

Potentially Important Food Plants of Bangladesh



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

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Dedication

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

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 Tom Goninon 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 an indicative guide 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 Bangladesh. This guide has been developed with the best intention to create interest and improve understanding of the important local food plants of Bangladesh, and on the understanding that it will be further edited and augmented by local specialists with appropriate knowledge and understanding of local food plants. Thanks is given to Dr Shaikh Tanveer Hossain and his colleagues at Landcare Bangladesh for their role in reviewing the draft plant list to ensure suitability for the intended audience in Bangladesh.

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.

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- 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
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- 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 Bangladesh has been produced to provide information on approximately 40 edible plants that are known to grow in Bangladesh. 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.

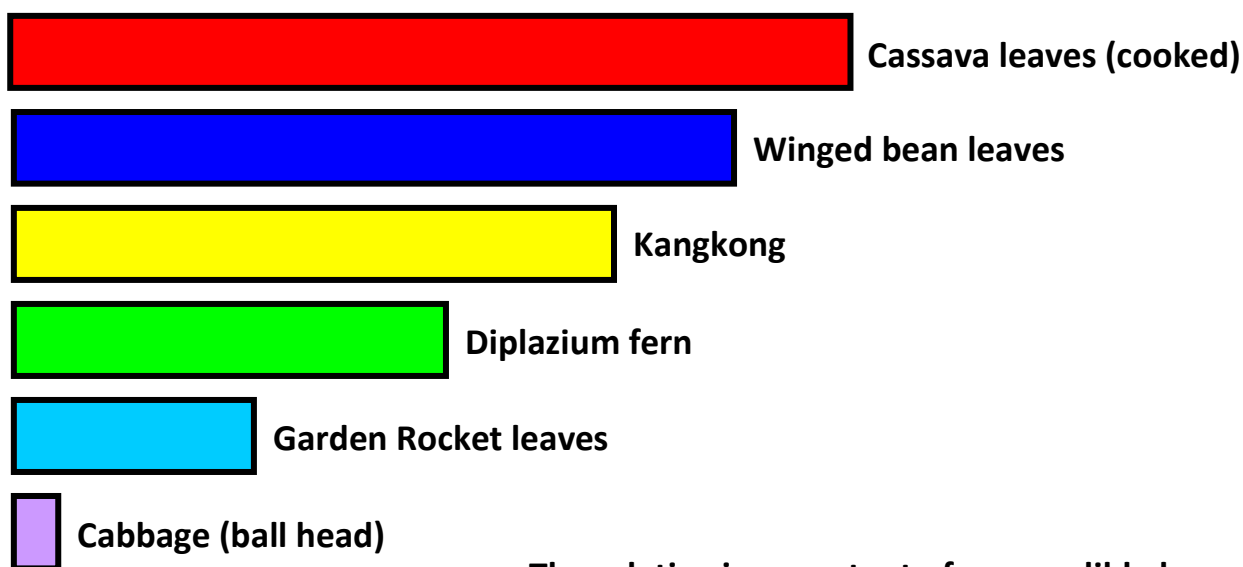
Naming of plants

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

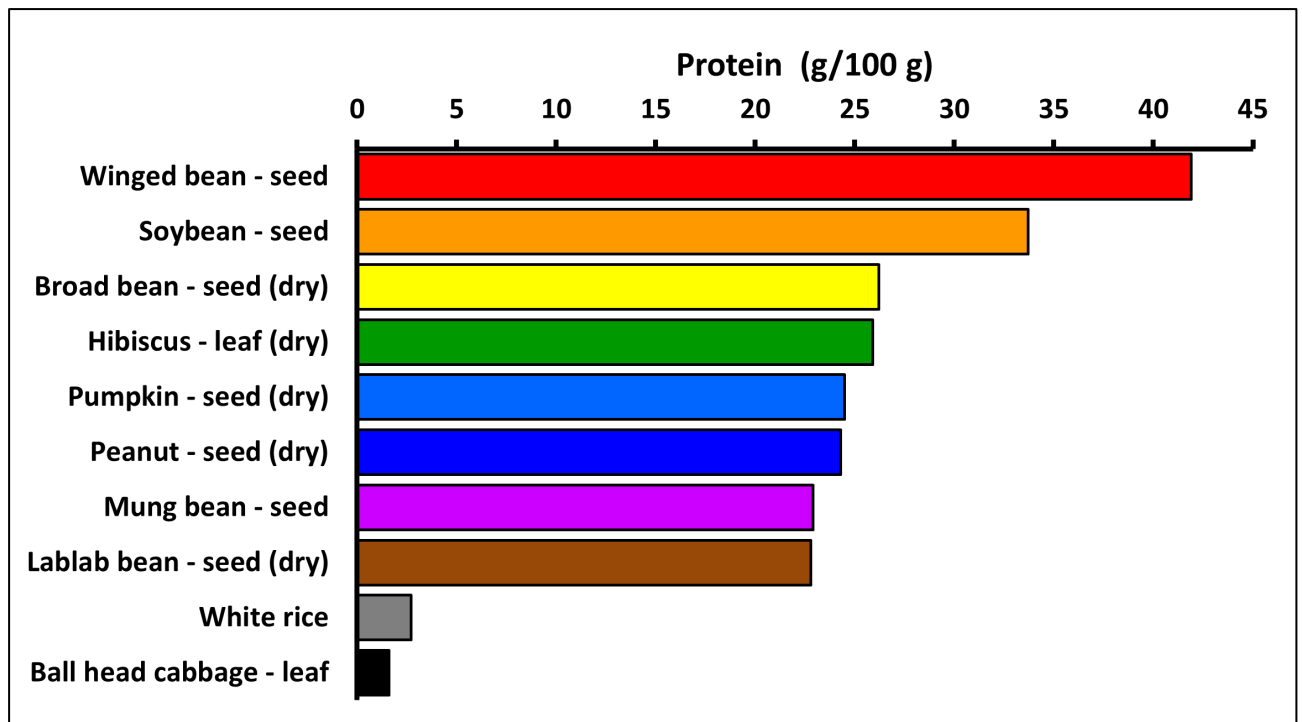
There are a large number of insects that enjoy sharing our food with us! We should not try to kill all these insects as they have an important role to play in keeping everything in nature in balance. What we need to do is to learn to manage these insects so we can all get some food to eat! Some insects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

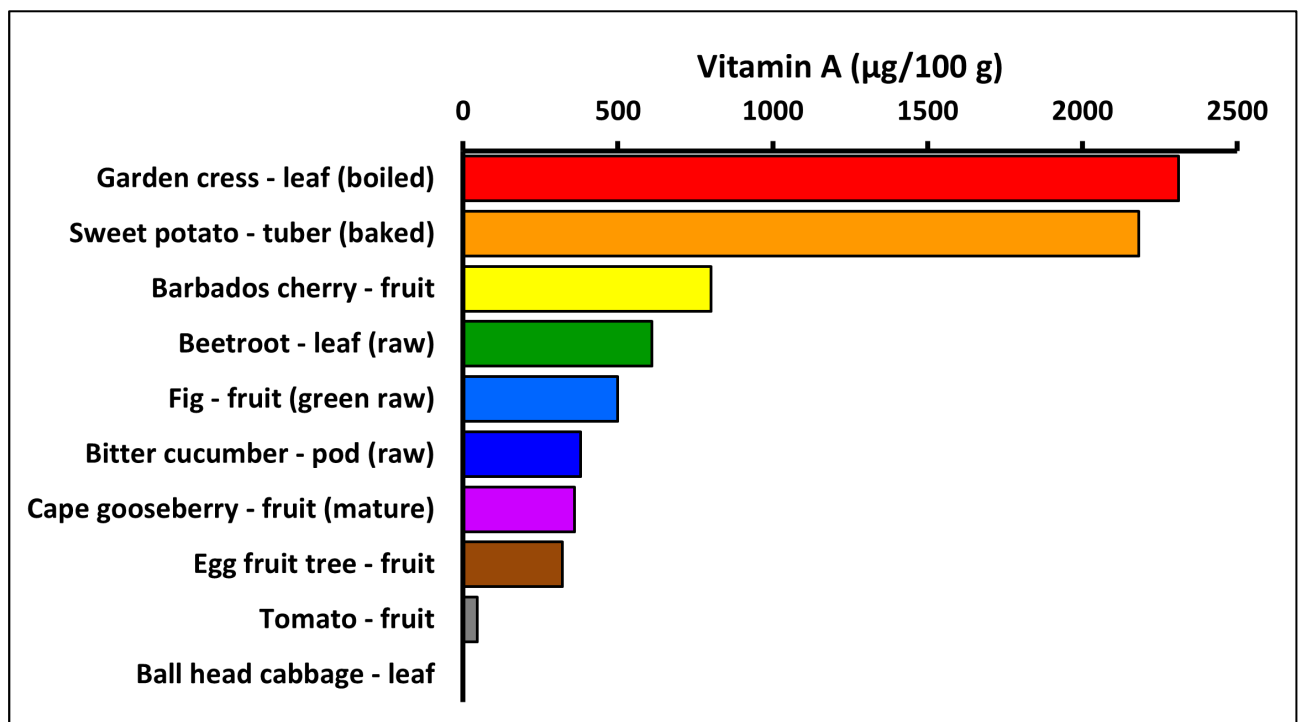
Diseases

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.

