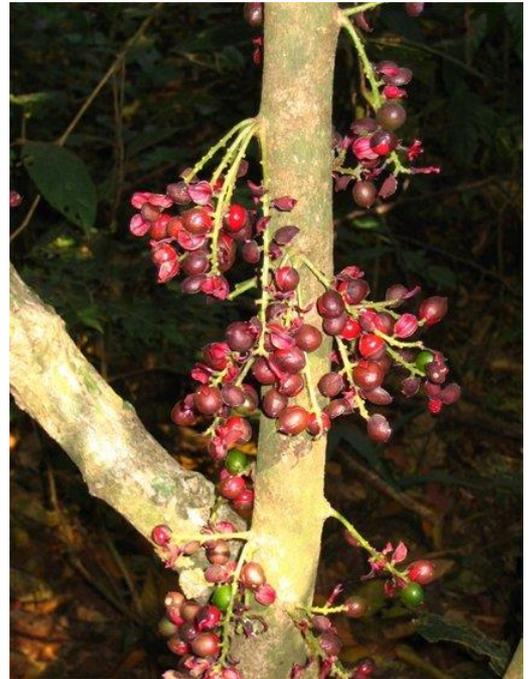
Distribution: A tropical plant. It is an under-storey plant of the high rain-forest.

Use: The fruit is eaten and used to flavour sauces and other dishes. They are also used for jams and jellies. The fruit stain the tongue.

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
fruit	6.7		11.4	6.2	361	8.5	
seed	3.9		13.3	12.6	22.3	4.9	

Image sourced from: <http://cfile1.uf.tistory.com/image/231ABD4854082D7207D894>

Fruit

Common name: Golden apple

Local:

Scientific name: *Spondias dulcis*

Plant family: ANACARDIACEAE

Description: Golden apple trees can grow to 30 m tall, but are more often 15 m tall in cultivation. It has a trunk 60 cm across which can have buttresses. The bark is fairly smooth. The twigs break off easily and the wood is soft. The leaves are 20 - 30 cm long and made up of 4 - 12 pairs of leaflets which have fine teeth around the edge. The leaves are smooth and dark green on top and pale green underneath. They are alternate. The leaves fall off for a part of the year. The old leaves wither to a bright yellow colour. Flowers are produced near the ends of the branches and mostly develop before the new leaves grow. The flowers are small and white and occur as several flowers on long stalks. The flower panicle is 15 - 30 cm long. They look something like a mango flower. The fruit is yellow, oval and up to 7 cm long and 4 cm across. Sometimes the outside of the fruit has a mottled black colour. There is one large stone inside divided into 5 cells with a seed in each. The stone is branched and has fibres.



Distribution: It is a tropical plant that grows in well drained soils or dry forests in lowland rainforest and in valleys up to about 950 m altitude in the equatorial tropics. It suits humid locations and is frost tender. Flowering is normally during the dry season. This species covers a full range from being a wild un-utilised tree in some areas to a planted, pruned and highly regarded village fruit tree in other areas. It is best suited to deeper alluvial soils. It often grows as a pioneer tree on landslides. Wild trees are probably spread around by birds, pigs and people.

Use: Fruit are eaten raw or pickled after peeling. They are also dried and used in curries, and are used for sweet drinks and made into jams and chutneys. Young leaves are edible raw or cooked. The kernel of the seed may be edible. Some fruit are poor size and sour. Green fruit are pickled.

Cultivation: Trees are mostly grown from seed and often grow wild. Flowers are bisexual and there are no apparent pollination problems. The seeds do not produce true to type so poor, sour fruit are often produced. Seeds normally germinate within one month. It is possible to grow plants from cuttings although it is difficult. Large cuttings should be used. Doing this would enable better types of fruit to be re-grown. It can also be grown using budding. Seedling trees are larger and more vigorous than budded or grafted trees. Tree spacing varies from 7.5 m to 12 m. Young trees benefit from shade during their first year. The top can be cut off trees to give a lower and more spreading tree. Trees can be topped to give a lower tree with spreading branches.

