

Potentially Important Food Plants of Democratic Republic of Congo



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

A project of the Rotary Club of
Devonport North and District 9830

www.foodplantsolutions.org

Potentially Important Food Plants of Democratic Republic of Congo

Dedication

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

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

Preface

This guide is based on information from the Food Plants International (FPI) database, “Edible Plants of the World”, 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 the Democratic Republic of Congo. This guide has been developed with the best intention to create interest and improve understanding of the important local food plants of the Democratic Republic of Congo, 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 in which they are to be grown, and how this resource may be used to address hunger, malnutrition and food security. For more information, visit the website www.foodplantsolutions.org. More detailed or specific information on plants, including references to material by other authors, is available on DVD on request.

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

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

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

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Introduction

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

Growing food

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

A country with very special plants

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

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

Getting to know plants

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

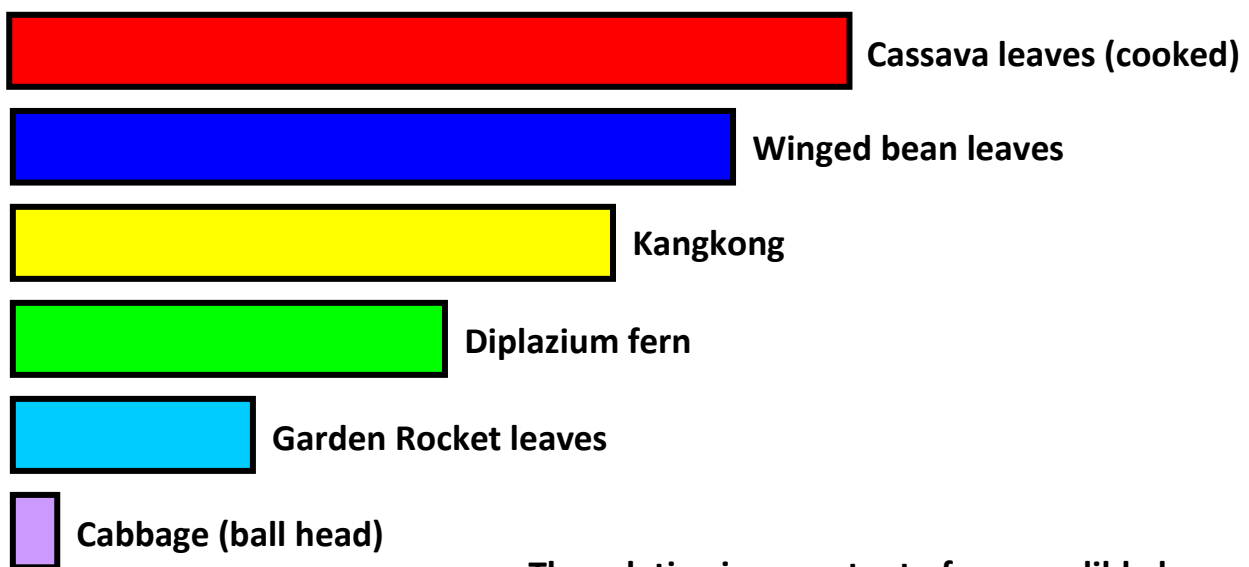
Naming of plants

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

Local food plants are often very good

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

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



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

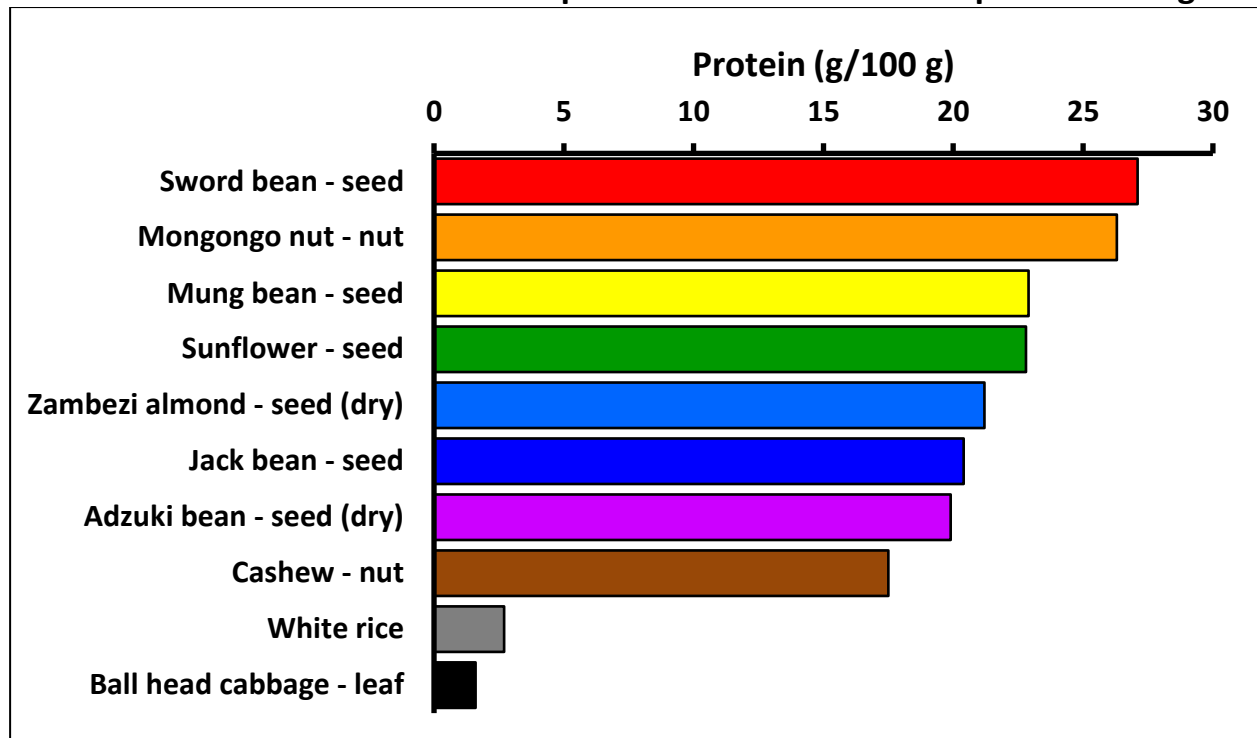
There are a large number of insects that enjoy sharing our food with us! We should not try to kill all these insects as they have an important role to play in keeping everything in nature in balance. What we need to do is to learn to manage these insects so we can all get some food to eat! Some insects 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.

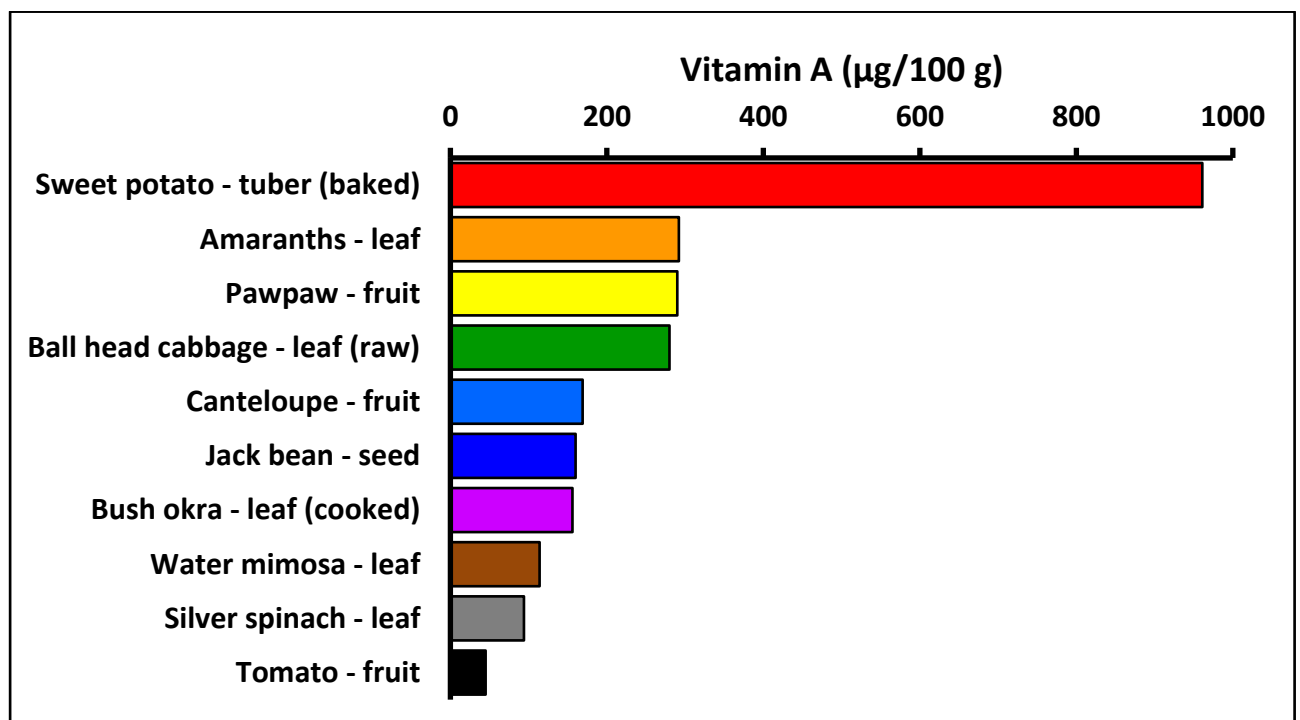
Diseases

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.