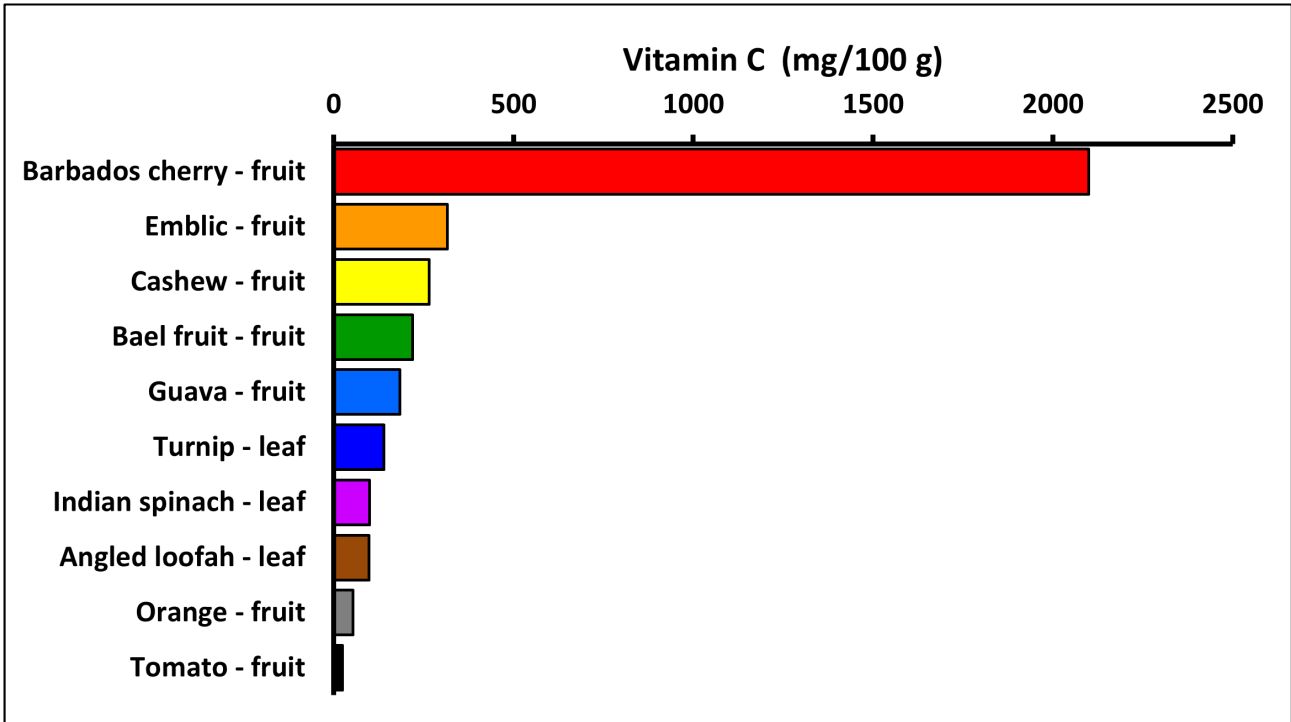
Food value charts for a selection of plants from Bangladesh



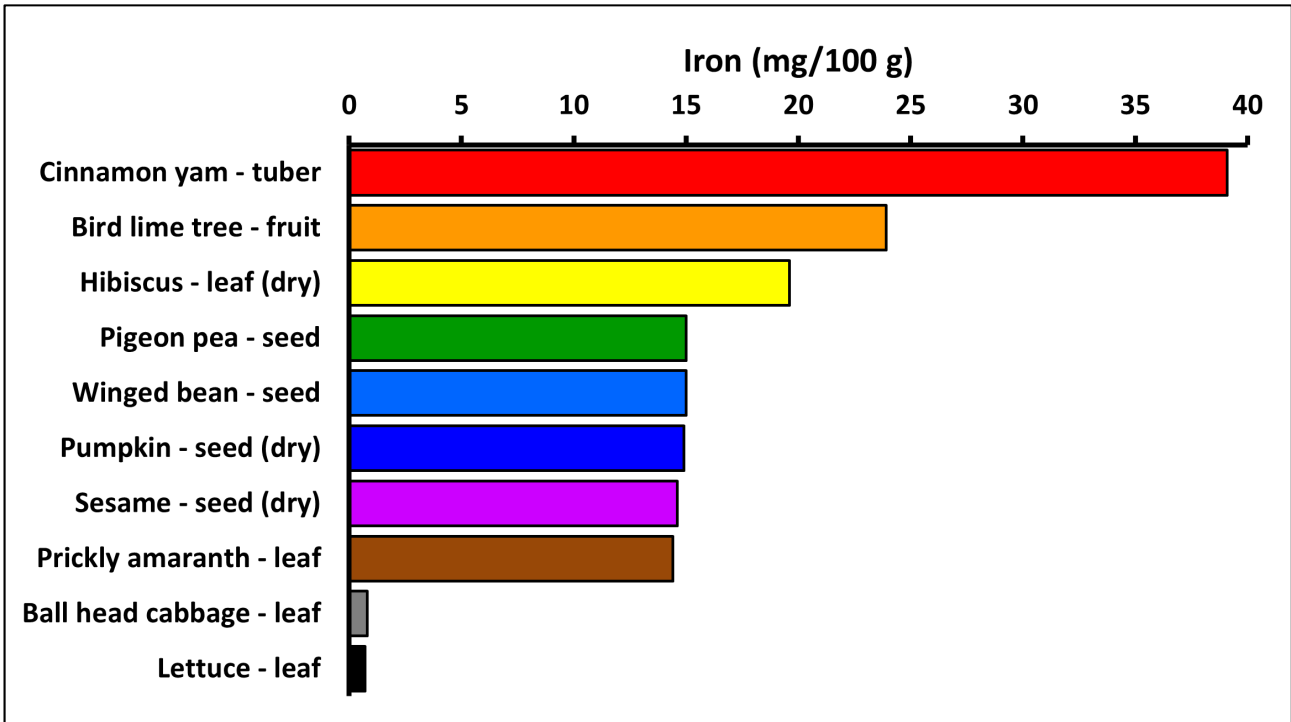
Protein helps the body repair cells and make new ones. Protein is also important for growth and development in children, teens, and pregnant women. Symptoms of protein deficiency include wasting and shrinkage of muscle tissue, and slow growth (in children).



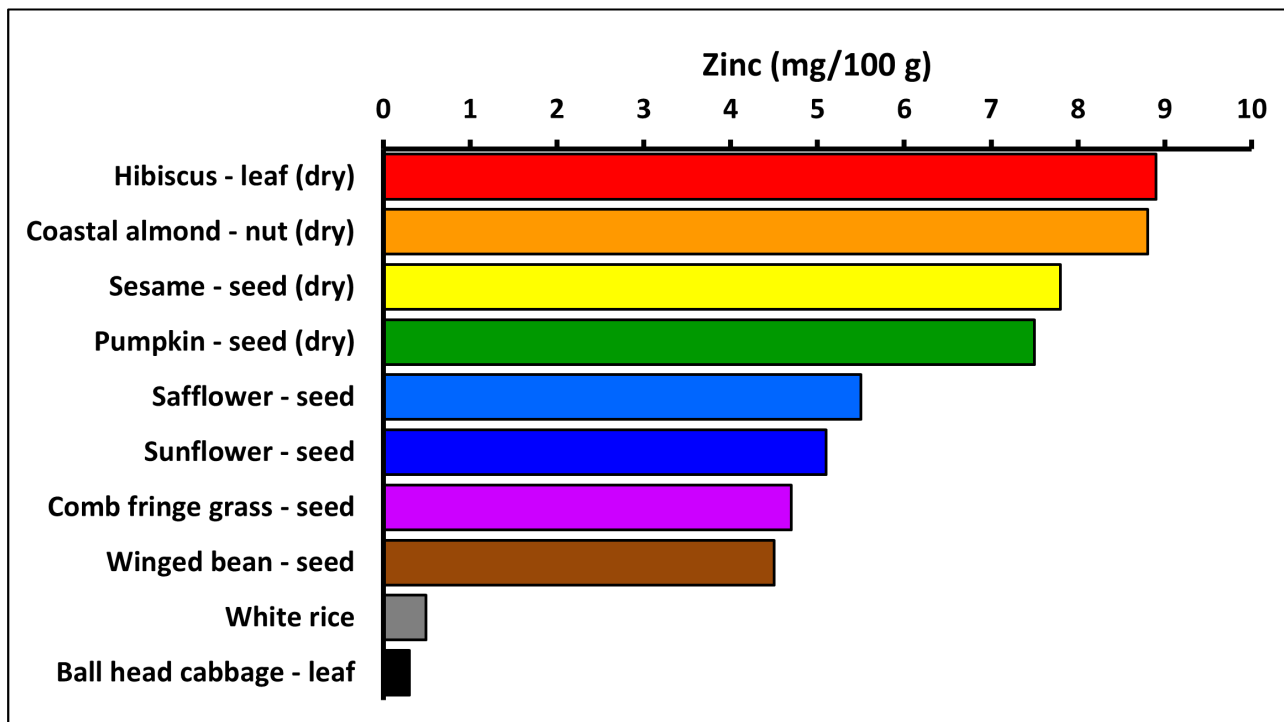
Vitamin A is very important for eyesight and fighting disease, particularly in infants, young children and pregnant women. People who are short of Vitamin A have trouble seeing at night.



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: Maize

Local:

Scientific name: *Zea mays*

Plant family: POACEAE

Description: A single stemmed annual plant that grows 2-3 m tall. The stem is solid and 2-3 cm across. It is a large grass family plant with prop roots near the base. Some forms produce tillers near the base. Seed roots feed the plant initially then casual side roots develop from the lowest node on the plant and continue supplying nutrients. Roots can go sideways for 1 m or downwards for 2-3 m. Leaves are produced one after another along opposite sides of the stem and there are 8-21 leaves. The leaf sheath wraps around the stem but opens towards the top of the sheath. The leaf blade is 30-150 cm long and 5-15 cm wide. The leaf blade has a pronounced midrib and is often wavy along the edge. The male flower or tassel is at the top. The female flower is called the ear. It is on a short stalk in the axils of one of the largest leaves about half way down the stem. It produces a large cob wrapped in leaves. Cobs commonly have 300-1000 grains. Normally only one or two cobs develop per plant.