Production: Trees may bear from 4 - 5 years old from seed. Cuttings take 2 - 3 years. Fruiting occurs seasonally from Jan to April in the southern hemisphere. Fruit matures in about 200 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	87.7	135	1.1		129	7.6	1.2

Vegetables

Common name: Purslane

Local:

Scientific name: *Portulaca oleracea*

Plant family: PORTULACACEAE

Description: A spreading branched herb. It lies flat on the ground. It grows each year from seed. The plants spread 10 to 50 cm wide. The stems are purplish. The leaves are fleshy, flat and shaped like a wedge at the base. They are 1.5 - 2.5 cm long and 0.3 - 1 cm wide. The flowers are yellow and occur in a few rounded heads. They are 0.8 - 1.5 cm across. They bloom about the middle of the day. The capsules are 0.5 cm long and oval. The seeds are black and shiny.



Distribution: It grows in tropical and temperate regions. They are common in waste places throughout Cameroon. It is a common self-sown plant in lowland areas and up to 1,700 m altitude. It prefers sandy well drained places. It can grow on salty soils. It can grow in arid places. It suits hardiness zones 7 - 12.

Use: The stems and leaves are cooked and eaten. Usually the skin is scraped off then the plant is boiled and mashed. It thickens stews and other dishes in which it is cooked. It is used as a pot herb. The fleshy stems are pickled. Sprouted seeds are eaten in salads. The seeds are ground for use in cakes and bread. **Caution:** In areas where a lot of nitrogen fertiliser is used plants can cause nitrate poisoning. Plants can also have oxalates.

Cultivation: It roots easily from broken pieces. It can be grown from stem cuttings. It can be grown from seed.

Production: The first harvest of leaves can be a month after planting. In the tropics it can complete its lifecycle in 2 - 4 months. Often it is harvested in the dry season when other vegetables are in short supply.

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	9.1	1405	19.5	-	-	-	-
plant	87.0	181	4.0	-	11	2.5	-
root	79	210	3.5	-	-	-	-
leaf	82.2	108	3.1	54	20	0.8	1.5

Vegetables

Common name: Bullrush millet

Scientific name: *Pennisetum glaucum*

Local:

Plant family: POACEAE

Description: An annual grass that grows to 3 m tall. The leaf blades are 20 - 100 cm long by 2 - 5 cm wide. The flower is dense and 40 - 50 cm long by 1.2 - 1.5 cm wide. They also vary in shape and size. Plants that tiller produce smaller heads. The species varies a lot. There are 13 cultivated, 15 weed and 6 wild races of this grass. It has a cylindrical ear like a bullrush. The grains are small and round and have a shiny grey colour like pearls. There are thousands of cultivated varieties.



Distribution: A tropical plant that suits regions with a short growing season. It grows in areas with less than 600 mm of rainfall. It is replaced with sorghum between 600 - 1,200 mm rainfall and then by finger millet or maize above 1,200 mm rainfall. It can grow in arid places.

Use: The seeds are eaten like rice. They are also ground into flour and made into bread and cakes. They are used to make alcoholic drinks. They are mixed with other grains and seeds to make fermented foods. Some kinds have sweet stalks that are chewed. The young ears can be roasted and eaten like sweet corn.

Cultivation: Plants are grown from seed. It is usually sown directly into the field. The plant density is adjusted to suit rainfall and soil fertility. The spacing is 45 cm apart up to 200 cm apart. It is also intercropped with other crops such as cowpea, sorghum and peanut. Crops are normally weeded 2 or 3 times.

Production: It takes from 75 - 180 days to maturity. The heads can be picked by hand or the plant removed. Some types need to be picked 2 or 3 times as heads mature.