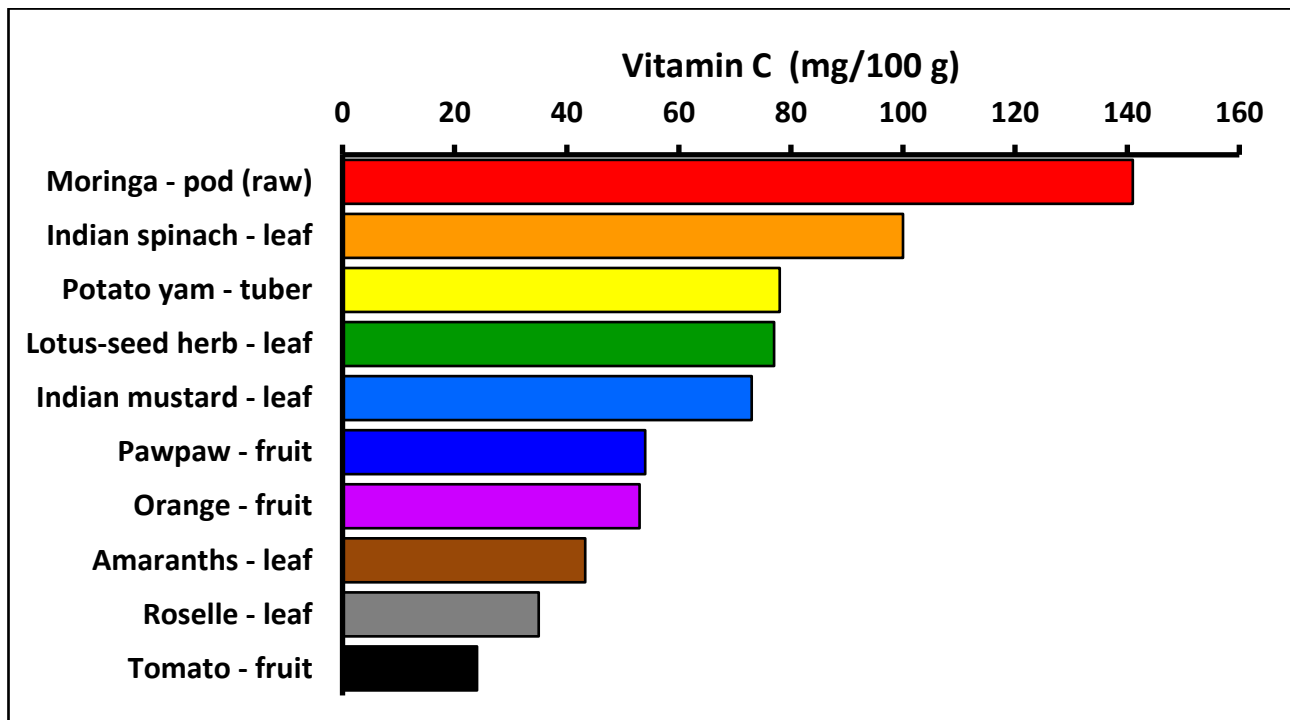
Food value charts for a selection of plants from Democratic Republic of Congo



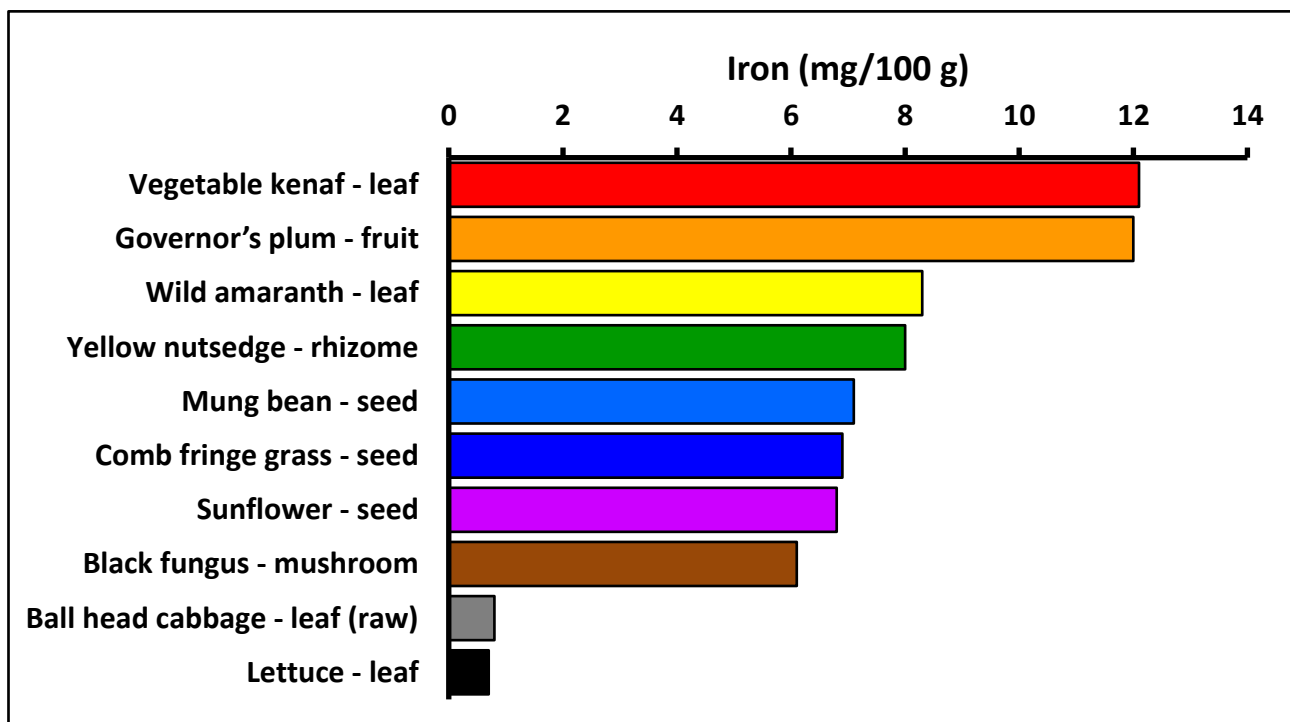
Protein helps the body repair cells and make new ones. Protein is also important for growth and development in children, teens, and pregnant women. Symptoms of protein deficiency include wasting and shrinkage of muscle tissue, and slow growth (in children).



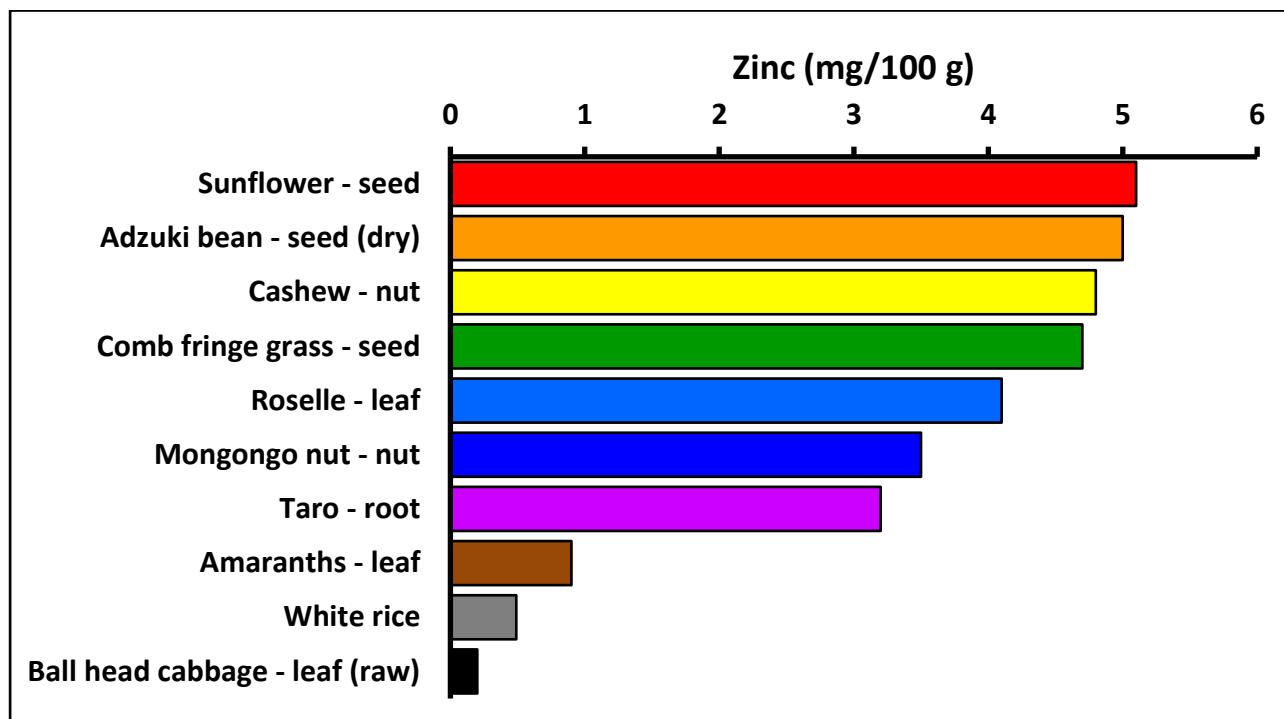
Vitamin A is very important for eyesight and fighting disease, particularly in infants, young children and pregnant women. People who are short of Vitamin A have trouble seeing at night.