Distribution: A warm temperate plant. Seeds need a soil temperature of more than 10°C to germinate. It grows best at less than 1800 m altitude in the equatorial tropics. It is grown in most areas of Asia and has been grown from sea level to 3300 m in the Americas. It tends to be grown in areas too dry for rice but wetter than for millets. Maize must have over 120 days frost free.

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

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

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

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (mature)	10.4	1528	10.0	100	4	4.9	2.2

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. 125 kg per hectare of sulphate of ammonia when plants are 15 cm high is used in Uganda.

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

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	11.7	1594	6.2	-	-	5.3	-

Starchy staples

Common name: Bullrush millet

Local:

Scientific name: *Pennisetum glaucum*

Plant family: POACEAE

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



Distribution: A tropical plant that suits regions with a short growing season. It grows in areas with less than 600 mm of rainfall. It is replaced with sorghum between 600-1200 mm rainfall and then by finger millet or maize above 1200 mm rainfall. It is important in the drier areas of India and Pakistan. It can grow in arid places.

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

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

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

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	11.6	1442	10.5	-	-	6.5	1.7

Starchy staples

Common name: Foxtail millet

Local:

Scientific name: *Setaria italica*

Plant family: POACEAE

Description: An annual grass. It grows 1-1.5 m tall. It can be tinged with purple colour. The stalks are upright and the section between the nodes is hollow. It develops tillers from the base. It has long leaf sheath. The leaf blade is 30-45 cm long by 1.2-2.5 cm wide. It has a prominent midrib and tapers towards the tip. The flower is a spike-like branching flower 7.5-25 cm long by 1.2-5 cm wide. The side branches carry 6-12 small spikes each with 1-3 bristles. The mature grain is 2 mm long. There are many named cultivated varieties.



Distribution: A warm temperate plant. It suits regions of low rainfall. It is grown from sea level to 2000 m altitude. It can tolerate a wide range of soil conditions. It cannot tolerate waterlogging or long periods of drought. It can grow in arid places.

Use: It can be cooked and eaten like rice. The seeds can be parched, popped, added to soups and sauces or made into porridge, cakes, puddings, and dumplings. The sprouted seeds can be used as a vegetable. The seeds can be used for making beer. The seeds can also be made into syrup.

Cultivation: Plants are grown by seed. Seed can be broadcast or drilled. Pure stands require 8-10 kg/ha of seed. Plants are harvested by cutting off the ears.

Production: It grows quickly. Plants mature in 80-120 days. Flowering occurs over 10-15 days. Plants can be self or cross pollinated. Yields of 800-900 kg/ha are common and straw yields for livestock feed can be up to 2500 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	13.5	1425	9.5	-	-	5.5	3.5

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: Cinnamon yam

Scientific name: *Dioscorea oppositifolia*

Local:

Plant family: DIOSCOREACEAE

Description: A yam. It is a large climber that keeps growing from year to year. The tuber is cylinder shaped and 50-90 cm long. The stem twines clockwise. It produces bulbils in the axils of leaves. The leaves are opposite and have 3-5 leaflets like fingers on a hand. They are 5-20 cm long by 3-8 cm wide.

Distribution: A tropical plant. It grows on the Deccan Plateau in India. It grows in open forest or along the edge of the forest. It is a cold hardy species. It grows on hillsides and steep valleys between 500-1500 m elevation. It is a potentially invasive plant.

Use: The tubers are cut and washed successively with salt and fresh water to remove an alkaloid (dioscorine) then cooked and eaten. They are not glutinous so have little binding strength. They can be boiled, mashed, fried or added to soups. A starch is extracted from the roots.

Cultivation:

Production: In Sikkim, tubers are available December to March.

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	81.9	1711	13.8	-	-	39.1	1.4

Image sourced from: <https://d2seqvvy3b8p2.cloudfront.net/9954ebef2bde85dbc4e3afd83aa64834.jpg>.



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	-

Starchy staples

Common name: Sorghum

Local:

Scientific name: *Sorghum bicolor*

Plant family: POACEAE

Description: Sorghum is a millet grass. A mature sorghum plant resembles maize in its stature. Plants vary in height from 45 cm to 4 m. It is an annual grass with erect solid stems. The stems can be 3 cm across at the base. Prop roots occur at the base of the plant. There are numerous sorghum varieties. Some have one main stem while others produce multiple tillers. More tillers are produced when plants are widely spaced. The nodes on the stem are slightly thickened. Short types have up to 7 leaves while tall late varieties may have up to 24 leaves. The leaf blade can be 30-135 cm long. Leaves are bluish green and waxy. They have a prominent midrib. The large flower panicle can be 20-40 cm long. The flower occurs at the top of the plant. It can stick upright or bend over. The flower can be open or compact. Over 1000 cultivated varieties occur in China.



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

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

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

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

Food Value: Per 100 g edible portion

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

Legumes

Common name: Peanut

Local:

Scientific name: *Arachis hypogaea*

Plant family: FABACEAE

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



Distribution: Peanuts grow in tropical and subtropical areas. They grow well from sea level up to about 1650 metres in the equatorial tropics. They require temperatures of 24-33°C. Plants are killed by frost. They need a well-drained soil and cannot stand water-logging and often require raised garden beds. Peanuts need 300-500 mm of rain during the growing season. Dry weather is needed near harvest.

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

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

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

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	4.5	2364	24.3	0	-	2.0	3.0
seed (fresh)	45	1394	15	-	10	1.5	-
leaf	78.5	228	4.4	-	-	4.2	-

Legumes

Common name: Pigeon pea

Scientific name: *Cajanus cajan*

Local:

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	13	28.1	1.6	0.8

Legumes

Common name: Chick pea

Local:

Scientific name: *Cicer arietinum*

Plant family: FABACEAE

Description: Chick peas are erect, annual herbs with a strong taproot. Plants grow up to 60 cm high and all parts are hairy. Plants are often bluish green in colour. The leaves are up to 5 cm long and have 9-15 pairs of leaflets along a stalk and a single leaflet at the end. The leaflets are 1-2 cm long by 0.3-1.4 cm wide and are strongly pointed and with a toothed edge. The flowers are carried singly on long stalks in the axils of leaves and are white, pink or purple. The flowers normally never open and are self pollinated.



The pods are inflated, 2-3 cm long and have 1 or 2 seeds. The seeds are angular and up to 1 cm across. They have a pointed beak. The seed colour can vary from brown, white, red or black. There are many named varieties.

Distribution: Chick pea is a sub-tropical crop. It suits high altitudes in the tropics because it needs cold nights with dew. It is well suited to semi arid regions. It can tolerate salt and drought. It does not do well in warm, humid places. It needs well drained soil and is damaged by frost. For best growth, night temperatures between 18-26°C, and day temperatures of 21-29°C, are required. The temperature range of 8°C between day and night is required. Annual rainfall of 600-750 mm and a relative humidity of 20-40% is suitable. The best soil pH is 5.5-7.5 but they will grow on alkaline soils.

Use: Mainly the ripe seeds are eaten. They are most commonly boiled and mashed but they can also be roasted or fried or used in stews and soups. The young leaves, shoots and pods are sometimes eaten. Sprouted seeds can be eaten. When roasted they can be eaten as a snack. The seeds can also be used to make flour. Chick peas are used in hummus, couscous, falafel, and to make pita bread. They can be fermented into miso and tempeh and the roasted roots and seeds can be used as a coffee substitute.

Cultivation: Chick peas are grown from seed. Often other crops are grown mixed with Chick peas but these are planted 3-4 weeks after sowing the Chick peas. Seed should be planted 2-12 cm deep. Seed will germinate at temperatures above 5°C but are best above 15°C. Spacing plants 10 cm apart in rows 25-30 cm apart is suitable if plants are put in rows. Plants are cut and harvested when leaves turn brown.

Production: Yields of 400-1600 kg per hectare of seed are average for chick peas. Plants can reach maturity in 4.5-5 months, but 7 months or longer are taken for some types.

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 (raw)	9.9	1362	20.2	190	3	6.4	-

Legumes

Common name: Soybean

Local:

Scientific name: *Glycine max*

Plant family: FABACEAE

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



Distribution: It is a temperate plant that suits lowland areas. It can be grown from sea level to 2000 m altitude. Many varieties will not flower in the tropics (short days). It needs fertile soil. The best soil acidity is pH 5.5-7.0. It is damaged by frost.

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

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

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

Food Value: Per 100 g edible portion

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

Legumes

Common name: Lablab bean

Scientific name: *Lablab purpureus*

Local:

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: Winged bean

Scientific name: *Psophocarpus tetragonolobus*

Local:

Plant family: FABACEAE

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



Distribution: A tropical plant that grows from sea level up to about 1850 m altitude in the tropics. It normally only produces tubers at 1200-1850 m altitude. It needs a day length less than 12 hours. It will not produce flowers or pods at places far from the equator. The main areas of production are between 20°N and 10°S latitudes. It is ideally suited to the tropics including the hot humid lowlands. For maximum seed production, temperatures of 23-27°C are needed, and for tubers the temperatures should be 18-22°C. Winged beans grow on a wide variety of soils and on soils with pH from 3.6-8.0. They are sensitive to acid and waterlogged soils.

Use: Young leaves and pods, flowers, ripe seeds and root tubers are edible. Seeds give an edible oil.

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

Production: The first green pods are ready about 10 weeks after sowing. Tubers are ready after 4-8 months. Seed yields of 1.2 tons/ha and tuber yields of 4 tons/ha are possible. A single plant can produce up to 75 pods. Dry bean yields of 45-330 g per plant can be produced depending on variety. Tuber yields of 5500-12000 kg per hectare have been produced. Seeds can contain a trypsin inhibitor which reduces protein digestibility. This inhibitor is destroyed by soaking seeds then boiling them well. Tubers can also contain this chemical and need to be well cooked.