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	11.6	1442	10.5	-	-	6.5	1.7

Vegetables

Common name: Edible hibiscus

Scientific name: *Abelmoschus manihot*

Local:

Plant family: MALVACEAE

Description: A branched shrub up to 2 m or more high. It has smooth, green, rounded twigs. The large leaves are simple and smooth, can vary in shape and have 3 - 5 lobes. They are normally very dark green, but pale green types can occur. The leaf stalks are 6 - 13 cm long and stalks can be green or have red colours on them. The hibiscus-like flowers are borne singly and are yellow with dark purple centres. They are produced on mature bushes. The fruit pods are a dry capsule with many small seeds, and are rather stiff or have bristly hairs. Plants can last for several years.



Distribution: It is well-suited to the tropical lowlands, but grows only poorly at an altitude of 1,800 m. It needs fertile soil. Plants will withstand occasional short periods of temperatures, down to about -5°C, so long as they are in a very well-drained soil. It suits areas with high humidity. It suits hardiness zones 10 - 12.

Use: Young leaves are cooked and eaten. They are slimy unless steamed or fried. It is a very nutritious plant.

Cultivation: It is normally grown from cuttings. Lengths of about 25 cm (2 or 3 leaf joints or "nodes") of fresh, green, stem cuttings are used. These are stuck in the ground. It can be grown from seeds. The narrow-leafed types tend to compete less well with weeds. In some areas, people tend to put the narrow-leafed types in the middle of the garden cropped amongst sweet potato, and the broad-leafed types near stumps or logs and around the edges of gardens. The pale, green-leafed types grow slowly. A fertile soil is needed. It can be planted in good soil in a newly cleared garden site or near houses where the soil fertility can be built up by adding food scraps, compost and ashes. The growth and colour of the leaves can be improved greatly by spraying the leaves each 2 - 3 weeks with a very small amount of nitrogen fertiliser (urea), dissolved in water (0.5% solution). This uses less fertiliser than putting it on the ground where it can wash away in the rain. Picking the tips off branches of the plants encourages the plant to produce more branches and leaves. If too many leaves are picked off the one bush at the one time when harvesting, it slows down the growth of more leaves. If the soil is very fertile, older bushes, which are only growing a few leaves, can be chopped off and the stump will regrow into a new bush. It is a very fast growing and productive food plant in the hot, humid tropics.

Production: Leaves are ready to harvest after about 80 days. Yields of 6.7 - 7.3 t/ha/crop have been recorded.

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	88	120	3.4	1.0	7.0	1.5	1.2

Vegetables

Common name: 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 fattened 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

Common name: 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

Common name: Horseradish 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 potherbs 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

Common name: 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

Common name: Smooth loofah

Local:

Scientific name: *Luffa cylindrica*

Plant family: CUCURBITACEAE

Description: A pumpkin family plant. It is an annual climber up to 10 m long. The stem is five angled and slightly hairy. The tendrils have 2 or 3 branches. Leaves are 10 - 20 cm across with 5 - 7 lobes. Male and female flowers are separate and yellow. The male flowers occur as 4 - 20 flowers together while female flowers are solitary in the leaf axils. Flowers open in the early morning. The fruit is fairly smooth and cylindrical and can be 30 - 60 cm long. The seeds are black, flat and smooth and 10 - 15 mm long.



Distribution: A tropical plant that grows well in the tropical lowlands but will also grow in more temperate places. It does best with temperatures of 25 - 30°C. It is better suited to the drier season as too much rainfall during flowering and fruiting is harmful. Soils should be well drained and moderately rich. It grows in areas with an annual rainfall of 1,000 - 1,800 mm. In Zimbabwe it grows up to 1,500 m above sea level. It can grow in arid places. It suits hardiness zones 9 - 12.

Use: The young fruit are eaten as a vegetable. They are skinned and have the centre removed. They can also be sliced and dried for later use. They can be pickled or used in soups, stews and curries. The seeds yield an edible oil after extraction. The seeds are roasted with salt and eaten as a snack. The young leaves and flowers are edible. They are blanched by covering to make them white. **Caution:** Older fruit are bitter and fibrous and contain poisonous substances.

