



## ***Moringa oleifera*: The Future of Health**

Village Volunteers

Juliana Silver



### **Natural History**

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*.

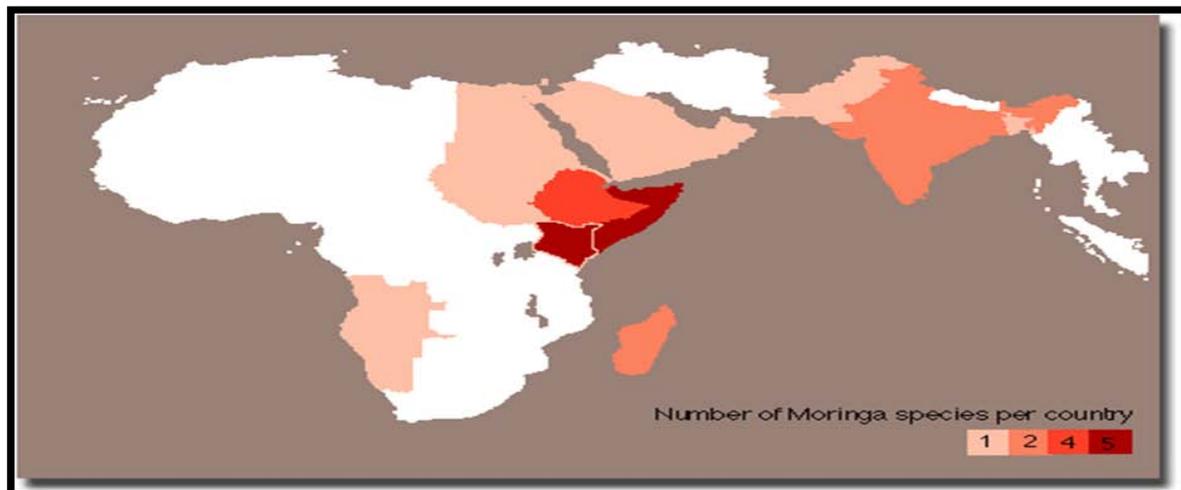
Angola: *M. ovalifolia*.

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

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

Map showing *Moringa* species per country

Image source: <http://www.mobot.org/gradstudents/olson/moringahome.html>



*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.

### **Nutritional Values of Moringa**

*Moringa* tree contains many nutrients such as essential vitamins, essential minerals, amino acids, beta-carotene, anti-oxidants, anti-inflammatory nutrients, phytochemicals and it also contains both omega-3 and omega-6 fatty acids (Kasolo NJ et al).

The leaves are highly nutritious, being a significant source of beta-carotene, Vitamin C, protein, iron, and potassium. The leaves are cooked and used like spinach. In addition to being used fresh as a substitute for greens, its leaves are commonly dried and crushed into a powder, and used in soups and sauces. The tree is a good source for calcium and phosphorus.

*Moringa* leaves and pods are helpful in increasing breast milk in the breastfeeding months. One tablespoon of leaf powder can provide 14% of the protein, 40% of the calcium, 23% of the iron and most of the vitamin A needs of a child aged one to three. Six tablespoons of leaf powder will provide nearly all of the woman's daily iron and calcium needs during pregnancy and breastfeeding. The moringa seeds yield 38–40% edible oil. The refined oil is clear, odorless, and resists rancidity at least as well as any other botanical oil. The seed cake remaining after oil extraction may be used as a fertilizer or as a flocculent that forms the particles into a solid to purify water. The bark, sap, roots, leaves, seeds, oil, and flowers are used in traditional medicine in several countries. The sap is used for a blue dye.

The nutrients are very important for health and vitality. Because *M. oleifera* contains so many essential nutrients, virtually all the different parts of the tree are being used by locals in different countries for a variety of nutritional, medicinal, and purification purposes. It is advisable not to consume the root since researchers have determined that the root is toxic and contains chemicals that can paralyze nerves.

*M. oleifera* is sometimes referred to as the "Tree of Life" because of its potential to help with malnutrition around the world. This species is also recognized by other names in different cultures. Here are some examples of names that *M. oleifera* is known as in different countries: Zingeridende (Ghana), Odudu oyibo (Nigeria), Moltong (Indonesia) Drumstick tree (U.K.), Sajna (India), Malunggay (Philippines), Mlonge, Mkimbo, (Kenya), and Nebeday (Senegal). It is also identified as horseradish, drumstick, or ben oil tree (Stephenson KK et. Al).