Food Value: Per 100 g edible portion

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

Legumes

Common name: Broad bean

Local:

Scientific name: *Vicia faba*

Plant family: FABACEAE

Description: An upright plant up to 1 m tall. Plants vary in height from 30-180 cm. It has a well-developed taproot. It has square stems which are hollow and have wings at the angles. There can be 1-7 branches from near the base of the plant. The leaves have leaflets along the leaf stalk and end in a short point. There are 2-6 leaflets. These are 5-10 cm long. Flowers occur in the axils of leaves and there are 1-6 flowers on a stalk. The flowers are white with black spots. Pods are large and fat and contain several large beans inside. The pods are 5-10 cm long in field varieties and can be 30 cm long in garden varieties. They are fleshy with a white velvety lining. They become tough and hard at maturity. The seeds can vary a lot in shape and size. They can be flat or rounded and white, green, brown, purple or black. They are 1-2.6 cm long. The hilum along the seeds is prominent.



Distribution: A temperate plant only suitable for the highlands over about 1200 m. in the tropics. It mainly occurs from 1900-2700 m altitude in equatorial zones. It is frost tolerant and is resistant to drought. It can grow with temperatures down to 4°C. In the lowland hot tropics it often flowers but does not set seed. It requires fertile soils. It does best with adequate lime needing a soil pH of 6.4-7.2. It can tolerate some salinity.

Use: It is mostly the young beans that are eaten. The ripe beans and leaves are also edible. The dried beans can be boiled, ground into flour and added to soups or used for making tofu. Sprouted seeds are cooked and eaten. The tender pods are eaten as a vegetable. **Caution:** Some people, mainly of Mediterranean origin can get a disease called Favism from these beans. The beans should be well cooked. They can react with some people using some antidepressant drugs.

Cultivation: The crop is grown from seed which are sown at 15-40 cm spacing. If the seed pod formation is poor, it can be improved by pinching out the tops of the plants when in flower. Hand pollination also helps. Plants are self-pollinated but also cross pollinated by insects.

Production: Time to maturity is 12-16 weeks. Yields in the cool tropics vary from 1-2 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 (dry)	10.0	1448	26.2	130	16	6.7	-
seed (fresh, raw)	76.0	315	7.1	35	140	1.9	0.6
seed (fresh, boiled)	83.7	259	4.8	27	20	1.5	0.5

Legumes

Common name: Mung bean

Scientific name: *Vigna radiata*

Local:

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

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](https://www.kuleuven-kulak.be/kulakbiocampus/lage%20planten/Amaranthus%20blitum%20-%20kleine%20majer/Amaranthus%20blitum-kleine_majer01.jpg)

Leafy greens

Common name: Red amaranth

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

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

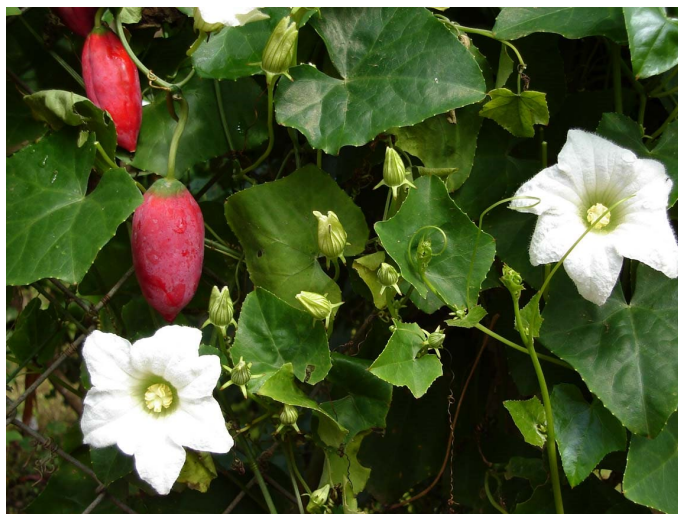
Common name: Ivy gourd

Local:

Scientific name: *Coccinia grandis*

Plant family: CUCURBITACEAE

Description: A pumpkin family plant. It is a climbing or trailing herb. It can climb 20 m high. It has single tendrils. It has long tuberous roots. The leaves are heart shaped, with the lobes towards the base in an angular shape. The leaves are 5-10 cm across. The edges of the leaves are irregular. The flowers occur as male and female flowers on separate plants. The flowers are large and white and occur singly. The fruit is oblong and up to 10 cm long by 2.5 cm across. It is green with white stripes. The fruit become bright red when mature. The seeds are white or light brown. They are hairy and flattened with a broad rim.



Distribution: A tropical plant. It does well in warm climates. In cold weather, plants remain dormant. They cannot grow in waterlogged soil. Plants grow between 550 and 1600 m altitude in Ethiopia. It requires a well distributed rainfall and a fairly high humidity. It grows in areas with an annual rainfall between 1000-1600 mm. It requires a sandy soil with good drainage and a high level of organic material. In Nepal the plants grow up to 1400 m altitude. In south Vietnam it grows up to 1500 m above sea level. In the Himalayas in India it grows between 1200-2000 m above sea level. It can grow in arid places.

Use: The leaves, shoots, and immature fruits are cooked as a vegetable. Mature fruits are eaten fresh. The ripe red fruit are collected, peeled and cut into small pieces and added to porridge. The leaf tips are cooked as a vegetable. The leaves can be stored for 10 days. The ripe fruit are eaten raw or cooked. They are used in curries.

Cultivation: Plants are grown from stem cuttings or tuberous roots. They can also be grown from seeds. Stem cuttings about 12-15 cm long are suitable. The plant needs a trellis to climb over. One male plant to every ten female plants is enough to ensure pollination. A spacing of 150 cm apart is suitable. During dry periods watering is required.

Production: Plants can grow for 3 or 4 years. The yield of fruit can be about 10 kg per plant

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	90.6	117	4.1	36	-	4.6	-
fruit	93.6	83	0.7	-	-	0.6	-

Image accessed from: https://upload.wikimedia.org/wikipedia/commons/e/e9/Coccinia_grandis_fruit.jpg

Leafy greens

Common name: Hibiscus

Local:

Scientific name: *Hibiscus rosa-sinensis*

Plant family: MALVACEAE

Description: A shrubby, evergreen, woody, shrub used for hedges. It grows 2-5 m tall. The bark is grey and flaky and has fine stripes. The leaves are bright green and oval with long tips. The edges are entire on the lower leaves. The upper leaves are coarsely toothed. The flowers occur singly in the axils of leaves. Flowers can be single or double. They are bell shaped and 10-15 cm across. There are a range of colours. The fruit are rounded capsules with many seeds inside. The capsules are beaked. Plants usually do not produce fruit in the hot humid tropics.



Distribution: A tropical and subtropical plant, common as an ornamental throughout the tropics. It originally came from China. It thrives on any type of soil. Different types are adapted to sunny or shady places. It grows in open, moist places. It grows where average temperatures are 15-30°C. It is very sensitive to frost and can grow from sea level to 1000 m altitude. It requires a minimum rainfall of 700 mm per year and suits hardiness zones 9-11.

Use: The leaves are eaten cooked. In some places they are pounded before cooking. The flowers are eaten raw or pickled. They are also added to drinks. They are used to colour foods including preserved fruit, sliced pineapple, agar-agar jellies, and cooked vegetables. The fresh flower ovary is eaten.

Cultivation: It is mostly grown from cuttings.

Production:

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf (dry)	6.4	1339	25.9	-	-	19.6	8.9
leaf (fresh)	76.0	321	2.3	-	-	-	-

Leafy greens

Common name: Kangkong

Local:

Scientific name: *Ipomoea aquatica*

Plant family: CONVULVACEAE

Description: Kangkong is a creeping sweet potato-like plant. It has hollow stems and can float on water. The leaves are green and are normally not divided like some sweet potato leaves, but the shape and size varies a little between different kinds. The trumpet shaped flower looks like a sweet potato flower and is normally white. The runners develop roots at the nodes and also branch. This branching increases when tips are picked off. Some variation in leaf shape can be observed. Leaf shape is less variable than



in the related sweet potato, but narrow and broad leafed kinds occur. White and green stemmed kinds occur. Green stemmed kinds have more cold tolerance than white stemmed.

Distribution: Kangkong is a tropical plant. It grows best in short day, stable high temperature, moist conditions. Temperatures need to be above 25°C for satisfactory growth. In equatorial regions plants probably grow up to 1000 m altitude. Below 23°C the growth rate is too slow for economic production, so production is mainly in the lowland tropics. Optimum soil pH is between 5.3-6.0. It suits damp places and grows well in swamps. It can grow as a partly floating plant in swamps and lagoons behind the beach along the coast. In some countries they grow the dry land form in gardens.

Use: The young tips of shoots are cooked and eaten. They can be boiled, steamed, stir-fried, or added to soups, stews or curries. The young stems can be used in pickles. The young tips can be eaten raw in salads and the roots are occasionally cooked and eaten.

Cultivation: Dryland kangkong is normally grown from seed. Sometimes seed are pre-soaked for 12-24 hours prior to sowing. Plants can also be grown from cuttings and establishment is rapid. Top cuttings 25-40 cm long can be planted beside a pond.

Production: Young tips can be harvested 30 days after planting, and subsequent harvests every 7-10 days. Production of new shoots probably declines at flowering. Yields up to 60000 kg/ha have been recorded.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	90.3	126	3.9	40	60	4.5	-
leaf (boiled)	92.9	84	2.1	520	16	1.3	0.2

Leafy greens

Common name: Angled loofah

Local:

Scientific name: *Luffa acutangula*

Plant family: CUCURBITACEAE

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



Distribution: A tropical plant. It grows from sea level to 500 m altitude in the hot humid tropics. It won't tolerate excessive rainfall so does best in drier areas or in the dry season in wetter areas. Day temperatures above 25°C are suitable. Some varieties require short day length. Adding additional nitrogen fertiliser can stimulate female flower formation in short day varieties. In Nepal it grows from 1000-1600 m altitude. It can grow in arid places.