Cultivation: Plants are grown from seed which are collected from ripe fruit. Seed are sown 4 - 5 cm deep and plants are put 1 metre apart. They can be sown in seed boxes and transplanted when 15 cm high. It is best to have a trellis for the plant to climb on or be left to climb over trees. They are often pollinated by insects but can be hand pollinated in the early morning.

Production: Fruit are harvested for sponges when fully mature. Young fruit are ready 2 - 3 months after planting while fruit mature 4 - 5 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
fruit	94.3	79	1.1	-	-	0.7	-
leaf	90	113	5.1	-	95	11.5	-

Nuts, seeds, herbs and other foods

Common name: 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

Common name: Black fungus

Local:

Scientific name: *Auricularia polytricha*

Plant family: AURICULARIACEAE

Description: A mushroom. This jelly fungus or mushroom grows on logs. The cap is ear-shaped. It is leathery and 8 cm across. The stalk is short. It has frilly, brownish clumps of translucent tissue.



Distribution: A tropical and subtropical plant.

Use: The mushroom is used both fresh and dried. It is used in sour salads and in soups. It can also be fried with chicken. It keeps its crunchy texture if only added to dishes in the last few minutes of 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
mushroom (dry)	14.8	1188	9.3	-	-	5.9	1.3
mushroom (fresh)	87.1	176	1.0	-	-	6.1	-

Image sourced from: www.treknature.com

Nuts, seeds, herbs and other foods

Common name: 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

Common name: 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

Common name: 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. Sunflower 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

Common name: Sweet basil

Scientific name: *Ocimum basilicum*

Local:

Plant family: LAMIACEAE

Description: An erect, branched, woody shrub. The branches are hairless and smooth. The leaves are hairless and oblong, with a narrow tip and blunt base. The base of the stems is tinged red. The leaf stalk is 1.5 cm long. The leaf blade is 2.5 - 5 cm long by 1 - 2.5 cm wide. The flowers are somewhat purplish, with very short stalks. The small nuts are smooth, oval and slightly flattened. Plants vary a lot, and several varieties have been selected. They can have liquorice, cinnamon or lemon flavours, and vary in size.



Distribution: It grows in many warm temperate countries, but also in the tropics. It suits both the lowlands and the highlands in the tropics. It cannot stand frost. It suits warm and hot climates. It needs some shade in tropical areas. It needs protection from wind. It needs rich, moist, well-drained soil. Soil should be at 25 - 30°C for seed to germinate. It suits hardiness zones 10 - 12.

Use: The seeds are soaked in water and eaten. The leaves are used raw or boiled to flavour foods. The seed yields an oil used to flavour sauces, pickles, meats and confectionary.

Cultivation: It is grown from seed. Seed should be sown 2 - 3 mm deep and covered with a light sand or soil. Seeds germinate within 3 - 5 days. Seedlings are thinned out to 20 cm apart. Seedlings can be transplanted. If top shoots are picked off, a more bushy plant is produced and flowering is delayed.

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	91.0	113	2.5	386	18.0	3.2	0.9
seed	6.4	1051	14.4	938	61.2	42.0	5.8

Nuts, seeds, herbs and other foods

Common name: Spring onion

Local:

Scientific name: *Allium fistulosum*

Plant family: AMARYLLIDACEAE

Description: An onion family plant with an indistinct bulb. It grows to 60 cm high and 20 cm wide and has fibrous side roots. They grow in large clumps. The leaves are rounded in cross section and hollow. They grow 15 - 30 cm long by 5 - 20 mm wide. The bulbs are very small, 4 - 8 cm long but only 5 - 25 mm across. The plant produces many side buds which develop as offshoots. Flowers grow on a stalk which comes from underground and there are many flowers on stalks around one head. This hollow stalk is 40 - 80 cm long. The flowers are yellow and they open from the top of the flower head downwards. There can sometimes be bulbils on the flower head.