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: Comb fringe grass

Local:

Scientific name: *Dactyloctenium aegyptium*

Plant family: POACEAE

Description: An annual grass. The stems are slender. They can lie along the ground. These can form roots at the nodes. They can have runners and form mats. It is 15-60 cm high. The edges of the leaf sheaths have small hairs. The leaf blades are flat and 5-20 cm long by 0.2-0.6 cm wide. The surfaces are lumpy/hairy. It tapers to the tip. The flowers spread like fingers on a hand. There are 2-9 flower stalks. They are long and narrow. They often spread out horizontally. The spikes are on one side of the stalk. The tip is bare. The seed grains are about 1 mm across.



Distribution: A tropical plant. It grows in disturbed weedy places especially on sandy soils in S China. It grows in tropical to warm temperate regions. It grows on clayey, sandy or black soil along the borders of ponds, swamps and bogs. In West Africa it grows from sea level up to 2000 m altitude. It grows in alkaline and salty soils. It grows in areas with an annual rainfall between 100-1580 mm. It can grow in arid places.

Use: The seeds are husked then boiled into a porridge. They are also roasted in a hot pot to soften them. It is then pounded into flour and cooked into porridge. The rhizome or runners are eaten raw.

Cultivation: Plants can be grown from seeds.

Production: The seeds are collected during the dry season. The seeds can be stored for several months.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	7.5	1234	9.8	-	-	6.9	4.7

Image sourced from: <https://www.feedipedia.org/node/465>

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 900-1250 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 2400 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.

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: Potato yam

Local:

Scientific name: *Dioscorea bulbifera*

Plant family: DIOSCOREACEAE

Description: A yam with a long smooth stemmed vine, round in cross section and without spines. The vine winds to the left, can climb into trees and grow to long lengths. The large leaves (14-30 cm across and slightly longer than wide) have pointed tips and round bases. About 7 veins arise from the tip of the leaf stalk. It produces often flattened bulbils (potatoes) in the leaf angles along the vine. They can be grey brown or purple. The smaller tuber underground is normally covered with roots. The flowers are large. The male



flowers are in spikes up to 20 cm long. The female spikes are usually in pairs. The winged fruit are about 2.5 cm long by 1.5 cm across. The seeds have wings. The bulbils normally have few fibres through the tissue compared to some yam tubers. Many varieties have yellow flesh.

Distribution: An annual tropical plant. It will grow from the coast up to about 1700 m altitude in equatorial zones. It is common near the edge of grassland and forest at mid altitudes. Both wild and cultivated forms occur. It is common near secondary forest at low and medium altitudes.

Use: The cooked tubers aerial bulbils are eaten. Some kinds are bitter and inedible or at least require special processing and cooking. Some varieties are poisonous.

Cultivation: Either the vine bulbils or the underground tubers are planted. The long vines can be trained up trees. The bulbils need a set storage time before sprouting. The leaves die off for 1-4 months each year before re-sprouting from the tuber. Bulbils only grow shoots from one end unless the bulbil is cut into pieces. If larger bulbils are cut, the cut surfaces should be dried and healed in a shady place for 2-3 days before planting. Bulbils are planted 8-12 cm below ground at a spacing of about 100 cm by 100 cm. Nitrogen and potassium fertilisers give greater responses than phosphorus. Friable well drained soils are most suitable. Often little cultivation or mounding is done. A high level of organic matter improves yield. Strong staking is required with branched 2 m stakes, or with trees or living stakes. Vine and tuber growth can be extensive and heavy.

Production: Bulbils or aerial yams are produced as leaves begin to unfold, continue until plant maturity, and often fall. Harvesting can start 3 months after planting but immature tubers have less starch. Underground tubers are normally not harvested until leaf die back. Wounds and damage to the tubers normally heal naturally given dry aerated conditions. Some varieties have seasonally dormant aerial tubers which only grow after an extended storage period. Others germinate quickly.

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	70.8	357	2.7	-	78	3.1	0.4
bulbil	79.4	326	1.4	-	-	2.0	-

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 2300 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, temperatures and hours of sunlight, enhance production and determine seasonality of production.

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

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

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

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

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

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

Food Value: Per 100 g edible portion

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

Starchy staples

Common name: Yellow nutsedge

Local:

Scientific name: *Cyperus esculentus*

Plant family: CYPERACEAE

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



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

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

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

Production: Yields of 800-900 kg per hectare of tubers are achieved on sandy soils. Yields of 8000-14000 kg per hectare are possible. Tiger nuts take 90-120 days to reach maturity.

Food Value: Per 100 g edible portion

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

Starchy staples

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.



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Distribution: It grows in many tropical countries, growing from sea level up to about 1800 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 $>30^{\circ}\text{C}$ while the minimum is 20°C . The best temperature range is $25\text{--}30^{\circ}\text{C}$. Rainfall is often seasonal in yam areas and the maximum needs to be 14-20 weeks rain, with the best being 1150 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 2700 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 33000 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	2182	24.6	0.5	0.3
tuber (raw)	70.0	387	1.2	4000	25	0.7	0.4
tuber (boiled)	72.0	363	1.1	1705	15	0.6	0.3
leaf	86.3	168	3.9	105	58	2.9	-

Legumes

Common name: Bottle gourd

Local:

Scientific name: *Lagenaria siceraria*

Plant family: CUCURBITACEAE

Description: A pumpkin family plant. It is an annual vine with large leaves. It can grow 3-9 m long and spread 3-6 m wide. The thick stems have furrows along them. It can climb over logs by attaching the tendrils which grow out of the stem near the leaf. The leaves are large and have soft hairs especially underneath. Flowers of both sexes are borne in the same plant. The plant produces male flowers first and these are on long stalks. Next it produces female flowers on short stalks. Flowers are large and white. They can be 10 cm across. They are mainly pollinated by insects. Fruit vary in shape and can be 8-90 cm long. They have brown seeds in a whitish green pulp. There are several varieties.



Distribution: A tropical plant that grows from sea level up to 2700 m altitude in the tropics. It grows best in a warm humid climate. It is sensitive to frost and prefers full sunlight. It grows best with a night temperature of 17-23°C and day temperatures of 28-36°C.

Use: The young fruit are boiled as a vegetable. The skin and seeds are removed and can also be steamed, fried or pickled. Young tips and leaves are edible. They are often cooked with milk or coconut milk to improve the flavour. They are also mixed with other edible leaves. The seeds are sometimes eaten and provide an edible oil. Old fruit are used as containers, and the seeds are not normally edible.

Cultivation: To achieve fast and uniform emergence, seed should be soaked overnight. Seeds are best sown in raised beds. Seedlings emerge in 5-7 days. Seedlings can be transplanted if required. Because plants cross-pollinate, plant and fruit types vary. Removing the young fruit to use as a vegetable will prolong the life of the plant. Large fruit can be obtained by removing some of the small fruit. A spacing of 1-2 m is suitable. It prefers a trellis to climb. Because it is shallow rooted, weeding needs to be done carefully.

Production: It is fast growing and flowers 2 months after seeding.

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)	3.2	2399	28.2	-	-	5.3	-
seed (fresh)	97.0	-	0.2	-	-	0.1	0.2
leaf	83.0	180	4.4	66	-	7.4	-
fruit	93.0	88	0.5	25	10	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 1800 m in the tropics. They can tolerate drought and are suited to a drier climate. They can grow in places with less than 600 mm rainfall per year. They do less well in the wet tropics. They suffer in waterlogged soils and are damaged by frost. It can also tolerate heat. It will grow on poor soils cannot grow on salty soils. It can grow in arid places and suits hardiness zones 10-12.

