

# Moringa: An indigenous high value underutilized vegetable crop can play a great role in nutrition and poverty alleviation in Bangladesh

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## ABSTRACT

Moringa (*Moringa* spp.) is one of the world's most beneficial trees. This fast growing plant is grown throughout the tropics for human food, medicine, livestock forage, dye and water purification. It can easily be grown in the homestead and along the roadsides. The climate of Bangladesh is favorable for moringa. The leaves and fruits of moringa contain high amount of beta-carotene, protein, vitamin C and iron. Both moringa species, *M. oleifera* (locally known as *Sajna*, fruiting in one season) and *Moringa stenopetala* (locally known as *Lajna*, fruiting year round) are most widely cultivated in Bangladesh. Malnutrition is a serious public health problem in the hunger prone northwestern region and saline-affected southern Bangladesh. Moringa plays a vital role to meet nutritional deficiency as well as to help to alleviate poverty mainly in the north-western region of Bangladesh. Research findings showed that *M. oleifera* and *M. stenopetala* both are well adapted to our northwestern region but in the southern saline and eastern wet areas only *M. oleifera* grows well. Compared to summer vegetables like cucurbits and amaranths, moringa fetches higher prices. In the northern part of Bangladesh about 20% of the population depends on moringa, but in saline and hilly areas only 2.5%. Moreover, moringa is used as a traditional remedy against smallpox and chicken pox.

## INTRODUCTION

Moringa (*Moringa oleifera* and *M. stenopetala*) is one of the most important, useful and nutritious vegetable trees in Bangladesh (Fig. 1). It contains beta-carotene, protein, vitamin C, calcium, potassium and iron (Table 1). Different parts of the tree are utilized for food, medicine, perfume, oil, lubricants, etc (Rashid 1976; Rahim et al. 2013). It is considered a minor vegetable in Bangladesh. But demand for moringa is gradually increasing day by day. Consequently, the production of moringa is increasing (Fig. 2). Almost all part of the trees are usable (Fig. 3-8). Production area should be expanded and yield should be increased. Only a few scientists are concerned about the improvement of moringa in our country; research on moringa in Bangladesh is scant. Here we evaluate the present status of moringa and future plans for moringa cultivation.

## Comparative nutrition of moringa leaves

In Southeast Asia and ASEAN countries moringa leaves are mostly used as vegetables. All moringa food products have a very high nutritional value compared to other foods. A nutritional comparison of moringa leaf with other food crops is shown in Figure 9.

### *Economic value*

Moringa is a nutritious vegetable that can be grown with minimum cost and is available year-round. In Bangladesh, the average price of moringa is about 50Tk/kg. About 60-100 kg pods are produced by a moringa tree per year, resulting an income of about 3000-5000 Tk/plant/yr. By cultivating 5 plants per homestead a farmer can earn worth Tk 15000 to 25000 per year under Bangladesh conditions (Rahim et al. 2013). Moreover, the pruned parts of moringa can be used as fuel wood. Therefore, moringa has great economic value in our country. Moringa serves as a major vegetables during lean periods of vegetable production in Bangladesh (Fig. 10; Rahim et al. 2013). *Moringa oleifera* harvested during lean period I (March-May) and *M. stenopetala* produces fruits year-round, ensuring both lean periods (March-May and August-October) are covered (Fig. 10).

### **Poverty alleviation through moringa cultivation**

In Bangladesh, vegetable consumption is about 120 g/person/day, which is far behind from the standard requirement of 200 g /persons/day. About 80% of the people in our country live below the poverty level. They have no ability to purchase major vegetables like tomato, cabbage, cauliflower, potato, etc. Hence, they can get some amount of nutritive values from moringa with minimum cost and effort. Moreover, if a farmer cultivated moringa in their homesteads, they can easily consume and sell moringa. As a result, malnutrition can be overcome as well as earning of money through moringa cultivation. A huge number of people depend on moringa cultivation, harvesting and marketing (Table 2).

### **Utilization**

The “drumstick” fruit of moringa, including young seeds, are good for soup. Young leaves can either be fried with shrimp or added as a topping in fish soup. Moringa leaves in soup increases urination and thus benefit the kidneys. The leaves are widely used in traditional medicine. Moringa is considered one of the world’s most useful trees, as almost every part of the tree can be used for food or has some other beneficial properties. As a traditional food plant, this vegetable has potential to improve nutrition, boost up food security, foster rural development, and support sustainable land care. Almost every part of the plant has value as food. Seed is eaten like a peanut. Foliage is eaten as a cooked vegetable, in curries, as pickles and for seasoning. It is commonly planted as a living fence tree.