Distribution: A temperate plant that prefers a sunny position and a light, well-drained soil. It prefers a soil pH in the range 6.5 - 7.5, but it tolerates a pH in the range 4.9 - 7.5. A hardy plant which produces leaves throughout the winter. They are also tolerant of high temperatures and can grow in the tropics. Plants yield better when grown above 1,000 m in the tropics. Temperatures above 25°C reduce production.

Use: The bulbs and leaves are eaten raw or cooked. The flowers are used raw to flavour salads.

Cultivation: It can be grown from seed or division of the bulbs. Bulbs should be planted fairly deeply. These multiply, producing more bulbs. Seedlings are transplanted when 10 cm high. A spacing of 7 - 10 cm is suitable. In China, soil is heaped up around the bulb to make it elongated. Seed production in the tropics is possible above about 1,000 m above sea level.

Production: Plants are ready for harvest 50 - 60 days 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
leaf (raw)	90.1	147	1.9	328	19	1.5	-

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>Alternanthera sessilis</i>	Lotus-seed herb	leaf	89.3	109	4.5	57	77	-	-	30
AMARANTHACEAE	<i>Amaranthus caudatus</i>	Amaranthus caudatus	leaf	6	1034	28.8	33	-	23.3	5.5	31
AMARYLLIDACEAE	<i>Allium fistulosum</i>	Spring onion	leaf (raw)	90.1	147	1.9	328	19	1.5	-	63
ANACARDIACEAE	<i>Mangifera indica</i>	Mango	fruit	83	253	0.5	54	30	0.5	0.04	42
ANACARDIACEAE	<i>Spondias dulcis</i>	Golden apple	fruit	87.7	135	1.1	-	129	7.6	1.2	48
ANACARDIACEAE	<i>Anacardium occidentale</i>	Cashew	nut	4	2478	17.5	-	-	2.8	4.8	59
ARACEAE	<i>Colocasia esculenta</i>	Taro	root	66.8	1231	1.96	3	5	0.68	3.2	15
ARACEAE	<i>Xanthosoma sagittifolium</i>	Chinese taro	root	67.1	559	1.6	5	13.6	0.4	0.5	17
ASTERACEAE	<i>Helianthus annuus</i>	Sunflower	seed	5.4	2385	22.8	5	1.4	6.8	5.1	61
AURICULARIACEAE	<i>Auricularia polytricha</i>	Black fungus	mushroom (dry)	14.8	1188	9.3	-	-	5.9	1.3	58
BASELLACEAE	<i>Basella alba</i>	Indian spinach	leaf	85	202	5	56	100	4	-	37
BOMBACACEAE	<i>Adansonia digitata</i>	Boabab	fruit	16	1212	2.2	-	360	7.4	6.7	39
CARICACEAE	<i>Carica papaya</i>	Pawpaw	fruit	88	163	0.5	290	54	0.4	0.18	46
CLEOMACEAE	<i>Cleome viscosa</i>	Sticky cleome	leaf	80.4	-	5.6	-	-	24	-	35
COMBRETACEAE	<i>Terminalia catappa</i>	Coastal almond	nut (dry)	4.2	2987	20	-	2	6.3	8.8	60
CONVOLVULACEAE	<i>Ipomoea batatas</i>	Sweet potato	tuber (baked)	72.9	431	1.7	961	24.6	0.5	0.3	12
CUCURBITACEAE	<i>Cucurbita pepo</i>	Marrow	fruit (mature)	92	105	1.6	17	16	2.4	-	52
CUCURBITACEAE	<i>Cucurbita maxima</i>	Pumpkin	fruit	69.6	439	1.4	-	-	-	-	53
CUCURBITACEAE	<i>Momordica charantia</i>	Bitter cucumber	fruit	93.6	105	1.2	-	-	0.2	-	55
CUCURBITACEAE	<i>Luffa cylindrica</i>	Smooth loofah	fruit	94.3	79	1.1	-	-	0.7	-	56
DIOSCOREACEAE	<i>Dioscorea alata</i>	Greater yam	tuber	76.6	323	2	18	10	0.8	0.39	10
FABACEAE	<i>Macrotyloma geocarpum</i>	Hausa groundnut	seed	9	1461	19.4	-	-	15	-	19
FABACEAE	<i>Vigna subterranea</i>	Bambara groundnut	seed	7.3	1572	18.4	-	-	4.6	2.2	22
FABACEAE	<i>Glycine max</i>	Soybean	seed	9	1701	33.7	55	-	6.1	-	23
FABACEAE	<i>Parkia filicoidea</i>	African locust bean	seed (dry)	7	1780	32.3	-	6	33.2	-	24
FABACEAE	<i>Vigna unguiculata subsp. unguiculata</i>	Cowpea	seed (dry)	11.2	1189	23.5	-	1.5	6.4	-	25
FABACEAE	<i>Vigna radiata</i>	Mung bean	seed	11	1432	22.9	55	4	7.1	-	26
FABACEAE	<i>Lablab purpureus</i>	Lablab bean	seed (dry)	10	1428	22.8	-	-	9	-	27
FABACEAE	<i>Canavalia ensiformis</i>	Jack bean	seed	10	1423	20.4	160	-	4.9	-	28
FABACEAE	<i>Cajanus cajan</i>	Pigeon pea	seed	10	1449	19.5	55	-	15	-	29
FABACEAE	<i>Arachis hypogea</i>	Peanut	seed (dry)	4.5	2364	24.3	-	-	2	3	57