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

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

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

Food Value: Per 100 g edible portion

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

Leafy greens

Common name: Smooth loofah

Local:

Scientific name: *Luffa cylindrica*

Plant family: CUCURBITACEAE

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



Distribution: A tropical plant that grows well in the tropical lowlands but will also grow in more temperate places. It does best with temperatures of 25-30°C. It is better suited to the drier season as too much rainfall during flowering and fruiting is harmful. Soils should be well drained and moderately rich. It grows in areas with an annual rainfall of 1000-1800 mm. In Zimbabwe it grows up to 1500 m above sea level. It can grow in arid places. It suits hardiness zones 9-12.

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

Caution: Older fruit are bitter and fibrous and contain poisonous substances.

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

Production: Fruit are harvested for sponges when fully mature. Young fruit are ready 2-3 months after planting while fruit mature 4-5 months after planting.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	94.3	79	1.1	-	-	0.7	-
leaf	90	113	5.1	-	95	11.5	-

Fruit

Common name: Bael fruit

Local:

Scientific name: *Aegle marmelos*

Plant family: RUTACEAE

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



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

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

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

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

Food Value: Per 100 g edible portion

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

Fruit

English: Burmese grape

Local:

Scientific name: *Baccaurea ramiflora*

Plant family: PHYLLANTHACEAE

Description: A small tree. It grows 10 m high. It can lose many leaves throughout the year. The leaves are thin. Male and female flowers are on separate trees. The fruit is round and 3-4 cm across. The edible fruit is pink or yellow when ripe.



Distribution: A tropical plant. It grows in northern forests in Thailand. In India it grows in the sub-Himalayan region.

Use: Ripe fruit are eaten raw. The fleshy layer around the seeds is eaten. The rind of the fruit can be used for chutney.

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	84.7	218.6	9.3	-	1.6	-	-
leaf		118	0.6	-	2.0	-	-
fruit	35.6	-	5.6	-	0.3	-	-

Fruit

Common name: Fig

Local:

Scientific name: *Ficus carica*

Plant family: MORACEAE

Description: A low spreading deciduous tree with large leaves. It can grow to 10 m high. Trees are widely spreading with many branches. It has milky sap. The small branches are straight and strong. The leaves spread out like fingers on a hand with 3 or 5 lobes. The leaves are rough textured on the upper surface and downy underneath. The flowers are of one sex only. There are two sex forms-the caprifig and the fig. The caprifigs are dry and hard and develop 3 times a year. They harbour the fig wasp which itself goes through 3 different stages of its life cycle in these 3 fruit seasons. The "fruit" is a hollow receptacle with an opening at the tip. Inside this the flowers grow and mature. The true fruit develop inside this large receptacle. They are produced either singly or in pairs in the axils of leaves. Fruit colour can vary from black or brown, to green and yellow. Wild figs have both male and female flower parts but cultivated figs have no male flower parts. There are several hundred cultivated kinds of fig.



Distribution: It is native to S.W. Asia. It suits tropical, subtropical and warm temperate regions. It can stand light frosts once hardened. It suits highland areas in the tropics with a lower rainfall. It produces better if there is not too much rain at flowering. Good summer heat is necessary for sugar-rich fruit. Plants do best in heavy soil in well prepared sites. It needs a neutral soil pH. It has some salt tolerance. It suits hardiness zones 10-12.

Use: Fruit are eaten raw or cooked. They can be dried, preserved or used in jam. They are used in syrups, bread, pastries, and pies, and are made into brandy and wine. Food is wrapped in the leaves while cooking to impart flavour. The latex is used to coagulate milk for cheese and junket.

Cultivation: Plants can be grown from seed or stem cuttings. They can also be grown by budding and grafting. Smyrna figs need fig wasps for pollination. This is done by hanging male flowers near female flowers to attract the wasps. Adriatic figs develop fruit without pollination. Trees should be pruned for good production and easy harvesting.

Production: Figs start to bear after about 5-7 years and can continue for decades, but they become unprofitable after 50 years. Fruit ripen in their second year. Normally figs have 2 harvests per year. The first crop is from old wood and the second from newer wood.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit (dry raw)	16.8	908	3.6	50	0	4.2	0.9
fruit (dry stewed)	50.7	504	2.0	30	0	2.3	0.5
fruit (green raw)	84.6	174	1.3	500	2	0.4	0.3

Fruit

Common name: Barbados cherry

Local:

Scientific name: *Malpighia glabra*

Plant family: MALPIGHIACEAE

Description: A small evergreen tree or shrub that grows 5-7 m tall. It often has several trunks. The branches are spreading and often drooping. The leaves are opposite and oval to sword shaped. They are 2-8 cm long by 1-4 cm wide. They are dark green and glossy and can be wavy along the edge. The leaf stalk is short. The flowers have both sexes. The flowering stalks are short with 3-5 pinkish-red flowers that are 1-2 cm across. The fruit is bright red. And 1-2 cm across with has several small triangular seeds. The fruit resemble a common cherry but is has 3 grooves and 3 seeds. The fruit are carried on the outside of the tree.



Distribution: A tropical and sub-tropical plant that suits the hot, tropical lowlands. It grows on sandy soils and in seasonally drier regions. Rainfall during flowering and fruiting improves fruit quantity and size. They do best in a frost-free site and need a well-drained soil. They can tolerate frost and drought. They do best in warm to hot climates with temperatures of 30-32°C. It can grow in arid places and suits hardiness zones 9-12.

Use: The fruit are eaten fresh or used in juice. They can be used for wine. They can be used in jellies, jams and preserves. The sauce or puree can be used as a topping for cakes, puddings, ice cream or sliced bananas. **Caution:** Acerola can produce an allergic reaction similar to that of latex.

Cultivation: They can be grown from hardwood cuttings or budded onto seedlings. They can also be grown by ground layering or from seed, although seed germinate poorly. A spacing of 3-4 m is suitable. Cross pollination is needed for good fruit production.

Production: Trees bear in 3-4 years and can continue for 15 years. Flowering normally follows periods of rainfall. There can be several flowering and fruiting periods per year. Flowers are pollinated by insects and fruit can ripen in 3-4 weeks. Fruit lose their flavour and nutritional value rapidly after harvest. They should be picked and eaten within a few hours. Individual trees can yield 15-30 kg of fruit per year.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	83.2	163	1.8	800	2100	0.8	-

Fruit

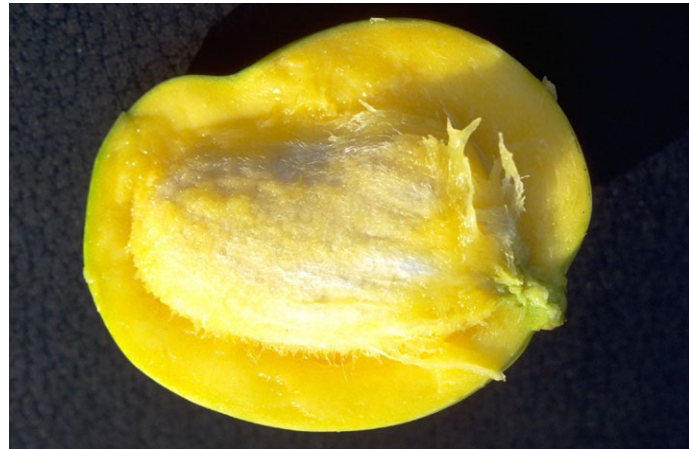
Common name: Mango

Local:

Scientific name: *Mangifera indica*

Plant family: ANACARDIACEAE

Description: An erect, branched evergreen tree. It can grow to 10-40 m high and is long lived. (Trees grown by vegetative means are smaller and more compact.) Trees spread to 15 m across. It has strong deep roots. The trunk is thick. The bark is greyish-brown. The leaves are simple and shaped like a spear. Some kinds of mangoes have leaves with a wavy edge. They can be 10-30 cm long and 2-10 cm wide. They are arranged in spirals. The leaf stalk is 1-10 cm long and flattened. Leaves are often brightly coloured and brownish-red when young. These tender leaves which are produced in flushes become stiff and dark-green when mature. The flower stalks are at the ends of branches. They are 10-50 cm long and branching. Up to 6000 flowers can occur on a stalk. Most of these are male and up to 35% have both male and female flower parts. Fruit are green, yellow or red and 2.5-30 cm long. The fruit hang down on long stalks. The outside layer of the seed is hard and fibrous and there is one seed inside. Several embryos can develop from one seed by asexual reproduction. The fruit shape and colour vary as well as the amount of fibre and the flavour. India has many varieties and they cannot tolerate humidity.



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

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

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

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

Production: Seeds germinate after about 20 days. Seedling trees produce after 4-6 years and increase in production up to 20 years. Trees often bear better each second year. Rain at flowering reduces fruit setting. Fruiting is at the end of the year. Fruit take 4-5 months to mature. Fruit vary in weight from 200-1000 g. Trees can produce one million flowers but only 500 fruit. Trees last for many years.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	83.0	253	0.5	180	30	0.5	0.04
leaf	82.1	226	3.9	-	60	2.8	-

Fruit

Common name: Emblic

Local:

Scientific name: *Phyllanthus emblica*

Plant family: PHYLLANTHACEAE

Description: A small deciduous tree. It grows 2-20 m tall. The trunk is bent and has many branches. The branches are spreading. The bark is greyish-brown and peels off in flakes. The leaves are pale green and feathery. New leaves are pinkish. The leaves have short stalks. The leaves are 1-1.5 cm long by 0.2-0.3 cm wide. The leaves are arranged on slender branches to appear like feathery compound leaves. They are like tamarind leaves. Male and female flowers occur on different trees. The flowers are small and yellow. They are densely clustered on the branches. The fruit are small and yellow to green. They are 2 cm across and edible. They have 6-8 faint lines along them. They are fleshy and edible. They are sour. Some improved kinds have fruit 8-9 cm across.