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

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

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

Food Value: Per 100 g edible portion

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

Legumes

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 700-5400 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	0	4.9	-
pod (fresh)	88.0	155	2.4	-	-	-	-

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: Sword bean

Local:

Scientific name: *Canavalia gladiata*

Plant family: FABACEAE

Description: A climbing or sometimes bushy and upright bean plant. Mostly it is a climber that can grow up to 4 m long. The leaves have 3 large leaflets. The leaflets are oval and 7.5-20 cm long by 5-12 cm wide. The top of the leaf can narrow abruptly to a tip while the base can be rounded or broadly wedge shaped. The leaves are slightly hairy on both surfaces. The leaf stalk is 5-12 cm long. The white flowers occur in a cluster 7-12 cm long with a stalk 4-20 cm long. The individual flower stalks are 2 mm long. The pods are long (20-40 cm) and curved. Seeds are coloured red or pink. The hilum is dark brown and almost as long as the seed.



Distribution: A tropical plant. Temperatures of 20-30°C suit it well and it grows from sea level to about 1000 m altitude in equatorial zones. They are drought and salt resistant. They can grow on lowland tropical nutrient depleted soils and on soils with pH from 4.5-7.0. They can tolerate some shade.

Use: Young pods are cooked and eaten. Seeds can be cooked and eaten, but the water should be changed and they should be well boiled. They are also fermented. The leaves are blanched and eaten. **Caution:** The seeds can be poisonous due to hydrocyanic acid and saponin. Cooking will remove these.

Cultivation: They are grown from seeds. Seeds germinate readily and the plant is relatively fast growing. Seeds can be sown 5 cm deep. Plants should be 60-70 cm apart. Climbing types need support. Often natural supports such as trees, walls and fences are used in backyard production. For large scale production 25-40 kg/ha of seed are needed.

Production: Green seeds/pods are produced in 3-4 months and mature seeds in 5-10 months. Seed yields of 700-900 kg/ha are possible. Green pods are hand picked when 10-15 cm long before they swell and become fibrous.

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	15.0	1335	27.1	-	-	-	-
pod (fresh)	89.0	142	2.8	-	-	-	-

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 2000 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

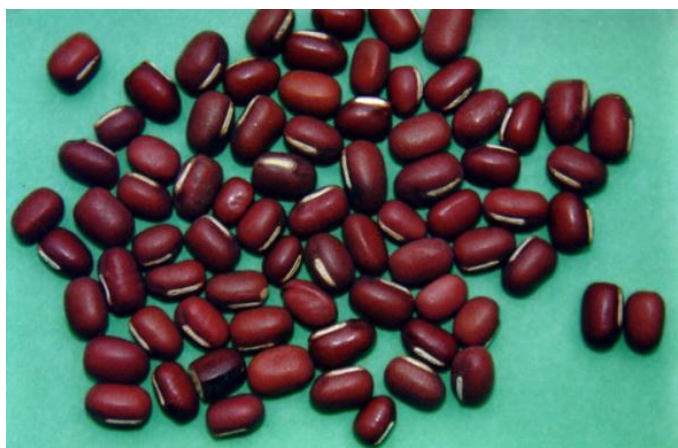
Common name: Adzuki bean

Local:

Scientific name: *Vigna angularis*

Plant family: FABACEAE

Description: An erect bushy bean plant that re-grows from seed each year. Plants grow up to 60 cm tall. The flowers occur as clusters of bright yellow flowers. The fruit are pods 6-12 cm long and contain up to 12 small oblong seeds. These can vary between red, brown and black. They are 0.5 cm long. There are several named cultivated varieties.



Distribution: A tropical plant. They cannot stand frost but can tolerate some cold. They are short day plants, forming flowers and pods when day lengths or hours of sunlight are getting shorter.

Use: The young pods are eaten cooked. The seeds can be eaten cooked. They are added to soups, stews and salads. They are boiled, mashed and sweetened. The seeds are germinated for sprouts. They can be popped liked corn or used as a coffee substitute.

Cultivation: Seed can be pre-germinated on wet paper to get it growing more quickly. The soil temperature needs to be above 15°C. A spacing of 15 cm is suitable.

Production: For green pods, plants should be picked regularly. For dry beans, plants can be allowed to go to maturity, then pulled up and dried.

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)	10.8	1780	19.9	-	-	9.8	-
whole bean (fresh)	69.6	396	6.6	-	-	2.5	1.0

Leafy greens

English: 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 1600 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: Silver spinach

Local:

Scientific name: *Celosia trigyna*

Plant family: AMARANTHACEAE

Description: A branched and straggling herb that grows 25-120 cm tall. The lower leaves have long leaf stalks. The plant looks like *Amaranthus hybridus* until it starts to flower. Where the leaf stalk joins the stem there is a pair of small moon-shaped leaflets that lie around the stem. The small white or silvery flowers are crowded together in separate clusters. The fruit is a capsule which is almost round and has several seeds.



Distribution: A tropical plant that grows in tropical lowlands and highlands in Africa. It is often along the coast but grows from sea level to 1960 m above sea level. It needs an annual rainfall of up to 2500 mm and an average temperature of 25-30°C. It cannot tolerate a temperature below 15°C. It grows best on fertile, well drained soils.

Use: The young shoots and leaves are cooked and eaten. They are finely cut and used in soups, stews and sauces. Because they can be bitter, they need extensive cooking or mixing with other foods.

Cultivation: Plants are grown from seeds which germinate in 4-5 days. It grows for 90-120 days. Because the seeds are small, they are best mixed with sand to give a more even distribution when sowing.

Production: Plants can be uprooted and harvested or leaves removed. Harvests of 4-5 t/ha can be achieved from weekly harvests over 2 months.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	89.0	139	2.7	94	10	5.0	-

Image accessed from <http://www.flickr.com/photos/36517976@N06/5063937939>

Leafy greens

Common name: Amaranths

Local:

Scientific name: *Amaranthus tricolor*

Plant family: AMARANTHACEAE

Description: A small, annual, leafy green herb about 1 m high, spreading to 45 cm wide. An upright, much-branched annual with a thin membrane covering the stems. Sometimes the plant lies over. The stems are angular. The plant branches in the upper part of the plant. It does not have thorns and grows from seed each year. Leaves have long leaf stalks which can be 5-10 cm long. Leaves vary in shape, size and colour. The leaf blade can be 5-25 cm long by 2-6 cm wide. Leaves are dull-purplish and the top leaves can be yellow or red. Some types have coloured leaves or patterns on the leaves. It has a clumpy seed head at the top. The flower spike at the top can be 30 cm long. The seeds are 1-1.2 mm across and black.



Distribution: It grows in most tropical countries, including the Pacific and Solomon Islands. It will grow in warm, temperate places. Plants grow wild in waste places. Amaranths grow from sea level to 2400 m altitude in the equatorial tropics. Amaranth seeds need a temperature above 15-17°C to germinate. In areas of the equatorial highlands above 1800 m, average temperatures are probably below this during the cooler months. It may be more difficult to get Amaranths started during these months. It suits hardiness zones 8-11.

Use: The young leaves and stems are cooked and eaten as a vegetable. The seeds can be eaten. It is a very important tropical vegetable. It grows quickly, produces well and is nutritious.

Cultivation: The very small seeds of this plant are scattered over ashes or fine soil in fertile ground. The seeds are normally spread by rubbing the dry seed heads between the hands. Some types are self-sown. These plants grow in most tropical countries. The soil must be fertile. If they are put in an old garden, they will grow very poorly. They should either be put in a new garden site, when it is cleared from bush, or in old ground that is had compost added. Small gardens close to a house can often be built up to a good fertility by using food scraps and ashes that are left over near houses. Amaranths need high amounts of two nutrients, nitrogen and potash. The ashes from fires are high in potash, so farmers scatter seeds of Amaranth over areas they have burnt. Normally, the hotter it is, the better they grow. They also like plenty of sunlight and do not suit shaded places. They need to have water most of the time they are growing. This is mostly not an issue in areas with high rainfall.

Production: Plants can be harvested when small by thinning out closely-spaced plants. These can be 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 the next 2 months.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	91.7	96	2.5	292	43.3	2.3	0.9

Leafy greens

Common name: Wild amaranth

Local:

Scientific name: *Amaranthus blitum*

Plant family: AMARANTHACEAE

Description: An annual plant that grows up to 1 m tall. The leaf stalk is slender. The leaves are oval and 1-6 cm long. There are prominent veins under the leaf. The male and female flowers are separate but on the same plant. They are in a spike at the top of the plant. The male and female flowers are mixed. The flowers are green. The seeds are round and 1-1.8 mm across. They are dark brown to black.