LAMIACEAE	<i>Plectranthus rotundifolius</i>	Country potato	tuber	76	393	1.4	-	1	6	-	14
LAMIACEAE	<i>Ocimum basilicum</i>	Sweet basil	leaf	91	113	2.5	386	18	3.2	0.9	62
MALVACEAE	<i>Sida cordifolia</i>	Goat's horns	leaf	6.6	1296	24.2	-	-	79.8	-	33
MALVACEAE	<i>Triumfetta rhomboidea</i>	Burweed	leaf	78.4	284	4.2	-	-	29.2	-	34
MALVACEAE	<i>Hibiscus cannabinus</i>	Vegetable kenaf	seed (dry)	8.1	1785	20.2	-	-	-	-	36
MALVACEAE	<i>Abelmoschus manihot</i>	Edible hibiscus	leaf	88	120	3.4	1	7	1.5	1.2	51
MORINGACEAE	<i>Moringa oleifera</i>	Horseradish tree	leaf	76.4	302	5	197	165	3.6	-	54
OPILIACEAE	<i>Opilia amentacea</i>	Catkin blooming	leaf	9.2	-	14.8	-	3.9	15.7	3.2	38
OXALIDACEAE	<i>Averrhoa carambola</i>	Carambola	fruit	90.8	149	0.5	300	40	1	0.1	40
PHYLLANTHACEAE	<i>Maesobotrya barteri</i>	Bush berry	fruit	6.7		11.4	6.2	361	8.5		47
POACEAE	<i>Eleusine coracana</i>	Finger millet	seed	11.7	1594	6.2	-	-	5.3	-	20
POACEAE	<i>Zea mays</i>	Maize	seed (mature)	10.4	1528	10	100	4	4.9	2.2	21
POACEAE	<i>Pennisetum glaucum</i>	Bullrush millet	seed	11.6	1442	10.5	-	-	6.5	1.7	50
PORTULACACEAE	<i>Portulaca oleracea</i>	Purslane	leaf	82.2	108	3.1	54	20	0.8	1.5	49
SAPOTACEAE	<i>Pouteria campechiana</i>	Egg fruit tree	fruit	60.6	580	1.68	320	58	0.92-	-	45
SOLANACEAE	<i>Physalis peruviana</i>	Cape gooseberry	fruit (mature)	84.2	201	2	36	30	1.5	-	44



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