Distribution: A tropical plant. It suits the hot humid tropical lowlands. It is native to tropical Asia. It grows in arid bushy savannah. It grows to 1500 m altitude. It often grows on poor shallow soils. It is light demanding and drought tolerant. It can tolerate forest fires. They are common in tropical deciduous forest in India. It suits the subtropics. It needs warm temperatures at time of flower bud formation. Dry times during fruiting cause fruit to drop. It can tolerate low and high temperatures once established. It can tolerate soils with a pH 6-10. Some varieties can tolerate saline soils.

Use: The fruit are cooked and used in preserves. The fruit are acid and can be eaten fresh or used for flavouring. They are also used as a seasoning in cooked food. They are pickled and made into jams, jellies, preserves, tarts and other foods. The dried fruit chips are seasoned with caraway seeds, salt and yoghurt and eaten. Unripe seeds and leaves are edible.

Cultivation: Plants are grown from seed. They are best grown using ring budding or veneer grafting. Trees can be pruned to form 4-6 branches from one trunk. They can be grown from cuttings, grafting or by air layering.

Production: Early growth is fast. Some budded trees produce fruit after 3 years. Seedling trees take 7-8 years. Best yields are produced after 10-12 years and trees can keep bearing for 70-75 years. In India fruit are available October to December.

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	78.4	281	0.6	-	316	0.9	0.5

Fruit

Common name: Cape gooseberry

Local:

Scientific name: *Physalis peruviana*

Plant family: SOLANACEAE

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



Distribution: A temperate plant that grows in the tropical highlands. It suits warm climates and does best in warm sunny conditions. It needs well drained soil. Plants are not killed by a slight frost but it grows best free from severe frosts and strong winds. In Indonesia plants are found from 700-2300 m altitude, but fruit best above 1500 m. It can grow in arid places and suits hardiness zones 8-10.

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

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

Production: Plants produce fruit in 1 year.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit (mature)	84.2	201	2.0	360	30	1.5	-

Fruit

Common name: Guava

Local:

Scientific name: *Psidium guajava*

Plant family: MYRTACEAE

Description: A small evergreen tree 8-10 m tall with smooth, mottled bark which peels off in flakes. It is shallow rooted and branches close to the ground. The branches are four-angled. The leaves are opposite, dull green, and somewhat hairy. They are oval and somewhat pointed at both ends, 15 cm long by 2-5 cm wide with short leaf stalks. The showy flowers are white and borne in loose, irregular arrangements of 1-3 flowers that grow in the axils of leaves on new growth. The petals are 1.5-2 cm long. Both self and cross-pollination occurs. The fruit



are rounded and 4-5 cm long. They are green, turning yellow when ripe. The skin is firm and encloses a pink, or nearly white, sweet-smelling, edible pulp with many seeds. In better selected varieties, the skin and the seeds are fully edible. Fruit vary from very acid to very sweet.

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

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

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

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

Food Value: Per 100 g edible portion

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

Fruit

Common name: Egg fruit tree

Local:

Scientific name: *Pouteria campechiana*

Plant family: SAPOTACEAE

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



Distribution: It is native to Central and South America. It is a tropical and subtropical plant that suits the coast and is damaged by frost. It can grow up to 1400 m in the tropics. It will grow on fairly poor soils but does better on fertile well drained soils. It can tolerate reasonably dry periods. It suits hardiness zones 10-11.

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

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

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

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	60.6	580	1.7	320	58	0.92	-

Vegetables

Common name: Prickly amaranth

Local:

Scientific name: *Amaranthus spinosus*

Plant family: AMARANTHACEAE

Description: An annual plant that grows 60-100 cm tall. It can be erect or lie over. The stems can be either nearly round or angular. The plant branches from the base upwards. Leaves are fairly smooth or hairless but can be tinged purple. The leaf stalk can be 0.5-10 cm long. The leaf blade is oval or sword shaped and 2-7 cm long by 0.6-3 cm wide. There can be a short tip at the top end and it gradually tapers to the base. Flower clusters occur at the sides and these can be single or arranged in compound spikes. The flower clusters at the top can be 3-10 cm long. The top flowers often droop over. Parts of the flowers in the clusters of the leaves form sharp spines 0.5-2 cm long. The upper flowers are male and the lower flowers are female. The seeds are 1-1.2 mm across and flattened.



Distribution: A tropical plant that grows world wide from the tropics to the warm temperate zone. It can grow in sun or light shade. In Tanzania it grows from sea level to 1800 m altitude, in areas with 800-1300 mm annual rainfall. It grows well in moist, damp soil and can also grow in arid places.

Use: The leaves are edible when cooked. The seeds are ground into flour and cooked. **Caution:** This plant can accumulate poisonous nitrates if grown with high nitrogen inorganic fertilisers.

Cultivation: Plants are often self sown but can be grown from seed.

Production: Leaves are often picked early in the season before spines develop. Leaves can be dried and stored.

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	84	3.6	109	46	14.4	0.3

Vegetables

Common name: Beetroot

Local:

Scientific name: *Beta vulgaris*

Plant family: CHENOPODIACEAE

Description: Beetroot is a dark green leafed plant up to 20 cm tall. It can be grown as an annual plant. Normally it gives a thickened root in the first year then flowers in the second year. The leaves vary in shape and colour. They can be oval with an irregular wavy edge. They can be dark green or reddish. It has a round or elongated fattened root. The root is red in colour. White varieties also occur. The flowers are small and green and have both sexes. They occur in flower arrangements with the end bud a flower bud. This forms a tall, branching, spike-like arrangement. Often two or more seeds are joined together in a "seedball".



Distribution: It is a temperate climate plant. It is mainly grown in the highlands from 1150-2600 m altitude in the tropics. Plants grow best at 18-22°C and are frost resistant. Temperatures below 10°C cause the plant to start its seeding phase. It is sensitive to acid soils but can grow in alkaline soils up to pH 10.

Use: The red roots are eaten after cooking. The root is also dried and powdered and the flour mixed with barley or wheat. They can be pickled or fermented as beetroot juice. They are often boiled, sliced and served with vinegar. The leaves are edible and can be cooked in soups and stews.

Cultivation: Plants are grown from seed. Normally the seeds are sown in the final site because transplanting is difficult. When the small clump of seeds or seed ball are planted more than one seedling will result. Plants get a soft heart due to boron deficiency. This is treated with borax.

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 (boiled)	82.7	189	1.8	4	5	0.4	0.4
root (raw)	87.1	118	1.3	4	6	0.8	0.4
leaf (boiled)	89	113	2.6	510	25	1.9	0.5
leaf (raw)	92	80	1.8	610	30	3.3	0.4

Vegetables

Common name: Turnip

Local:

Scientific name: *Brassica rapa*

Plant family: BRASSICACEAE

Description: A cabbage family herb. It is an erect annual plant. It has a round white fleshed taproot, which may be tinged purple. The leaves are divided and have hairs. Where the leaves join the root it is not raised into a "neck". There are Asian or more tropical varieties. These will produce seed in warmer places. The wild form is a thin plant with leaves that clasp the stem. The pods are 4-6.5 cm long and have seedless beaks 2-3.2 cm long.



Distribution It will grow in both the lowlands and highlands in the tropics but does best in the highlands between 1700-2600 m altitude. In Java it can be grown above 1000 m above sea level. It is frost resistant. A temperature of 9-16°C is best. Also short day length and cool weather are important. It grows in Nepal to 2500 m altitude. It suits hardiness zones 9-11.

Use: The swollen root is cooked and eaten. The leaves can be eaten. The seeds can be ground to a powder and used as a seasoning.

Cultivation: It is grown from imported seed. In the lowlands they are best grown in the shade. Plants are spaced 10-15cm apart. This can be achieved by thinning out plants.

Production: The roots are ready after 8-10 weeks. They need to be harvested when young to avoid becoming hard and 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
leaf	90	117	3	46	139	1.9	-
root (raw)	90	113	0.9	-	21	0.3	-

Image sourced from: https://upload.wikimedia.org/wikipedia/commons/thumb/d/d3/Turnip_2622027.jpg/800px-Turnip_2622027.jpg

Vegetables

Common name: Sweetfern

Local:

Scientific name: *Diplazium esculentum*

Plant family: ATHYRIACEAE

Description: A large fern with an upright stem. It forms tufts. It can be 1 m high and 1 m wide. It usually grows as a large clump. It spreads by underground runners. It has feather-like fronds that are 50-80 cm long and divided 2 or 3 times. The leaf stalks are black near the bottom. The secondary leaflets are pointed at the tip and about 8 cm long and 1 cm wide. The leaflets have teeth and are about 2-5 cm long.



Distribution: It grows in Asia and the Pacific including Solomon Islands. It grows in moist tropical places and mostly occurs in coastal areas. It is common in wet areas. It also occurs in Malaysia, Indonesia, Philippines and Fiji where it is used as food. It is widely distributed in the Philippines on areas of gravel and the banks of streams. It is frost sensitive. It is an important vegetable fern throughout Asia and the Pacific.

Use: The fronds are cooked and eaten as a vegetable. They are also used in stews.

Cultivation: Plants can be grown from spores. They need to be in a well-drained potting medium and kept in a high humidity environment. The spores need a temperature of 21°C to grow and should be sown as soon as ripe. Plants should be transplanted into a moist, well-drained soil with partial shade. Plants can also be grown by separating the underground runners.

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
frond	94	81	2.4	211	2.0	2.4	1.8

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	-

Vegetables

Common name: Garden cress

Local:

Scientific name: *Lepidium sativum*

Plant family: BRASSICACEAE

Description: A cabbage family herb. It is an annual plant about 60 cm high. It has narrowly lobed leaves. The leaves near the base have long stalks and the leaves higher on the plant do not have stalks. The flowers are small and white. The fruit is a pod. These are oval and deeply notched. The seed pods are reddish brown. The plant develops tuberous roots and grows for a second season. There are some named cultivated varieties.