Distribution: It grows in both temperate and tropical zones. It grows well with temperatures above 25°C. In Indonesia it grows from the lowlands to about 2000 m above sea level.

Use: The leaves and young plant are eaten cooked. The seeds are ground into flour and used to make bread. **Caution:** This plant can accumulate poisonous nitrates if grown with high nitrogen inorganic fertilisers. An edible dye is obtained from the seed capsules.

Cultivation: Plants can be grown from seed if the soil is warm. Seeds are small and grow easily. They can be transplanted. Cuttings of growing plants root easily. The seed needs to be near the soil surface.

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	-	-	3.9	92	-	8.3	-

Image accessed from: https://www.kuleuven-kulak.be/kulakbiocampus/lage%20planten/Amaranthus%20blitum%20-%20kleine%20majer/Amaranthus_blitum-kleine_majer01.jpg

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 the Philippines. It grows in open moist places from sea level to 2000 m in Papua New Guinea. In Fiji it grows from sea level to 500 m. In Nepal it grows to 2400 m altitude. 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: https://commons.wikimedia.org/wiki/File:Alternanthera_sessilis.jpg

Leafy greens

Common name: Jute

Local:

Scientific name: *Corchorus olitorius*

Plant family: MALVACEAE

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

seeds. The seeds are dull grey and with four faces and one long point. Each seed has one pale line along it.



Distribution: A tropical plant. It is mostly coastal, below 250 m altitude. Temperatures of 22-35°C are suitable. It can stand both drought (2-3 weeks) and water-logging, except when young. A well-drained soil is best. They require humus-rich soils. A soil pH of 5.5-7.0 is best, but they can grow in soils with pH up to 8.5. They also need adequate moisture for good leaf production. A rainfall of 1000 mm is suitable. A high relative humidity (80-90%) is best. It produces seeds when day lengths are short. It grows in most African and Asian countries.

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

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

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

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf (raw)	80.4	244	4.5	1923	80	7.2	-
leaf (cooked)	87.2	155	3.4	156	33.0	3.1	0.8

Leafy greens

Common name: Roselle

Local:

Scientific name: *Hibiscus sabdariffa*

Plant family: MALVACEAE

Description: A branched shrub up to 2 m tall. It has reddish stems, leaves and fruit. Different types vary in their height, shape and leafiness. The leaves are 7-10 cm across and lobed. The upper leaves often have more lobes than the lower leaves. The flowers are large and yellow and in the axils of the leaves. They are carried singly. The bracts at the base of the flower are enlarged and form a fleshy red fruit. This capsule is 3 cm long and contains 22-34 seeds. The seeds are dark brown and 4-6 mm long. 1000 seeds weigh about 25 g.



Distribution: A tropical plant that grows from sea level up to about 1000 m altitude. It will tolerate a range of soils and requires short days for flowering. It will grow in semi arid locations. It grows best where average temperatures are in the range 25-30°C. It needs a temperature above 10°C. Plants will tolerate high temperatures. They grow up to 800 m altitude in Africa. A rainfall of 450-550 mm distributed over a 90-120 day growing period is required. It cannot tolerate waterlogged soils. It can grow in arid places. It suits hardiness zones 10-12.

Use: The swollen bases of the flowers are used for jams or drinks. The young leaves can be cooked and eaten. They can also be dried and used. The flowers can be used to flavour drinks. The seeds can be eaten. They can be dried and ground. They can be pressed for oil.

Cultivation: Seeds are sown and the seedlings can be transplanted. They are transplanted when 15-20 cm high. Seed should be planted 1-2.5 cm deep. A spacing of 50 cm x 50 cm is suitable although a wider spacing is used for fruit and a closer one for leaves. Plants can be propagated by cuttings.

Production: Fruit are ready 12-15 weeks after sowing. The bracts are picked 15-20 days after flowering. They can produce about 1 kg per plant. The yield of leaves can be 10 tons 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	8.2	1718	19.6	-	-	4.2	-
leaf	86.4	185	10.9	58	35	1.5	4.1
calyces	86.0	185	1.6	29	14	3.8	-

Fruit

Common name: Pawpaw

Local:

Scientific name: *Carica papaya*

Plant family: CARICACEAE

Description: Pawpaw is 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 (50 cm wide) deeply lobed and on leaf stalks up to 90 cm long. Trees can be male, female or bisexual. Male flowers are small and white and on long stalks. Female and bisexual flowers are on short stalks. These have no fruit, round fruit and long fruit respectively. There are three forms of long fruit. The seeds are black.



Distribution: It is a tropical plant that grows from sea level up to about 1700 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 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: Moringa

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 1350 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 m 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	883	31.0	2.0	0.2
pod (raw)	88.2	155	2.1	7	141	0.4	0.5
seed	6.5	-	46.6	-	-	-	-

Fruit

Common name: Canteloupe

Local:

Scientific name: *Cucumis melo*

Plant family: CUCURBITACEAE

Description: A pumpkin family plant. It is an annual climber with tendrils. It grows to 0.5 m high and spreads to 1.5 m across. The stems are soft and hairy and often angled. The leaves have lobes and often a wavy or toothed edge. They are on long leaf stalks. The leaves are often hairy underneath. The tendrils are not branched. The flowers are yellow and funnel shaped with expanded lobes. The male flowers occur in clusters and are produced before the female flowers. The fruit is round, mostly with a rough or streaky skin. It is green or yellow inside. The fruit is edible. Different kinds of melons occur. Some have a hard, warty, scaly skin. Others have a network of fine ridges over the surface.



Distribution: A tropical plant, but not suited to places with high rainfall. It suits hot dry places with a fertile well drained soil. It needs a sheltered sunny position. It is drought and frost tender. A temperature range of 24-28°C is best but much higher temperatures are tolerated. Mostly they are grown below 500 m altitude in the tropics. A pH of 6-6.7 is best. Acid soils are not suitable. It can grow in arid places. It suits hardiness zones 9-12.

Use: The ripe fruit are eaten raw. They are also dried, candied and made into jams, jellies and preserves. The seeds are sometimes eaten roasted. The seeds are blended with fruit juice to form a drink. Sometimes the immature fruit are cooked as a vegetable. The seeds contain an edible light oil. The young leaves are eaten as a potherb.

Cultivation: They are grown from seed planted about 1-4 cm deep. Plants need to be 1-2 m apart. Seedlings can be transplanted when about 10-15 cm high.

Production: Plants are ready 3-4 months after planting. Yields of 20 kg per 10 sq m is 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
seed	7.0	2319	15.8	-	-	-	-
leaf	85.0	172	4.2	72	-	-	-
fruit	93.0	109	0.5	300	30	0.4	0.2

Fruit

Common name: Breadfruit

Local:

Scientific name: *Artocarpus altilis*

Plant family: MORACEAE

Description: A large tree that grows 20-26 m in height. The trunk can be 6 m tall before branching, and up to 1 m across. It is an evergreen tree but can lose its leaves in dry weather. The leaves are large and vary from rough to smooth and shiny, and from entire to deeply lobed. They can be entire or divided into 5 to 11 lobes. The leaves are bright green on the upper surface with yellow veins and are pale and dull on the under surface. They have very small stiff hairs underneath. Male and female flowers



grow separately on the same tree and normally appear at the same time. The flowers are in the axils of leaves. Male flowers form a drooping, oblong catkin 12-30 cm long. Female flowers form a globular head. The flower head develops into the compound fruit. The fruit are large and green and vary from round to oblong. They can be 12-22 cm long and 9-17 cm wide. Seeded fruit have projecting tubercles on the surface of the fruit. Seedless kinds are smoother with rounded or 5 to 6 sided processes on the surface. Seeded, small-seeded, and non-seeded types occur. There are a number of cultivars of each. Seeded fruit have 30-90 seeds per fruit. Seed can be 2 cm across and with darker lines.

Distribution: A tropical plant that grows in the hot, humid, tropical lowlands. The plant is purely tropical and normally grows below about 650 m altitude, but they can grow from sea level up to about 1150 m. Seeded types are more dominant in the west of Papua New Guinea. Trees are killed by temperatures below 5°C. It tends to grow in the temperature range 16°C to 38°C and probably requires an average temperature over 22°C to grow well. It grows on a range of soils providing they are well drained. There is some cultivar difference in drought and salt tolerance. Uniformly warm humid climates suit it best. An annual rainfall of 200-250 cm and a relative humidity of 70-80% suits. It suits hardiness zone 11-12.

Use: The large seeds are boiled in salted water or roasted before eating. The flesh of the fruit is eaten cooked. It can be boiled, baked, steamed, mashed, or turned into soups, puddings, cakes and pies. Dried fruit are made into flour. Young leaves and flowers are edible. The central core and the skin are not eaten.