### **Information specific to malnutrition**

*Moringa* trees have been used to combat malnutrition, especially among infants and nursing mothers. Three non-governmental organizations in particular have advocated *Moringa* as "natural nutrition for the tropics." Leaves can be eaten fresh, cooked, or stored as dried powder for many months without refrigeration, and reportedly without loss of nutritional value. *Moringa* is especially promising as a food source in the tropics because the tree is in full leaf at the end of the dry season when other foods are typically scarce.

A large number of reports on the nutritional qualities of Moringa now exist in both the scientific and the popular literature. It is commonly said that Moringa leaves contain more Vitamin A than carrots, more calcium than milk, more iron than spinach, more Vitamin C than oranges, and more potassium than bananas,” and that the protein quality of Moringa leaves rivals that of milk and eggs. The oral histories recorded by Lowell Fuglie in Senegal and throughout West Africa report countless instances of lifesaving nutritional rescue that are attributed to Moringa. In fact, the nutritional properties of Moringa are now so well-known that there seems to be little doubt of the substantial health benefit to be realized by consumption of Moringa leaf powder in situations where starvation is imminent. Nonetheless, the outcomes of well-controlled and well-documented clinical studies would still be clearly of great value.

### **Medicinal use of Moringa**

In a research done by Kasolo JN et al, *M. oleifera* was found to contain Phytochemicals which are non-nutritive chemicals that plants produce as a self defense mechanism. Phytochemicals present in *M oleifera* include catechol tannins, Gallic tannins, steroids, triterpenoids, flavonoids, saponins, anthraquinones, alkaloids and reducing sugars (Kasolo JN et al). These phytochemicals have been researched and are known to have medicinal values for humans such as detoxification and purification of water, antibiotics, skin treatment, anti-inflammatory, ulcers, blood pressure, diabetes, anemia and many other uses. The presence of this chemical indicates the possible healing properties of this species leaves and other parts of its tree. Locals in countries where *M. oleifera* grows know and understand the healing abilities of this plant (Kasolo JN et al). Here are some examples of local uses of *Moringa*:

### **Some local uses of Moringa**

- The juice from the leaf is mixed with honey followed by a drink of coconut milk 2 to 3 times a day to help cure diarrhea, dysentery and colitis in India and Senegal.
- Leaves are applied to sores and skin infection and they are also prescribed to cure anemia in Senegal.
- Leaves are also used for skin treatments to cure cuts, scrapes, sores, rashes and signs of aging.
- It is used to help with anxiety and sleeplessness.
- In India and Senegal the gum of Moringa is used to treat fevers, dysentery and asthma.
- The gum is used for dental decay in India.
- In Aruba, the paste of crush seeds is used to cure warts.
- Powdered Moringa oleifera leaves are sprinkled on children's food in Senegal to help combat malnutrition.

## How to plant *Moringa*

*Moringa* can be planted by using the stem or by planting the seeds.

### Image of *Moringa* garden



Image by Gorav Seth, flicker photo:

### How to plant *Moringa* from the stem

The stem cut from branches of *Moringa* after each season can be used to plant new trees.

- Make a cutting at least 1" (2.5cm) in diameter and at least six feet (1.8m) long.
- Dig a hole 3 ft. (1m) x 3 ft. (1m) and 3 ft. (1m) deep.
- Place cutting in this hole and fill with a mixture of soil, sand and composted manure if desired. Pack firmly around base of the cutting. Form a slight dome or cone shape, sloping down away from the cutting. It is desirable that water not touch the stem of the new tree.
- Water generously, but do not drown the cutting in water.

*Moringa oleifera* can also be planted directly in the ground instead of transplanting it. Its seeds can be planted as soon as they are mature- the seeds are mature when they are completely dry. This process of planting *M. oleifera* seeds directly in its permanent location is preferred since its stems are very fragile and can be easily destroyed in the process of transplanting them.