Distribution: A temperate plant. In Nepal it grows between 200-3000 m altitude. In tropical Africa it grows between 750-2900 m and is best at cooler locations. It suits plant hardiness zones 4-10.

Use: The leaves are used in salads. They are cut when young. The tender leaves are cooked as a vegetable. They are used in curries. The fresh or dried seed pods can be used as a pungent seasoning. The seeds also yield an edible oil. The seeds can be sprouted and eaten.



Cultivation: Seeds are sown at regular intervals of about 2 weeks throughout the year. They need to be sown shallowly in a fine soil. Plants can start to be harvested in a few weeks.

Production: It is fast growing.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
leaf	87.2	150	4.2	58	59	2.9	0.2
leaf (boiled)	92.5	96	1.9	2310	23	0.8	0.2

Image accessed from: <https://i.pinimg.com/originals/5a/4e/3a/5a4e3a1ef0846df605fb7be2781d45bc.jpg>

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: Eggplant

Local:

Scientific name: *Solanum melongena*

Plant family: SOLANACEAE

Description: A perennial shrubby herb up to 1 m tall. It is often grown as an annual. It has a deep taproot and branched side roots. The stem is thick and covered with many woolly hairs. The plant has many branches. Often the plant is spiny. Leaves can be 20 cm long and wavy along the edge. Leaves are covered with hairs. Flowers are bluish red and 5 cm across. They are either solitary or in small groups opposite the leaves. They have 5 large woolly lobes which continue to surround the base of the fruit. Fruit are white, blue, green or purple. The fruit colour and shape vary. Sometimes the fruit is spiny. Often the fruit are 10-20 cm long and 5-8 cm wide. Numerous kidney shaped seeds are in the flesh of the berry. There are many cultivated varieties.



Distribution: A tropical plant. Plants grow from sea level up to 2200 m altitude in the tropics. It suits wet climates but does well in dry climates with irrigation. It needs a long warm growing period. A daily mean temperature of 20-30°C is most suitable. They are frost tender. They need a rich, friable, well tilled soil. In the sub-tropics they can be grown as a summer crop.

Use: Fruit are mostly fried then eaten. They can also be grilled, baked, stuffed and stewed. They are used in curries. The fruit are also dried and stored. The leaves, although edible, are hairy and not good flavor.

Cultivation: Plants are grown from seeds. Seeds germinate slowly. At the best temperature, they germinate in 8-12 days. Seed are sown in nursery beds. Seedlings can be transplanted when about 8 cm tall or 4-6 weeks old. Plants need to be about 60-100 cm apart. Because some cross pollination can occur, seed crops need to have varieties planted 400 m apart.

Production: Fruit are ready for harvest after 3 months. They continue to yield for 3-4 months.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
fruit	91.8	117	0.8	6	1.3	0.4	0.2
fruit (fresh)	93.4	62	0.7	50	5	0.4	0.3
leaf	86.4	198	4.6	280	-	3.4	0.6

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: Safflower

Local:

Scientific name: *Carthamus tinctorius*

Plant family: ASTERACEAE

Description: An erect, annual herb that grows to 60-150 cm tall. It has many branches. It has spines but the numbers vary. The stems are white, stiff and round with fine grooves along their length. The types with more spiny leaves are better for oil production. The leaves are arranged in spirals around the stem. They do not have leaf stalks. The leaves are dark green and glossy. They are 10-15 cm long and 2-4 cm wide. The flower head is made up of many small flowers that are 13 mm long and like tubes. They are yellow to orange in colour. The fruit is 4 angled and has a hard hull and a single white or grey seed. The seed is oblong.



Distribution: It grows in both tropical and temperate zones. It does better in drier regions. It cannot tolerate waterlogging. It does not suit the low, wet tropics. It needs a good dry season for drying. It is resistant to drought. It can stand some wind and salinity. High temperatures can result in poor seed set. It does best where temperatures are 17-20°C on average. At the equator it can grow at 1600-2000 m altitude but most commonly in other regions it grows below 900 m altitude. A soil pH of 5-8 is suitable. It can grow in arid places.

Use: The young shoots and leaves are eaten cooked or raw. They can be seasoned with soy sauce. The seeds are hulled and roasted. They are eaten as snacks. They are also used in chutneys. The seed oil is used in cooking and as a salad oil. This can be done by boiling the seeds and floating off the oil. The dried, edible petals are used to colour foods. They can give red or yellow dyes. The slightly bitter petals can be cooked with rice.

Cultivation: Plants are grown from seed. A fine seed bed is required and seed are broadcast or drilled. It is best sown about 2-3 cm deep. Seeds germinate in 4-7 days and a soil temperature of 15°C is best. Plants should be topped as soon as the first buds appear to increase the number of flower heads. A spacing of 15-30 cm between plants is suitable. Wider spacing gives more heads per plant and closer spacing gives higher yields per area. A seeding rate of 20-30 kg per hectare is required. Crops respond to fertiliser if there is sufficient moisture. In very dry weather, harvesting in the moist morning or evening avoids seed shattering. Plants are uprooted and heaped for a few days before threshing.

Production: Plants take 120 days to maturity. Seeds are ripe about 35-40 days after maximum flowering. Plants are harvested when leaves turn brown.

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	5.6	2163	16.2	5	0	4.9	5.5

Image accessed from: http://1.bp.blogspot.com/-Vyvwpg5La4c/U-gCRoPVHal/AAAAAAAAWPg/54ALJ6_Xuk/s1600/13+Carthamus+tinctorius+1.jpg

Nuts, seeds, herbs and other foods

Common name: Bird lime tree

Local:

Scientific name: *Cordia dichotoma*

Plant family: BORAGINACEAE

Description: A medium sized tree that loses its leaves at some times of the year. They usually grow 5-15 m tall but can grow up to 27 m tall and 50 cm across in the trunk. The tree has spreading branches. The bark is 2 cm thick and grey. It is deeply cracked. The leaves are alternate, smooth and pointed at both ends. They have 2-3, easy to see, hairy veins on the underside. The leaves are 5-8 cm long and 2-4 cm wide. The leaf stalk is 3-4 cm long. The flowers are white or yellow, and borne in flower clusters at the ends of branches. The flower clusters are 1-5 cm across, while individual flowers are 2 mm across. The flowers are orange, and funnel shaped at the base. Male and both sex flowers occur on separate trees. The fruit are yellowish white or pink, and soft but with a hard stone. They are 2 cm across and contain a sticky juice. The fruit is sweet and edible.



Distribution: It is a tropical plant. It grows near rainforests and near the coast. It suits humid locations. It can tolerate wind and salt spray. It is very sensitive to frost. It requires a well drained soil, in a sunny position. They are common and widely distributed in secondary forest and open places at low altitudes in the Philippines. In Nepal it grows between 300-1400 m elevation. It grows in all warmer parts of the Indian subcontinent. It can grow in arid places.

Use: The pulpy portion of the ripe fruit is eaten raw or stewed. Immature fruit is pickled or eaten in curries. The seeds are also claimed to be edible, but it is uncertain if treatment is needed before eating. Oil is extracted from the seeds and used in cooking. The young leaves and shoots are cooked as a vegetable. The flowers are also eaten.

Cultivation: Plants are grown from seed. The seed should be sown fresh. It can also be grown from semi-ripe cuttings.

Production: Plants are fairly slow growing. In Nagaland, fruit are available June to August.

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	-	-	-	-	-	23.9	3.9

Image sourced from: <https://efloraofindia.com/wp-content/uploads/2020/10/Picture3-4.jpg>

Nuts, seeds, herbs and other foods

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

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: Linseed

Local:

Scientific name: *Linum usitatissimum*

Plant family: LINACEAE

Description: An annual herb with a single stem 70-100 cm tall. It branches only in the upper part when flowering. Varieties for flax are single stemmed while varieties for linseed seed are more branched. The leaves are small and hairless. The flowers are blue or white. The petals are 13-18 mm long. The capsule is 6-9 mm wide. It contains 10 seeds. These are flat and oblong.



Distribution: It needs a temperate climate. It can grow in moderately fertile soils. Plants have some drought and frost resistance. It has been grown in mountains in Java. In Argentina it grows from sea level to 1000 m above sea level.

Use: The seeds are crushed to make linseed oil. This has occasionally been used as a cooking oil. The oil is high in Omega-3. Flax seed has also been used to make tea. Roasted seeds are used as a coffee substitute. The seeds are also used in bread and cereals and can be sprouted. They can be used as an egg substitute in muffins, cakes and scones. The leaves are also eaten as a vegetable with sour cream and lemon. **Caution:** Some varieties contain high levels of poisonous alkaloids.

Cultivation: Plants are grown from seed and are generally self pollinated. It can be grown mixed with sesamum or chickpea.

Production: Plants take 24-27 weeks to mature.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed	8.8	2059	19.5	0	1.3	6.2	4.2

Image sourced from: https://live.staticflickr.com/3154/2592675853_953c2e03aa_b.jpg

Nuts, seeds, herbs and other foods

Common name: Sesame

Local:

Scientific name: *Sesamum indicum*

Plant family: PEDALIACEAE

Description: A small, erect annual plant. It is very branched and grows 1-2 m tall. The stem is stout, 4 sided and furrowed along its length. It is densely covered with fine, downy, glandular hairs that vary in shape. The lower leaves have long stalks and are spear shaped, often with lobes or a toothed edge. The leaf stalks are 3-11 cm long. The leaf blade is 4-20 cm long by 2-10 cm wide. Upper leaves are narrow and oblong. They are 0.5-2.5 cm wide. The flowers occur in the axils of upper leaves, either on their own, or



in groups of 2 or 3. They can be white, pink, purplish and with yellow spots and stripes. The fruit can be smooth or rough and there are 2 chambers in the capsule. The fruit are brown or purple. They are oblong and deeply grooved. The seeds are small and oval. They are 3 mm by 1.5 mm and vary in colour from white, yellow, grey, red, brown or black. The fully ripe pods burst open.