Cultivation: Seeded forms are self-sown by birds or bats. The presence or absence of seeds significantly affects the production. Seeded trees are mostly propagated by seed which needs to be sown fresh, without seed drying out. Seedless trees are propagated by root cuttings. Cuttings of roots 1.5-4 cm across and 25 cm long are suitable. Cuttings can be rooted in sand during the wet season. They should be placed horizontally and kept moist and shaded. Using intermittent mist improves root formation and cutting establishment. Rooting hormones also assist. This process takes 10 weeks or more and then rooted cuttings should be hardened off in a sunny position for up to 3 more months before planting out into the field. Young plants do best with adequate sun and no shade. Root suckers produced naturally, or by damaging the roots, are a common method of production of new material. Marcottage or budding can also be used for propagation. The

vegetatively propagated trees are therefore clones and the variation is presumably therefore somatic.

Fruit set can be improved by dusting male flowers onto female flowers 3 days after they emerge. Artificial pollination has resulted in increased yields in some places. This is both an increase in fruit size and more fruit retained on the tree to maturity. The pollen in the male flower is available 10-15 days after emergence. It is about 3 months from flowering to fruit maturity.

Because trees often occur from natural seed dispersal by fruit bats and marsupials, trees are often randomly spaced and common in secondary forest. A spacing of 10-13m is suitable between cultivated trees.

Trees rarely receive much attention after establishment but pruning of branches to allow easier access to fruit is sometimes undertaken. Seedless fruit are picked before maturity when the fruit is eaten by boiling. Mature fruit can be sweeter but they need to be cooked by baking or roasting. Seeded fruit are normally allowed to drop and are then harvested. The seeds are about 20 % dry matter as protein with a good nutritional balance. The essential amino acid levels are high for vegetable protein. Fresh fruit are highly perishable and need to be handled carefully.

Pit preservation of breadfruit involves lactic acid fermentation. The fermentation needs to be last for 2-3 months to produce a palatable product. Breadfruit slices can be stored under refrigeration in a fresh marketable state at 14°C for up to 10 days. Segments can be boiled for 2-5 minutes then frozen at minus 15°C for at least 11 weeks.

Production: Trees begin to bear after 3-6 years. Growth of the trees is vigorous, with fruiting starting after about 3 years. Trees grow to 10-15 m in 10-12 years. Fruiting can occur over 5-8 months in some locations and this is partly due to varieties with overlapping fruiting seasons. A tree can produce 50-150 fruit, weighing 1-1.6 kg each, per year. Large trees can give 700 fruit per year of 1-4 kg each. An average seed weighs 5 g. Fruit are harvested 65-95 days after flowering.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	74.4	506	1.5	4	25	0.4	0.2
leaf	75.5	314	5.0	-	-	17.5	-
fruit & seed	87.1	192	2.0	-	-	-	-

Fruit

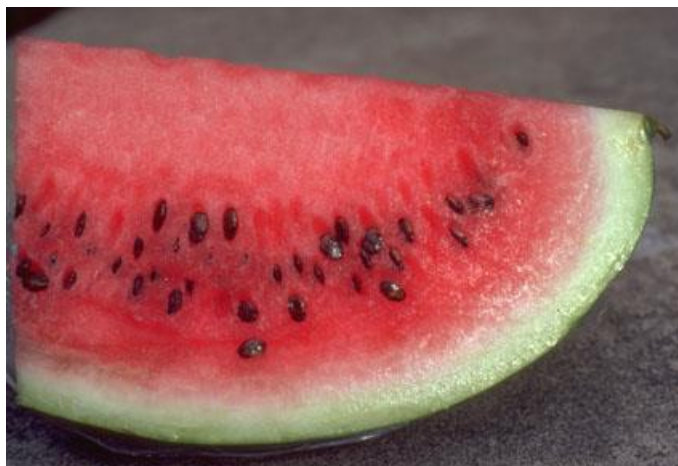
Common name: Watermelon

Local:

Scientific name: *Citrullus lanatus*

Plant family: CUCURBITACEAE

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



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

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

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

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

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

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	90	148	0.6	-	-	0.2	-
seed	10	2107	40	--	-	5.6	-

Fruit

Common name: Coast gold leaf

Local:

Scientific name: *Bridelia micrantha*

Plant family: PHYLLANTHACEAE

Description: A deciduous tree that grows up to 21 m tall. It has a wide leafy crown. The trunk is grey-brown. It is smooth when young- but rough when older. The twigs are knobbly and covered with small scattered raised brown dots. The leaves are simple and slightly wavy. They are oval and have a point at the end. The base is narrowed or rounded. The leaves are 4-18 cm long and 2.5-10 cm wide. There are 8-15 pairs of veins. The veins and midrib are raised under the leaf. The leaves are on short robust leaf stalks. Young leaves are red. The male and female flowers occur on the same tree. The male flowers have stalks and the female flowers have no stalks. The flowers are white and in clusters in the axils of leaves. The fruit are small and oval. They are edible.



Distribution: A tropical tree that grows in open woodland and near rivers. It can stand some frost. It is drought resistant. In Malawi it grows between 500-1750 m altitude. It grows in areas with a rainfall between 800-2500 mm per year. It can grow in arid places. It can grow in seasonally flooded areas.

Use: The fruit are eaten raw. They are also used for jam. The bark is eaten as a famine food.

Cultivation: Plants are grown from seed. Seed must be sown fresh. The fruit pulp must be removed and then the seeds sown. The seedlings can be transplanted at the 2-leaf stage. They transplant easily. It can be grown by cuttings and root suckers.

Production: It is fast growing. Fruit are collected at the end of the rainy season.

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	81.1	281	0.9	-	5.4	0.9	0.3

Image sourced from: <http://www.plantzafrica.com/plantab/plimagesab/brideliamicranth1.jpg>

Fruit

Common name: Governor's plum

Local:

Scientific name: *Flacourtia indica*

Plant family: FLACOURTITACEAE

Description: A shrub or small tree that grows 5-15 m tall. The trunk is crooked and low branched and armed with scattered slender spines. The leaves are alternate, pointed at the base and rounded at the tip. The edges of the leaves are toothed with rounded lobes. Leaves are dark green on top and pale green underneath. They are 6-17 cm long and 3-7 cm wide. Male and female trees occur. The flowers are small and white; occur singly or in pairs in the axils of leaves or near the ends of short branches. The edible fruit are rounded, fleshy, purple or nearly black. They are smooth and about 1 cm across. The flesh is yellowish, juicy and acid. There are 6-10 small flattened seeds inside.



Distribution: A tropical plant that grows in the lowlands. They thrive in dry, shrubby areas at low altitudes. Trees grow in coastal areas and up to 700 m or higher. In Africa it grows from sea level to 2400 m above sea level. It grows in sub-tropical, broadleaved, evergreen forest. It can grow in arid places. It also grows on limestone.

Use: The fleshy pulp of the fruit is eaten raw when ripe or can be cooked and eaten or made into jelly. Fruit can be dried and stored.

Cultivation: Trees are normally grown from seed. Because the seeds have a hard seed coat it helps to scratch the seed to assist germination. Cuttings and air layering can be used. Groups of trees containing both male and female trees need to be grown from root suckers or by budding. Some kinds are self-pollinating. A spacing of 12-16 m apart is needed.

Production: Fruit matures in 60-90 days from pollination.

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	69.5	452	0.5	15	14	12	-

Vegetables

Common name: Okra

Local:

Scientific name: *Abelmoschus esculentus*

Plant family: MALVACEAE

Description: A tropical annual herb that grows erect, often with hairy stems. It mostly grows about 1 m tall but can be 3.5 m tall. It becomes woody at the base. The leaves have long stalks up to 30 cm long. Leaves vary in shape but are roughly heart shaped with lobes and teeth along the edge. Upper leaves are more deeply divided than lower ones. The flowers are yellow with red hearts. The fruits are green, long and ribbed. The seeds are 4-5 mm across. They are round and dark green.



Distribution: A tropical plant that suits the hot humid tropical lowlands but is unsuited to the highlands. It is very sensitive to frost. It can grow in salty soils. It grows best where temperatures are 20-36°C. It can grow well in dry climates with irrigation. It suits hot humid environments. It does best on well drained well manured soils but will grow on many soils. A soil pH of 5.5-7.0 is best.

Use: Pods are eaten cooked. They are slimy, but less so if fried. Dried powdered seeds can be used in soups as a thickener. They can also be pickled. Young leaves can be eaten cooked. They can be dried and stored. Flowers can also be eaten. Okra is frozen and canned. The seeds are roasted and used as a coffee substitute.

Cultivation: They are grown from seeds, which are easy to collect. They need high temperatures for germination (over 20°C) and a sunny position. Often seeds are soaked for 24 hours before sowing to give quick germination. Seeds are sown 1.5-2.5 cm deep with 2-3 seeds per hole. Later these are thinned out to one plant. Seeds can be sown in nurseries and plants transplanted. Pinching out the tops of plants when 30 cm high encourages branching. A spacing of about 90 x 45 cm is suitable. About 8-10 kg of seed are required for one hectare. Most kinds respond to fertiliser. Seeds do not breed true and can cross with other kinds of okra growing nearby. This is not normally a problem but simply means plants and fruit are not all the same.