### **Steps in Planting Moringa from seeds:**

1. Choose an area with plenty of sun light and appropriate soil that does not accumulate water.
2. Dig holes 1 ft (30 cm) square and 1 ft deep. Back-fill the holes with loose soil. Moringa can grow in poor soils but compost or manure can be added to the soil by choice.
3. Plant 3 to 5 seeds in each hole, 2 in. (5 cm) apart. Plant the seeds no deeper than three times the width of the seed (approximately ½ in. or 1.5 cm).
4. Keep the soil moist enough so that the top soil will not dry and choke the emerging plant. At the same time do not over saturate the soil to prevent the seeds from getting spoiled.
5. When the plants are four to six inches tall, keep the healthiest sapling in the ground and remove the rest. Termites and nematodes can kill a young sapling. Take measures to protect saplings from these two dangers.

### **Why use Moringa leaf powder**

Moringa leaf powder has a high nutritional value, and is easy to make, easy to store and easy to use. It can be used as a beverage additive and for sprinkling on food. It can also be used for making tea.

### **How to make *M. oleifera* leaf powder**

- Harvest some leaves from the Moringa tree
- Allow the leaves to air dry (when drying, do not place leaves in direct sunlight so that the vitamins on the leaves does not get depleted)
- After the leaves have dried, rub the leaves over a container until the leaves particles are very small.

Studies have shown that *M. oleifera* can be used as an absorbent to remove Pb(II), Co(II), Cu(II), Cd(II) and Ag(I) from water. Using *M. oleifera* to purify water cost less and it is highly efficient (Sharma P, et al).



## How to make Moringa seed powder and how to purify water with Moringa



- Obtain *Moringa oleifera* seed (mature dry seeds), peel them and grind the inner seeds into a powder.
- Pour the powder into the water you want to be purified.
- Stir the water, then allow the water to rest for a few minutes
- Chemicals and dirt will rest at the bottom of the container (in a semi-solid form)
- Use the water from the top of the container
- Use 30 to 300 milligrams of Moringa powder for every one liter of water to be purified.

Image by Forest & Kim Starr Creative Commons

## Photo comparing purification effects of Moringa



Image source:

<http://www.goodwaterfund.org/resources/MoringaTreatedWater1.jpg>

## How to make tea from the *M. oleifera* flower

- Boil some water, then drop a few clusters of flowers in to the boiled water
- Allow this mixture to steep for about 5 minutes
- Add honey or sugar to taste.

### Photo of *M. oleifera* flower



Image by jemasmth flicker photos

### Cooking Recipes with *M. oleifera*

This recipe was obtained from [Moringa Nature's Medicine Cabinet](#)

#### **Basic *Moringa* leaf sauce**

2 cup fresh *Moringa oleifera* leaves

1 cup water

Chopped onions

Salt and Butter

Wash the leaves and steam them for a few minutes in water. Add chopped onions, salt, butter and any other season according to tastes.

The following recipes and more can be found at  
<http://www.miracletrees.org/moringarecipes.html>

#### **SAUTED PIGEON PEA OR CONGO PEA, PAPAYA, MORINGA AND WINGED BEAN WITH LIVER**

Ingredients:

1-1/4 c. pigeon or Congo peas 1/2 c. liver

3 quarts water 3 T. salt

3/4 c. cooking oil 2 c. water

4 segments garlic 1-3/4 c. winged bean

1-1/4 c. tomatoes 2 c. *Moringa* leaves

Preparation: Boil peas until cooked. Set aside. Sauté garlic, onion and tomatoes.

Add liver. Cover and cook

until liver is tender. Season. Add water. Add

winged bean and papaya. Cover and cook

10 minutes. Add

cooked peas and *moringa* leaves. Serve

hot.

#### **CORN WITH MORINGA LEAVES**

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Ingredients:

2 c. grated young corn 1 small sponge  
gourd (luffa)

2 cloves garlic 1 c. *moringa*

1 head onion 1-1/2 Accent or MSG

3 c. water salt to taste

Preparation: Sauté garlic and onion in  
medium fry pan. Add water and let it boil.

Then add the corn, stirring

often to avoid burning. When cooked, add

the gourd and *moringa*.

## Conservation and Ecological Aspects of *M. 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 *M. 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 *M. 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 *M. oleifera* species. Also, *M. 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.

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