

Bana Grass and Moringa Oleifera Propagation and Farming

Everywhere it says: “Land Preparation. Deep plowing is recommended so that the roots will be able to penetrate deep in the ground. This will make the plants more resistant to drought. The soil should be well pulverized with the use of a rotavator.”

But we think it should not be necessary, it is “stone age” thinking. In Sweden most farmers do not till the soil. Hence, we would prefer non-tilling practice, and; https://en.wikipedia.org/wiki/No-till_farming#Origin.

“No-till farming reduces nitrous oxide (N₂O) emissions by 40-70%, depending on rotation. Nitrous oxide is a potent greenhouse gas, 300 times stronger than CO₂, and stays in the atmosphere for 120 years”

Hence cut a hole with a sharp spade, some 10-15 cm deep to plant the 2-node cutting in.

Bana Grass Propagation

When you cut down stems to produce cuttings it is important to:

- 1) That the stems are “green” and alive
- 2) Each cutting should have two nodes
- 3) Take of as much of the leaves as possible.



And, to improve the survival rate it is suggested the cuttings are placed with their “feet” in a container with 4-5cm of water and only plant them when they have sprouted at the top and you can see the beginning of roots at the bottom: After 10-14 days they are ready to plant:



Bana grass is best propagated vegetatively (stem cuttings with two nodes). These nodes are planted carefully into the soil at an angle of 45° with the bottom end down. And the sprout on the upper side of the cutting. One node will then be buried into the soil. In a Bana Nursery plants are planted at an interrow spacing of 0.5 m and intra-row spacing of 0.5 m. And every three lines maybe 1 m to easy manual watering This will give $\pm$ 25 000 cuttings per ha.

And it is advisable to that the node is up and not down, see these pictures where the stem grows parallel to the ground (before I understood better...):



After 1 week

After 30 days

After 3 month

After 5 months

After 90 days you first cut the of the stems for 2 nodes cuttings continue as per above. Cut the stem above the first node.



In this case the amounts of stems and cuttings produced by 1 cutting in 3 months – 33 two node cuttings! But say you should get 10-20 cuttings every 3 months.

Fertilizer. To provide adequate fertility of the soil, incorporate 1 to 2 tons or organic fertiliser per hectare – preferably chicken manure – or one small handful per cutting before planting.

Propagating Moringa Oleifera

It is suggested 750 plants per ha should be good density for seed production. Start planting 2 seed in 1-2 litre plastic planting bag, with good planting soil, alternatively premix with half handful of chicken manure. And, the plants should be places in full sun light and watered every other day. And when you water, do not water on top of the plant but the soil in the bag.

When the plants are 40-50 cm high, they should be ready plant in the field, preferably in the rainy season. And no tilling only used a spade and maybe add a handful of chicken manure.

With hand irrigation 1 ha should produce $\pm$ 3 tonnes of seed ($\pm$ 10 million seed) per season.

Farming Moringa Oleifera

The suggested plant density should be every 10 cm of 500 000 plants per ha, with drip irrigation and harvesting every 45 days it should yield 400 of wet tonnes per year, 50 dry tonnes and 10+ t/of Crude Protein.

What is very important is that the planting area is fenced in to protect from roaming cattle, sheep and goats, who loves Bana Grass!

The cost of planting and farming Moringa and income is similar to Bana grass.

Back to Bana Grass

Propagation

1 000 cuttings should give you 25 000 cuttings in 3 months. When we have managed to plant 1 ha of Bana Grass/Super Napier/Pakchong1, this ha will produce 2-300 000 cuttings in another 3 months.

After 180 days:

2-300 000 cuttings, which should suffice for >10 ha at 25 000 cuttings per ha.

Here is when we need some cattle, goats or ducks to sell the leaves and tops to.

Income from tops and leaves of the stems:

After ± 3 months we should have ±10 tonnes of dry matter (tops and leaves) per ha. If Lucerne can sell for R 1800/t say Bana can sell for R2 200/t in summer and R3 300/t in winter and as Bana grass protein content is a few % lower, let's use R 2000/t.

<https://www.farmersweekly.co.za/crops/field-crops/investing-in-lucerne-pays-off-for-western-free-state-farmer/>

Income of the Bana hay is then R 20 000/ha or (divided by R 250) 80 labour days.

In this sugar cane document they use 25 labour days per hectare for hand planting:

https://sacanegrowers.co.za/wp-content/uploads/2020/11/2020_2021-G6789.pdf

Then we should have 55 labour days over for covering the cost of harvesting and cleaning the cuttings.

Cost of planting 15 ha

30day x 10ppl x USD 10 = USD 5 000

Weeding/Manual irrigation, first 90 days only = USD 1 500

Chicken manure = USD 750

Subtotal = USD 7 250

Or R 8700/ha. It would still leave R 11 300 or 45 labour days for harvesting and cleaning the cuttings.

Hence income of selling the Bana hay should cover the cost of planting.

After 270 days:

Cost of planting 300 ha

30day x 200ppl x USD 10 = USD 60 000

Weeding/Manual irrigation, first 90 days only = USD 15 000

Chicken manure = USD 15 000

Subtotal = USD 90 000

After 360 days:

Here is when we should be ready to start Protein production and sell to a feed producing company.

Cost of planting another 1000 ha

30day x 1000ppl x USD 10 = USD 180 000

Weeding/Manual irrigation, first 90 days only = USD 150 000

Chicken manure = USD 45 000

Subtotal = USD 275 000

Production and Income

90 days production from 300 ha;

1000 tonnes of protein, net value USD 250/t or USD 250 000

1500 tonnes of press cake to cattle (or maybe for other use). USD 15(?) /t or USD 22 500

After 430 days:

Production and Income at harvesting every 60 days, based on 400t/ha per year of wet biomass:

- 1 000 ha will produce 60 000 t wet biomass of which 8 000 t dry biomass, from which we can takeout >800 Crude protein.
- 800 tonnes of Crude protein (USD 500/t x 800 = USD 400 000)
- 7 000 tonnes of press cake for pellets/briquetting (USD 700 000 @ USD 100/ton) or GreenCoal (USD 1.2 million @ USD 200/ ton) or Biochar (USD 2.5 million @ USD 500/ton)
- 300 000 tonnes of liquid fertiliser to return to the field or to be sold (USD 3 million @ USD 10/ton).

Or annually:

- 1 000 ha will produce 400 000 t wet biomass of which 50 000 t dry biomass, from which we can takeout >5 000 t Crude protein.
- 5 000 tonnes of Crude protein (USD 500/t x 5000 = USD 2.5 million/year)
- 45 000 tonnes of press cake for pellets/briquetting (USD 4.5 million @ USD 100/ton) or GreenCoal (USD 8 million @ USD 200/ ton) or Biochar (USD 15 million @ USD 500/ton)
- 300 000 tonnes of liquid fertiliser to return to the field or to be sold (USD 3 million @ USD 10/ton).