### **Moringa production methods**

1. Propagation by stem cutting is best for production and true to type (Fig. 11).
2. Best planting time is April/May.
3. Pruning occurs in April/May.
4. Fertilizing: 10 t/ha organic matter, 250 kg Urea/ha, 200 kg TSP/ha and 200kg MoP/ha has been found to be the optimum dose, to be applied after pruning
5. Collection of egg masses, or hand killing of larvae clusters of hairy caterpillar can completely control the insect on moringa.

6. Irrigation during January/February and September/October produces better yield.

## **CONCLUSION**

Moringa is a unique underutilized vegetable tree that has a huge nutritional and economic value. Its cultivation cost is very low compared to other vegetables. Necessary steps should to be taken in Bangladesh to implement the slogan “Every homestead should have at least one moringa tree for home consumption.” However, further market and economic analysis of moringa is needed to understand why it is not being adopted more widely in different regions of Bangladesh.

## **References**

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Figure 1. ★ = Indicates major moringa growing region of Bangladesh



Figure 2. Production and yield of moringa in Bangladesh (Source: BBS 2010)



**Figure 3. Young moringa seedling**



**Figure 4a. Moringa at vegetative growth stage**



*Rahim et al.*

**Figure 4b. Moringa**



*Rahim et al. 2013*

**Figure 5a. Moringa flowers**



*Rahim et al. 2013*



**Figure 5a-b. Tender leaves and fruits of moringa**



*Rahim et al. 2013*

**Figure 5c. Bundled leaves of moringa for marketing**





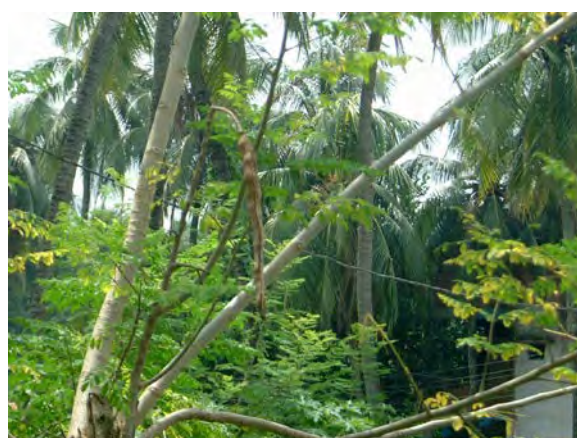
**Figure 5d. Moringa drumsticks**



**Figure 5e. Edible leaves**



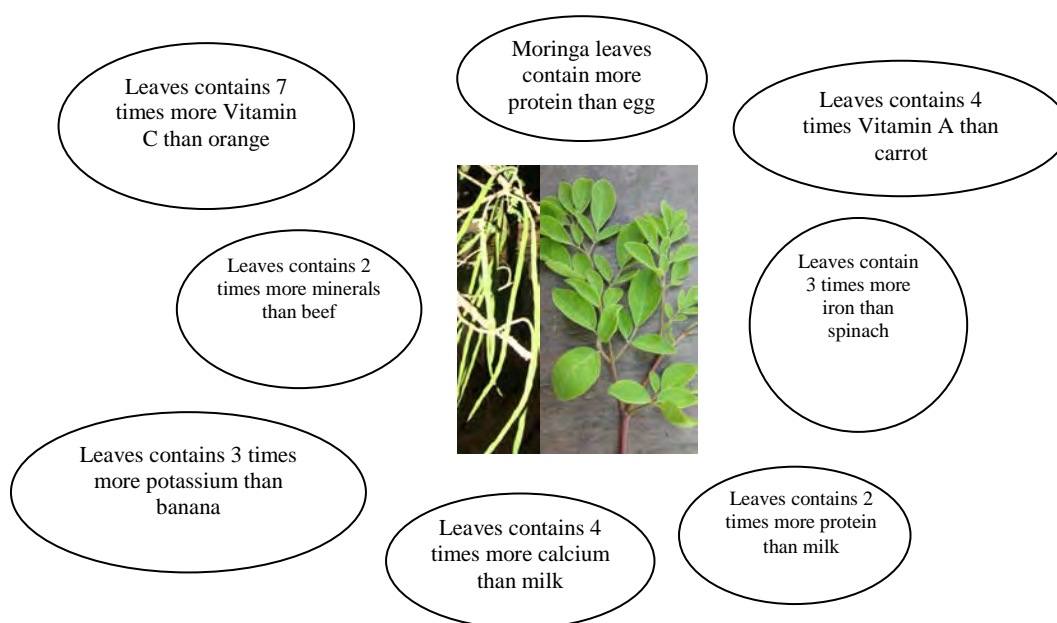
**Figure 5f. Moringa at flowering and fruiting stage (Flowers and young fruits are edible)**



