



***Moringa Oleifera*: A Brief Overview**

Village Volunteers

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History of the Moringa Tree:

Moringa is known in 82 countries by 210 different names. It's well known by the name of "**the Miracle Tree**". Moringa has been used by various societies such as Roman, Greek, Egyptian, and Indian, etc. for thousands of years.

Moringa is a native plant of Western Himalayas and India. The plant is also found in different regions and 14 varieties. For instance, the plant that grows in Mali is the *Moringa Oleifera* and is also known as the Ben-oil tree, Cabbage tree, Horseradish tree, Drumstick tree, Mother's Best Friend and Miracle tree.

Ancient Egyptians treasured Moringa oil as protection for their skin from the ravages of desert weather. Later, the Greeks found many healthful uses for Moringa and introduced it to the Romans. Over the centuries, the Moringa plant has been carried to all the tropical parts of the world, where it readily takes root. It is commonly used for food, for medicinal purposes, as a wind-break in fields, and many other purposes. The Moringa plant spread eastward from India to the lower parts of China, Southeast Asia and the Philippines. From India it also spread westward to Egypt, the Horn of Africa, around the Mediterranean, and finally to the West Indies in America. On the island of Jamaica in 1817, a petition concerning Moringa oil was presented to the Jamaican House of Assembly. It described the oil as being useful for salads and culinary purposes, and being equal to the best Florence oil as an illuminator--giving clear light without smoke. The leaves and pods were likewise used in local recipes. In America, Moringa can be found in markets which cater to immigrants from India, Sri Lanka, China and the Philippines. Usually this is in the form of frozen or canned foodstuffs.

The genus *Moringa* is indigenous to several countries. These countries include Madagascar, Namibia, SW Angola, Kenya, Ethiopia, Red Sea, Horn of Africa, India, Pakistan, Bangladesh and Afghanistan in the northwestern region of the Himalayans (Fahey, 2005).

List of Countries and indigenous species:

Kenya: *M. arborea*, *M. borziana*, *M. longituba*, *M. rivae*, *M. stenopetala*

Somalia: *M. borziana*, *M. longituba*, *M. pygmaea*.

Ethiopia: *M. longituba*, *M. rivae*, *M. ruspoliana*, *M. stenopetala*.

Madagascar: *drouhardii*, *M. hildebrandtii*.

Namibia: *M. ovalifolia*.

Angola: *M. ovalifolia*.

India: *M. concanensis*, *M. oleifera*.

Red sea and Horn of Africa: *M. peregrina*.

Moringa typically grows in semi-dry, desert or tropical soil which is why it grows well in many countries that normally have dry soils. There are about thirteen different known species of *Moringa*, of which *Moringa oleifera* is the most studied and used. *M. oleifera* are native only to

India and they are now widely distributed to many other tropical parts of the world such as Egypt, The Philippines, Kenya, Ghana, Sierra Leone, Uganda, Haiti, Nicaragua, Ethiopia and many other countries with the type of soil in which *Moringa* thrives. *Moringa* can grow with very little moisture because its roots can store moisture for prolonged periods of time.

Conservation and Ecological Aspects of *Moringa Oleifera*:

Although *Moringa oleifera* holds much promise in helping to alleviate hunger and malnutrition around the world, most of the thirteen species of *Moringa* are under threat in the northwestern part of the Red Sea due to severe drought and over exploitation of its roots (Stephenson KK, et al). Researchers and conservationists are working towards preventing the genus of *Moringa* from extinction especially since it contains so many needed nutrients. Since researchers have been focused on the nutritive values of *M. oleifera*, there is very little documentation or research done on the impact of introducing *Moringa oleifera* in a non-native land. *Moringa oleifera* is spread by its seed but since its seeds are in a shell it is well contained and can generally be spread by humans. *M. oleifera* modified root system enables it to thrive in semi- dry conditions. Since *M. oleifera* is drought resistant it may not be affected by global warming but on the other hand, no research was observed that indicated whether this tree will be affected by oversaturation or cold weather.

There is little research assessing competition between *M. oleifera* and other local species; therefore, it is always great practice to consider its potential effects on native plants before proceeding to plant it. Choosing an area to plant and grow *Moringa oleifera* that will allow the plant to grow without possibly interfering with the growth of native plants might be a successful approach when planting *Moringa oleifera* in its non-native environment. Since most plants tend to have other organisms that depend on the plants for nourishment, it's possible that *Moringa oleifera* contains other organisms on it that may become pests in a non native land. Therefore, it is necessary to consider pests that may unintentionally be passed on to another country and damage local crops and soils simply because of the introduction of non native *Moringa oleifera* species. Also, *Moringa oleifera* has been known to have nitrogen fixing capabilities which can be good if nitrogen fixing is done in moderation. On the other hand, if nitrogen fixing is done in excess, soils can be depleted and native crops and plants will not survive.

Based on the information collected during this research, *Moringa oleifera* shows great potential in helping with hunger and malnutrition around the world.

Growing Conditions:

Moringa trees grow best in 25 to 35 degrees Celsius, but can withstand temperatures up to 48 degrees. It can grow in altitudes up to 1200 meters and tolerates a pH range of 5.0-9.0, meaning it can grow in acidic and basic soil. Only 250 to 3000 mm of annual rainfall are required. It can be grown even in dry clay, although well-drained sandy loam is best. It can be grown in mud, but can't tolerate prolonged flooding or poor drainage. It can be grown from seeds, or cuttings. Leaves can be harvested within a year of planting and flowers and pods can be harvested after two years. Within three years, one tree will produce 300-400 pods while a mature tree can yield up to 1000. It grows up to 12 meters in height. More information on how to grow and harvest *Moringa* is available in the resources section of this document.