Production: Plants maintain production if the fruits are harvested regularly. Plants are ready to harvest 8-10 weeks after sowing. Seed yields of 500-800 kg per hectare are recorded. Pod yields of 4-6 tonnes per hectare occur. It takes 2-4 months from sowing to harvest of young pods. Pods develop 5-10 days after flowering. Pod harvests can continue for 1-2 months. Leaving pods on the plants stops new pods developing.

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	9.2	1721	23.7	-	-	-	-
leaf	81.0	235	4.4	116	59	0.7	-
pod (fresh)	88.0	151	2.1	185	47	1.2	-
fruit (cooked)	90.0	134	1.9	58	16.3	0.5	0.6
fruit (raw)	90.0	71	2.0	90	25	1.0	-

Vegetables

Common name: African horned cucumber

Local:

Scientific name: *Cucumis metuliferus*

Plant family: CUCURBITACEAE

Description: An annual pumpkin family plant. It grows to 0.5 m tall and spreads to 1.5 m wide. The stems are trailing and hairy. The tendrils are curled and do not branch. The leaves have 3 lobes and are heart shaped. The edges of the leaves have teeth. The flowers are funnel shaped and yellow. They open into five lobes. Male and female flowers occur on the same plant. The female flower is above a prickly green ovary which enlarges to become the fruit. The fruit are oblong and spiny and change from green to orange as they ripen. They are 12 cm long and 6 cm across. The fleshy pulp surrounding the seeds is bright green. The seeds are white. It tastes and smells like a cucumber. The skin is not eaten.



Distribution: A tropical plant. It requires conditions similar to cucumbers. It prefers light well drained soil. It needs a protected sunny position. It is drought and frost tender. It grows at low and medium elevations in Zimbabwe. It grows from 210-1800 m above sea level. It can grow in arid places.

Use: The peeled fruit are eaten raw. They can also be cut open and sun dried for storage and use in preserves. The young leaves are stripped and cooked then eaten. The seeds are pounded and used for flavouring. **Caution:** If the plants are bitter they need to be used with caution.

Cultivation: Plants are grown from seed. They take 8-16 days to germinate in warm soil.

Production: Plants grow rapidly. They flower and set fruit in 6-8 weeks. It is then 7 weeks to maturity.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	91.0	136	1.1	-	18.6	0.5	0.3

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 2400 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: 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: Water mimosa

Local:

Scientific name: *Neptunia oleracea*

Plant family: FABACEAE

Description: A plant which grows in water. It has stalks which lie along the ground and also ones which stick upwards. The stems are up to 1.5 m long. The floating parts have spongy white balls around each internode. These only develop when plants grow in water. From each internode roots extend downwards and leaves extend upwards. The leaves are 3.5-8 cm long with 2-3 pairs of leaflet stalks. Along these are 8-18 pairs of leaflets. These are 4-10 mm long by 1.2-3 mm wide. They are dark green. The flowers are in round heads. They are 1.5 cm long. The flower stalk is 12-30 cm long. The fruit is a pod. It is oblong and flat. It is 2 cm long by 1 cm wide. There are 4-8 seeds. These are 4-5 mm long by 2.5-3.5 mm wide.

Distribution: It is a tropical plant. It floats in ditches and ponds.

Use: The young leaves and stalks are eaten as a vegetable. (The white section is removed.) They can be eaten raw but also fried or served with vermicelli and peanut curry. It is also used in sour vegetable salads and hot and sour soup. The young seed pods are cooked and eaten.



Cultivation:

Production: It is grown in tanks.

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	88.0	142	5.2	114	-	3.0	-

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 1000 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: 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 is cultivated in South China. It can grow in well-drained sandy soils and in dry but seasonally waterlogged places. It grows from 1500-2100 m above sea level. It grows in areas with an annual rainfall of 500-635 mm. It can grow in arid places and suits hardiness zones 10-12. It grows in many African and Asian countries.

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

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

Production:

Food Value: Per 100 g edible portion

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

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. In Thailand it grows on logs of Sesbania, Kapok, or mango. In China and the USA it is often near melting snow.

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	0	0	5.9	1.3
mushroom (fresh)	87.1	176	1.0	0	0	6.1	-

Image sourced from: <https://ultimate-mushroom.com/edible/386-auricularia-polytricha.html>

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 1200 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 1750 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 -1 0 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: 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: Indian mustard

Local:

Scientific name: *Brassica juncea*

Plant family: BRASSICACEAE

Description: It is an erect leafy annual cabbage plant. It grows to about 1 m high. The plant can vary a lot. The dark green leaves are elliptical and deeply divided. The end segment of the leaves is oval. The leaves taper towards the stem and have a strong mustard flavour. The flowers are pale yellow. They have 4 petals. It produces a flower and seed pods at the top. The seed pod is 3-5 cm long and narrow. The seeds are reddish-brown.



Distribution: A warm temperate plant. It is grown in some highland areas in the tropics. It is often grown as a cool season crop. Most varieties are not frost tolerant. It needs a fertile, well drained soil. A pH of 5.5-6.8 is suitable. It can tolerate poor soils. It can grow in arid places. It suits hardiness zones 9-11.

Use: The leaves are cooked and eaten. They have a bitter taste, so the cooking water needs changing. They can be stir-fried, or added to soups and stews. They can be eaten crystallised in vinegar or salt. They can be used in salads. The seeds can be fried then used as a spice. They also yield an edible oil. They can be sprouted. The leaves are also pickled.

Cultivation: The seed is broadcast. They can be put in a nursery and transplanted. A spacing of 25 cm x 25 cm is suitable. Seed germinate in 5 days at 20-25°C.

Production: Plants grow rapidly. Leaves can be harvested one month after planting. Leaves can be harvested several times. Whole plants can be harvested in about 45 days from transplanting.

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	6.9	1964	24.9	-	3	10.0	-
leaf	92.0	108	2.4	31	73	2.7	-

Nuts, seeds, herbs and other foods

Common name: Zambezi almond

Local:

Scientific name: *Ricinodendron heudelotii*

Plant family: EUPHORBIACEAE

Description: A tree that grows to 40 m high. It loses its leaves during the dry season. The leaves are like fingers on a hand and alternate. There are 3-5 leaflets and these are 6-30 cm long by 3-15 cm wide. Male and female flowers are on separate trees. There are 5 petals and 5 sepals and they are united in a tube. The fruit are small and green. They are 4 cm across. They have 2 lobes. There are 1-2 nuts.



Distribution: A tropical plant that is common in secondary forest. It grows between 200-500 m altitude. It requires 1000 mm of rainfall but can grow in areas with 10000 mm of rain per year. It needs light. It requires a temperature between 18-32°C. It needs free draining acid soils.

Use: The dried kernels are ground and used in stews or eaten as a relish. They can be eaten raw or roasted. The nuts also yield an edible oil. The leaves are cooked as a vegetable. The kernels can be stored for many months.

Cultivation: Plants are grown from seed. Seed germinate after 3-6 weeks. It can also be grown from leafy stem cutting, layering or side grafting. Trees can regenerate from the stump.

Production: It is fast growing. Trees fruit after 8-10 years. Fruit are collected from the ground. They are put in a heap and the flesh allowed to rot to remove the stones. They are then washed and boiled and allowed to cool overnight in cold water before boiling again.

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)	5.5	2215	21.2	-	-	0.4	-

Image sourced from:

https://www.researchgate.net/publication/312150843_Bioprospective_Screening_of_Ricinodendron_Heudelotii_Seed

Nuts, seeds, herbs and other foods

Common name: Mongongo nut

Local:

Scientific name: *Schinziophyton rautanenii*

Plant family: EUPHORBIACEAE

Description: A large spreading tree. It has a sturdy trunk up to 1 m across. It usually grows 7-9 m tall but can be 24 m tall. The crown is rounded. It has smooth green or golden bark and stubby branches. There are reddish-brown furry hairs on the young branches and stalks. These disappear with age. The plant has a cloudy latex. The leaves are produced one after another along the stalk. The leaves are compound and leaflets arranged like fingers on a hand. The leaves have 3-7 leaflets and these are 5-13 cm long and 2.5-9 cm wide. They are velvety grey underneath. The leaf stalks are 15 cm long.