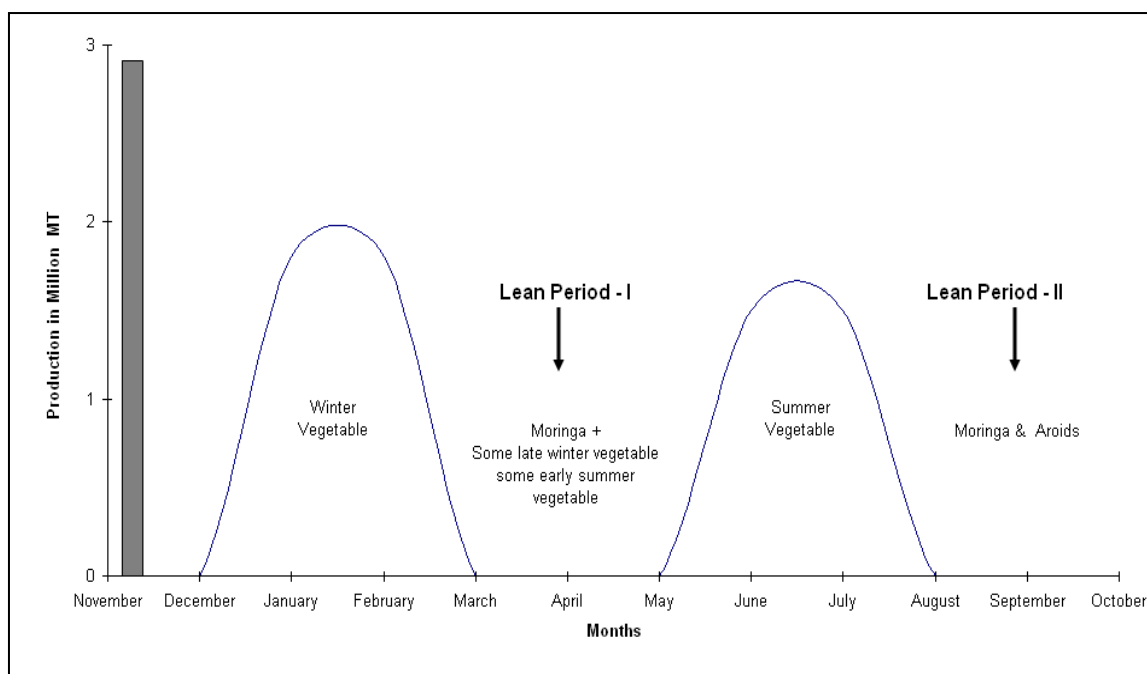
**Figure 6. Moringa at mature stage (fruits and seed edible)**



**Figure 7. Pods and seeds of drumstick**



**Figure 9. The comparison of nutritional value of moringa leaf with other foods.**



**Figure 10. Role of moringa during lean period of vegetable production**



Figure 11a-c. Limb cuttings for propagation of drumstick

Table 1. Nutritive Value of moringa

Nutrition		Leaves	Fruit
Water	(%)	75	87
Protein	(g)	6.7	2.5
Carbohydrates	"	13.4	3.7
Fat	"	1.7	.1
Fiber	"	0.9	4.8
Calorie	K.Cal.	90	26
Carotene	(I.U.)	11300	180
Thiamin	(mg)	0.06	0.05
Riboflavin	"	0.05	0.07
Niacin	"	0.8	0.2
Vitamin-c	"	220	120
Calcium	"	440	30
Iron	"	7.0	5.3

Rashid, 1999; Rahim 2012

Table 2. Percent peoples' involvement with moringa

Activities	% peoples' involvement
Cultivation	40.00
Harvesting	30.00
Marketing	30.00