Distribution: A tropical plant that suits the hot, dry, semi-arid tropics and sub-tropics. It can tolerate short periods of drought once established. It needs a temperature of 20-24°C in early growth, then 27°C for ripening. It grows from sea level to about 1200 m in areas with an annual rainfall of 400-1000 mm. Soils need to be well drained. It is very intolerant of water-logging. It cannot stand high humidity and needs frost free conditions. It needs a dry period for seed drying. It does not like acid soils. It grows in open sunny places. It can grow in arid places.

Use: The seeds are eaten. They are used in soups or fried or boiled. They are used in tahini and hummus. Seeds are eaten in the form of sweetmeats. Roasted seeds are used in pickles. They are also put on bread. Oil from the seeds is used in cooking and on salads. The refuse from the seed after the oil has been extracted is boiled in water and made into soup.

Cultivation: Plants are grown from seed. Seed will not germinate below 21°C. Seeds are broadcast on well prepared land and then harrowed in using a light harrow, or sown 2-15 cm apart in rows 20-45 cm apart. Plants can be thinned or weeded during early growth to produce a better crop. Seeding rates of 9-11 kg/ha are used. Some varieties shatter easily.

Production: Yields of 340-500 kg/ha are average. Plants reach maturity in 80-180 days. Crops are harvested as the leaves begin to drop. Plants are cut and stoked or dried in racks. The hull is removed by soaking in water overnight, then partly dried and rubbed against a rough surface.

Food Value: Per 100 g edible portion

Edible part	Moisture %	Energy kJ	Protein g	proVit A µg	proVit C mg	Iron mg	Zinc mg
seed (dry)	4.7	2397	17.7	1	-	14.6	7.8
leaf (raw)	85.5	188	3.4	-	-	-	-
oil	0.1	3683	0.2	-	-	-	-

Nuts, seeds, herbs and other foods

Common name: Coastal almond

Local:

Scientific name: *Terminalia catappa*

Plant family: COMBRETACEAE

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



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

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

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

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

Food Value: Per 100 g edible portion

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

Nutritional values of food plants by plant Family

Plant Family	Scientific name	Common name	Edible part	Moisture %	Energy kj	Protein g	Vit A µg	Vit C mg	Iron mg	Zinc mg	Page
AMARANTHACEAE	<i>Amaranthus blitum</i>	Wild amaranth	leaf	-	-	3.9	92	-	8.3	-	28
AMARANTHACEAE	<i>Amaranthus tricolor</i>	Red amaranth	leaf	91.7	96	2.5	292	43.3	2.3	0.9	29
AMARANTHACEAE	<i>Amaranthus spinosus</i>	Prickly amaranth	leaf	91.7	84	3.6	109	46	14.4	0.3	46
ANACARDIACEAE	<i>Mangifera indica</i>	Mango	fruit	83.0	253	0.5	180	30	0.5	0.04	40
ANACARDIACEAE	<i>Anacardium occidentale</i>	Cashew	fruit	84.7	213	0.8	0.12	265	1.0	0.2	55
ASTERACEAE	<i>Carthamus tinctorius</i>	Safflower	seed	5.6	2163	16.2	5	0	4.9	5.5	56
ASTERACEAE	<i>Helianthus annuus</i>	Sunflower	seed	5.4	2385	22.8	5	1.4	6.8	5.1	59
ATHYRIACEAE	<i>Diplazium esculentum</i>	Sweetfern	frond	94	81	2.4	211	2.0	2.4	1.8	49
BASELLACEAE	<i>Basella alba</i>	Indian spinach	leaf	85.0	202	5.0	56	100	4.0	-	30
BORAGINACEAE	<i>Cordia dichotoma</i>	Bird lime tree	fruit	-	-	-	-	-	23.9	3.9	57
BRASSICACEAE	<i>Brassica rapa</i>	Turnip	leaf	90	117	3	46	139	1.9	-	48
BRASSICACEAE	<i>Lepidium sativum</i>	Garden cress	leaf (boiled)	92.5	96	1.9	2310	23	0.8	0.2	51
CHENOPODIACEAE	<i>Beta vulgaris</i>	Beetroot	leaf (raw)	92	80	1.8	610	30	3.3	0.4	47
COMBRETACEAE	<i>Terminalia catappa</i>	Coastal almond	nut (dry)	4.2	2987	20.0	-	2	6.3	8.8	62
CONVOLVULACEAE	<i>Ipomoea batatas</i>	Sweet potato	tuber (baked)	72.9	431	1.7	2182	24.6	0.5	0.3	17
CONVOLVULACEAE	<i>Ipomoea aquatica</i>	Kangkong	leaf	90.3	126	3.9	40	60	4.5	-	33
CUCURBITACEAE	<i>Coccinia grandis</i>	Ivy gourd	leaf	90.6	117	4.1	36	-	4.6	-	31
CUCURBITACEAE	<i>Luffa acutangula</i>	Angled loofah	leaf	89.0	-	5.1	-	98	11.5	-	34
CUCURBITACEAE	<i>Luffa cylindrica</i>	Smooth loofah	leaf	90	113	5.1	-	95	11.5	-	35
CUCURBITACEAE	<i>Momordica charantia</i>	Bitter cucumber	pod (raw)	94.0	71	1.0	380	84	0.4	0.8	52
CUCURBITACEAE	<i>Cucurbita maxima</i>	Pumpkin	seed (dry)	6.9	2264	24.5	38	1.9	14.9	7.5	58
DIOSCOREACEAE	<i>Dioscorea oppositifolia</i>	Cinnamon yam	tuber	81.9	1711	13.8	-	-	39.1	1.4	16
FABACEAE	<i>Arachis hypogaea</i>	Peanut	seed (dry)	4.5	2364	24.3	0	-	2.0	3.0	20
FABACEAE	<i>Cajanus cajan</i>	Pigeon pea	seed	10.0	1449	19.5	55	-	15.0	-	21
FABACEAE	<i>Cicer arietinum</i>	Chick pea	seed (raw)	9.9	1362	20.2	190	3	6.4	-	22
FABACEAE	<i>Glycine max</i>	Soybean	seed	9.0	1701	33.7	55	-	6.1	-	23
FABACEAE	<i>Lablab purpureus</i>	Lablab bean	seed (dry)	10.0	1428	22.8	-	-	9.0	-	24
FABACEAE	<i>Psophocarpus tetragonolobus</i>	Winged bean	seed	8.5	1764	41.9	-	-	15.0	4.5	25
FABACEAE	<i>Vicia faba</i>	Broad bean	seed (dry)	10.0	1448	26.2	130	16	6.7	-	26
FABACEAE	<i>Vigna radiata</i>	Mung bean	seed	11.0	1432	22.9	55	4	7.1	-	27
LINACEAE	<i>Linum usitatissimum</i>	Linseed	seed	8.8	2059	19.5	0	1.3	6.2	4.2	60
MALPIGHIACEAE	<i>Malpighia glabra</i>	Barbados cherry	fruit	83.2	163	1.8	800	2100	0.8	-	39

Plant Family	Scientific name	Common name	Edible part	Moisture %	Energy kJ	Protein g	Vit A µg	Vit C mg	Iron mg	Zinc mg	Page
MALVACEAE	<i>Hibiscus rosa-sinensis</i>	Hibiscus	leaf (dry)	6.4	1339	25.9	-	-	19.6	8.9	32
MALVACEAE	<i>Hibiscus cannabinus</i>	Vegetable kenaf	leaf	79.0	280	5.5	34	-	12.1	-	50
MORACEAE	<i>Ficus carica</i>	Fig	fruit (green raw)	84.6	174	1.3	500	2	0.4	0.3	38
MYRTACEAE	<i>Psidium guajava</i>	Guava	fruit	77.1	238	1.1	60	184	1.4	0.2	44
PEDALIACEAE	<i>Sesamum indicum</i>	Sesame	seed (dry)	4.7	2397	17.7	1	-	14.6	7.8	61
PHYLLANTHACEAE	<i>Baccaurea ramiflora</i>	Burmese grape	fruit	84.7	218.6	9.3	-	1.6	-	-	37
PHYLLANTHACEAE	<i>Phyllanthus emblica</i>	Emblic	fruit	78.4	281	0.6	-	316	0.9	0.5	42
POACEAE	<i>Zea mays</i>	Maize	seed (mature)	10.4	1528	10.0	100	4	4.9	2.2	11
POACEAE	<i>Eleusine coracana</i>	Finger millet	seed	11.7	1594	6.2	-	-	5.3	-	12
POACEAE	<i>Pennisetum glaucum</i>	Bullrush millet	seed	11.6	1442	10.5	-	-	6.5	1.7	13
POACEAE	<i>Setaria italica</i>	Foxtail millet	seed	13.5	1425	9.5	-	-	5.5	3.5	14
POACEAE	<i>Dactyloctenium aegyptium</i>	Comb fringe grass	seed	7.5	1234	9.8	-	-	6.9	4.7	15
POACEAE	<i>Sorghum bicolor</i>	Sorghum	seed	-	1459	11.1	-	-	-	-	19
RUTACEAE	<i>Aegle marmelos</i>	Bael fruit	fruit	58	577	2.3	0.13	219	0.55	-	36
SAPOTACEAE	<i>Pouteria campechiana</i>	Egg fruit tree	fruit	60.6	580	1.7	320	58	0.92	-	45
SOLANACEAE	<i>Physalis peruviana</i>	Cape gooseberry	fruit (mature)	84.2	201	2.0	360	30	1.5	-	43
SOLANACEAE	<i>Solanum melongena</i>	Eggplant	fruit (fresh)	93.4	62	0.7	50	5	0.4	0.3	54



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