The base of the leaflets is unequal. They are dark green on top and paler underneath. The leaves have star shaped hairs in both sides. There are 1-3 flat dark glands where the leaf joins the stalk. It loses its leaves during summer. The male and female flowers on different plants. The buds are rusty red and velvety and on long furry stalks. The flowers are small and white or yellow. The female flowers are more tightly grouped together than the male flowers. The fruit is egg shaped and 35 mm long by 25 mm wide. They are velvety. When young they are hairy and when mature have a tough brown shell. There is a thick layer of pulp around a very hard and finely pitted stone. Inside this are two light-coloured kernels. The fruit and the kernel are edible.

Distribution: A tropical plant. It grows on Kalahari sand. It needs a hot subtropical climate. It grows in deep, well-drained, dry sandy soils. It is often over limestone material. It does well with average temperatures above 20°C and often above 30°C. It will grow with rainfall between 200-1000 mm per year. It grows at altitudes between 200-1000 m. It can tolerate frost. It can grow in arid places.

Use: The fresh and dried fruits are eaten. The fruit flesh and the seeds are eaten raw or cooked. The nuts are also eaten. They are eaten raw, dried, cooked, whole or pounded and mixed with other ingredients to make a variety of dishes. The fruit is eaten raw or cooked. It is also used to make soup and beer. The nuts also produce an oil used for cooking.

Cultivation: Cultivation has proven difficult. Seed grow more easily if they have passed through an elephant.

Production: Trees take 25 years until fruiting. Fruit are harvested off the ground.

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	4.2	2717	26.3	-	-	3.4	3.5
fruit	8.6	1409	7.8	-	27.0	2.5	1.7
press cake	12.0	1338	56.5	-	-	-	-

Image sourced from: http://zambiaflora.com/speciesdata/image-display.php?species_id=135650&image_id=2

Nuts, seeds, herbs and other foods

Common name: African breadfruit

Local:

Scientific name: *Treculia africana*

Plant family: MORACEAE

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



Distribution: A tropical plant. It suits hot, tropical lowland climates. It grows in forests near rivers. It can grow in swampy areas. It grows from sea level up to 1500 m in Uganda or 1200 m in Tanzania.

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

Cultivation: Plants are grown from seed. Seed can be planted in pots then transplanted or they can be sown direct. There are about 5000 seeds per kg. Seeds will only store for a few weeks but seed treatment is not needed before sowing.

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

Food Value: Per 100 g edible portion

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

Nutritional values of food plants by plant Family

Plant Family	Scientific name	Common name	Edible part	Moisture %	Energy kj	Protein g	Vit A µg	Vit C mg	Iron mg	Zinc mg	Page
AMARANTHACEAE	<i>Alternanthera sessilis</i>	Lotus-seed herb	leaf	89.3	109	4.5	57	77	-	-	31
AMARANTHACEAE	<i>Amaranthus blitum</i>	Wild amaranth	leaf	-	-	3.9	92	-	8.3	-	30
AMARANTHACEAE	<i>Amaranthus tricolor</i>	Amaranths	leaf	91.7	96	2.5	292	43.3	2.3	0.9	29
AMARANTHACEAE	<i>Celosia trigyna</i>	Silver spinach	leaf	89.0	139	2.7	94	10	5.0	-	28
ANACARDIACEAE	<i>Anacardium occidentale</i>	Cashew	nut	4.0	2478	17.5	-	-	2.8	4.8	52
ARACEAE	<i>Colocasia esculenta</i>	Taro	root	66.8	1231	1.96	3	5	0.68	3.2	13
ASTERACEAE	<i>Helianthus annuus</i>	Sunflower	seed	5.4	2385	22.8	5	1.4	6.8	5.1	53
AURICULARIACEAE	<i>Auricularia polytricha</i>	Black fungus	mushroom	87.1	176	1.0	-	-	6.1	-	51
BASELLACEAE	<i>Basella alba</i>	Indian spinach	leaf	85.0	202	5.0	56	100	4.0	-	27
BRASSICACEAE	<i>Brassica juncea</i>	Indian mustard	leaf	92.0	108	2.4	31	73	2.7	-	54
CARICACEAE	<i>Carica papaya</i>	Pawpaw	fruit	88.0	163	0.5	290	54	0.4	0.18	34
CONVOLVULACEAE	<i>Ipomoea batatas</i>	Sweet potato	tuber (baked)	72.9	431	1.7	961	24.6	0.5	0.3	18
CUCURBITACEAE	<i>Citrullus lanatus</i>	Watermelon	fruit	94.0	92	0.4	20	5	0.3	0.1	40
CUCURBITACEAE	<i>Cucumis melo</i>	Cantaloupe	fruit	93.0	109	0.5	169	30	0.4	0.2	37
CUCURBITACEAE	<i>Cucumis metuliferus</i>	African horned cucumber	fruit	91.0	136	1.1	-	18.6	0.5	0.3	44
CUCURBITACEAE	<i>Cucurbita maxima</i>	Pumpkin	fruit	69.6	439	1.4	-	-	-	-	45
CUCURBITACEAE	<i>Cucurbita pepo</i>	Marrow	fruit	91.3	102	1.1	-	12	0.8	0.2	46
CUCURBITACEAE	<i>Lagenaria siceraria</i>	Bottle gourd	fruit	93.0	88	0.5	25	10	2.4	-	20
CUCURBITACEAE	<i>Momordica charantia</i>	Bitter cucumber	pod (boiled)	94.0	79	0.8	11	33	0.4	0.8	48
CYPERACEAE	<i>Cyperus esculentus</i>	Yellow nutsedge	rhizome	36.5	1262	3.5	-	-	8.0	-	15
DIOSCOREACEAE	<i>Dioscorea alata</i>	Greater yam	tuber	76.6	323	2.0	18	10	0.8	0.39	16
DIOSCOREACEAE	<i>Dioscorea bulbifera</i>	Potato yam	tuber	70.8	357	2.7	-	78	3.1	0.4	12
EUPHORBIACEAE	<i>Ricinodendron heudelotii</i>	Zambezi almond	seed (dry)	5.5	2215	21.2	-	-	0.4	-	55
EUPHORBIACEAE	<i>Schinziophyton rautanenii</i>	Mongongo nut	nut	4.2	2717	26.3	-	-	3.4	3.5	56
FABACEAE	<i>Cajanus cajan</i>	Pigeon pea	seed (young boiled)	71.8	464	6.0	2	28.1	1.6	0.8	21
FABACEAE	<i>Canavalia ensiformis</i>	Jack bean	seed	10.0	1423	20.4	160	0	4.9	-	22
FABACEAE	<i>Canavalia gladiata</i>	Sword bean	seed	15.0	1335	27.1	-	-	-	-	24
FABACEAE	<i>Lablab purpureus</i>	Lablab bean	seed (young)	86.9	209	3.0	14	5.1	0.8	0.4	23
FABACEAE	<i>Neptunia oleracea</i>	Water mimosa	leaf	88.0	142	5.2	114	-	3.0	-	47
FABACEAE	<i>Vigna angularis</i>	Adzuki bean	seed (dry)	13.4	1377	19.9	1	-	5.0	5.0	26
FABACEAE	<i>Vigna radiata</i>	Mung bean	seed	11.0	1432	22.9	55	4	7.1	-	25
FLACOURTITACEAE	<i>Flacourtia indica</i>	Governor's plum	fruit	69.5	452	0.5	15	14	12	-	42
MALVACEAE	<i>Abelmoschus esculentus</i>	Okra	fruit (cooked)	90.0	134	1.9	58	16.3	0.5	0.6	43
MALVACEAE	<i>Corchorus olitorius</i>	Bush okra	leaf (cooked)	87.2	155	3.4	156	33.0	3.1	0.8	32
MALVACEAE	<i>Hibiscus cannabinus</i>	Vegetable kenaf	leaf	79.0	280	5.5	34	-	12.1	-	50
MALVACEAE	<i>Hibiscus sabdariffa</i>	Roselle	leaf	86.4	185	10.9	58	35	1.5	4.1	33
MORACA	<i>Treculia africana</i>	African breadfruit	seed (dry)	9.2	1555	12.6	-	-	-	-	57
MORACEAE	<i>Artocarpus altilis</i>	Breadfruit	fruit	74.4	506	1.5	4	25	0.4	0.2	38
MORINGACEAE	<i>Moringa oleifera</i>	Moringa	pod (raw)	88.2	155	2.1	7	141	0.4	0.5	36

Plant Family	Scientific name	Common name	Edible part	Moisture %	Energy kJ	Protein g	Vit A µg	Vit C mg	Iron mg	Zinc mg	Page
PHYLLANTHACEAE	<i>Bridelia micrantha</i>	Coast goldleaf	fruit	81.1	281	0.9	-	5.4	0.96	0.3	41
POACEAE	<i>Dactyloctenium aegyptium</i>	Comb fringe grass	seed	7.5	1234	9.8	-	-	6.9	4.7	10
POACEAE	<i>Eleusine coracana</i>	Finger millet	seed	11.7	1594	6.2	-	-	5.3	-	11



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