The Parts of the Tree:

Pods: The vegetable pods grown on the tree are the most valuable part of the tree. They can be eaten raw or cooked or roasted like nuts. They are a good source of calcium and phosphorus.

Flowers: The cooked flowers are edible as well, alone or mixed with other foods or fried in batter. They are a good source of nectar for honey-producing bees. Boiling them in water makes tea.

Leaves: Moringa leaves are extremely healthy because they contain all nine essential amino acids when usually only animal products contain all these essential nutrients. The leaves contain significant amounts of beta-carotene, Vitamin C, protein, iron, and potassium. The leaves can be prepared in a variety of ways: they may be cooked, eaten fresh, or dried and powdered for soups and sauces. The anti-bacterial and anti-inflammatory properties of the leaves are useful when applied to wounds or insect bites. Putting Moringa leaves into the soil can prevent “damping off disease” (*Pythiumdebarianum*) in seedlings. Crushed leaves are used to clean cooking utensils and even walls.

Seeds: The seeds yield edible oil that is clear and odorless. It burns without smoke and will not turn rancid. The seeds are 35% oil and the remaining seed cake can be used as fertilizer or to purify water.

Roots: The roots are sometimes consumed shredded as a condiment, but they contain an alkaloid called spirochin that is a potentially fatal nerve-paralyzing agent so the roots should not be eaten.

Wood: The wood is useful for burning but it is light and not suitable for building. The fibrous bark can be pounded to make material for rope or mats. The wood also produces a blue dye.

How to get Moringa Seeds:

For optimum resilience to local conditions, it is best to obtain Moringa seeds as close as possible to where they will be grown. If there are already local Moringa trees, look for dry, brown pods and collect seeds before the pods split and fall to the ground. Keep in mind that Moringa can also be grown from cuttings.

How to use the Morigina Tree:

All of the parts of the tree can be used in a variety of ways. Moringa is full of nutrients and vitamins and is good in your food as well as in the food of your animals. Moringa helps to clean dirty water and is a useful source of medicines.

Human food:

All Moringa food products have a very high nutritional value. You can eat the leaves, especially young shoots, young pods, flowers, roots, and in some species even the bark. Leaves are low in fats and carbohydrates and rich in minerals, iron and vitamin B.

Fresh leaves:

Moringa leaves get tougher as they get older so it is best to pick the growing tips and young leaves. The leaves can be used in the same way as spinach. An easy way of cooking them is to steam 2 cups of freshly picked leaves for a few minutes in one cup of water, seasoned with an onion, butter and salt or other seasonings according to taste.

Dried leaves:

Dried leaves are also useful. A powder can be made out of dried leaves by crushing or pounding them. You can sift the powder to remove leaf stems. This powder can then be added to sauces at the same time as other condiments or vegetables are added.

Flowers:

The flowers can be cooked and mixed with other foods or fried in batter. They can also be placed in hot water for five minutes to make a kind of tea. They are also a good source of nectar for honey producing bees.

Pods:

The pods can be eaten from when they first appear to when they become too woody to snap easily (up to 30cm long). They are cooked like other green beans and have a similar flavor to asparagus. Beware as some bitter varieties are poisonous if too many are eaten. Even the pods that have become too woody can be boiled until they are tender. They are opened and the white flesh is scraped out and returned to the boiling water. This can be used in soups and stews.

Gum:

The gum that is found in the bark can be used to season food.

Other Uses of the Moringa Tree:

Fertilizer:

The seed cake, which is produced by pressing the seeds to extract oil, cannot be eaten as it contains harmful substances. However, it contains high levels of protein and makes a good fertilizer for use in agriculture.

Live Fencing:

Planted as a living fence, Moringa provides wind protection and shade. It grows very quickly and if cuttings are planted close together they will form a fence that livestock cannot get through in just 3 months.

Alley cropping:

Moringa has a large tap root and few lateral roots so it will not compete for nutrients with the crops. It will also add to the nutrients available as it produces many protein rich leaves. They grow very quickly but do not provide too much shade due to the structure of their leaves. They are also very good at reclaiming marginal land.

Natural pesticide:

By digging Moringa leaves into the soil before planting, damping off disease (*Pythium debaryanum*) can be prevented among seedlings.

Cleaning agent: Crushed leaves are used to clean cooking utensils or even walls.

Fuel wood:

The wood is light and is a good fuel for cooking. However, it is not suitable for building. The bark can be beaten into a fiber that can be used to make rope or mats and the wood produces a blue dye. Chippings of wood can be used to make a good quality paper. The tree also produces viscose resin that is used in the textile industry.

Honey Clarifier:

Clarified seeds can be used to clarify honey without boiling. Seed powder can also be used to clarify sugar cane juice.

Honey Producer:

Flowers are good source of nectar for honey producing bees.

Oil:

The seeds of the Moringa tree are 28% oil by weight. This oil is slightly sweet, turns rancid slowly and is used for cooking, making soap, as a lubricant for machinery and extraction of essential oils in perfume. It is slightly yellow and odorless.

Pulp:

The soft, spongy wood produces a wood pulp for making newsprint and writing paper.

Tanning Leather:

The bark and gum can be used in tanning hides.

Biogas:

Moringa leaves provide an excellent material for production of biogas