TRAINING MANUAL ON TREES AND VEGETABLE PRODUCTION
PREPARED FOR WOMEN AND WORKERS
AT SELECTED MOSQU IN ADDIS ABABA,
ETHIOPIA

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COLLABRATION WITH

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1. Introduction

Environment protection is an important aspect of Islam. Being stewards of the Earth, it is the responsibility of Muslims to care for the environment in a proactive manner. There is a definite purpose behind the creation of different species, be it plants or animals. Muslims are encouraged to reflect on the relationship between living organisms and their environment and to maintain the ecological balance created by Allah. Protection of the environment is essential to Islamic beliefs and mankind has the responsibility to ensure safe custody of the environment.

Planting trees is an easy and effective way to beautify your property, provide shade in summer and wind protection in winter and enhance privacy all while increasing real estate values at the same time. Since a tree is such a visible part of the landscape care must be taken to ensure proper growth conditions are maintained. A tree is far more difficult - and expensive - to replace, once mature in the landscape, than most shrubs. However, with some advance planning, trees too can be easily maintained.
2. Planting tips for trees (moringa, capricious)

A. Methods of planting

1. **Select the right time for planting the tree.** Do not plant in sunny day because the heat will stress the plant and may cause it to die. The best time to plant a tree is early in the morning or late afternoon.

2. **Choose a suitable tree for the region, climate, and space.**

   - Research local cultivars of species native to your area. If you are willing plant a non-native species, consider carefully why.

3. **Prepare the hole.** Take a suitable shovel and dig a hole that is 4-5 times the width of the root ball, more than enough so it will fit, and give room for the fresh roots to grow without stress. This lets the roots ease in more easily and begin to grow outwards into the soil. No need to cut off the wire root basket if there is one, the roots will grow through and it will prevent damaging the root ball during planting.
4. **Prepare the tree for planting.** The process is slightly different for a small tree and a large tree:

- If it is a *small tree*, then you can turn it upside down gently to get it out of the pot. You could also cut some plastic containers to remove them.
- If the tree is *larger* and has a net or a hessian or rope bag, you might need to use large scissors or a sharp knife to cut through the packaging.

5. **Place the tree into the hole gently.** Be sure the hole isn't too deep or too shallow. The ground level of the plant in the pot should match up with the ground level after you fill the hole in. Do not bury over the crown (where the stem changes to root) or leave any roots exposed.
6. **Use some compost or composted manure if needed.** If the soil that you currently have is not rich, has clay-like qualities or if it has the consistency of dust or sand, the addition of manure or compost will give the tree a great start in life. Backfill three quarters of the hole with existing dirt, one quarter with compost or composted manure.

![Image of planting a tree with compost](image1.png)

7. **Resist the temptation to use a commercial fertilizer; it tends to over boost the tree and make it "burn out", less likely to do well over the long term.** A great benefit to new trees, however, is an organic mixture that includes micorrhizae, beneficial fungi that enhance a tree's uptake of soil nutrients. It may also include rock phosphate, a natural root-growth enhancer.

8. **Water the newly planted tree.** Allow settling, backfill the remaining soil, and water again. This will eliminate air pockets. Water one gallon (3.7 liters) for every six inches (15 cm) of tree height.

![Image of watering a planted tree](image2.png)
9. **Mulch, mulch, mulch!** Cover the planting hole with 1-3 inches (2.5 cm - 7.6 cm) of shredded hardwood or leaf mulch. Keep the mulch 2-3" away from the trunk or the trunk will rot. Don't over-mulch the tree, either. A few inches are enough to keep water in and most weeds out. Mulch a circle out to the drip line, about the same width as the tree's leaves.

10. **Water it again.** After the planting is finished come back in about an hour and water one more time.
11. **Stake the tree if necessary, for about the first year.** Make sure that whatever stakes you use are tied loosely to the trunk and do not dig into the bark or tighten around the tree. Remove the stakes once the roots have a chance to become established, after about the first year. Staking protects the tree against blowing over in the wind, and it can also help to remind people moving around the tree not to run into it.

![Stake Diagram](image)

12. **Keep watering your tree for the first few years as it gets established.**
   Depending on the climate and your area, it will need weekly watering until the roots are established. To form deep roots, water deeply. A long, slow trickle of water will water more deeply than a quick sprinkling. Remember, deep roots help your tree to resist droughts and winds.

![Watering Diagram](image)
B. Cultural practice

- Water, Mulch and Fertilizer

**Watering:** Newly planted trees should be watered at the time of planting. In addition, during the first growing season, they should be watered at least once a week in the absence of rain.

**Mulching:** To conserve moisture and promote water and air penetration, the back filled soil surrounding newly-planted trees can be covered with mulch consisting of material such as bark, wood chips. Mulch depth should be between 3 to 4 inches. Do not, under any circumstances, cover the area surrounding the tree with plastic sheeting since air and water movement are prevented.

**Fertilizer:** Since all soils have a history, it can be beneficial to get soil analyzed properly for macronutrients such as Nitrogen (N), Phosphorus (P) and Potassium (K), micronutrients, pH, soil type, and drainage. Although many trees survive without fertilizer at time of planting, the majority of plants suffer root loss and stress associated with movement between ideal nursery grown conditions and the final planting.
3. Planting tips for vegetables (potato, carrot, tomato, beetroot)

A. Planting methods with its cultural practice

1. Potato

   Ecological requirement of the crop

   Climate: Though a temperate crop, potato is adapted to a range of climatic conditions. Most varieties perform well when days are sunny and nights are cool.

   Soil: Deep well drained
   ✓ This is followed by hill, black and red soils. Soil should be loose, firm and without compacted layer that hinders root penetration.
   ✓ Compacted layers also restrict drainage

   Propagation and planting
   ✓ Potato can be propagated by its tuber or using true potato seeds.

   Seed rate: 18 quintals/ha if we use medium size tubers and 20Q/ha for large tubers.

   Planting time: If we use irrigation water planting should be at frost free periods, starting from January in our case.

   Land preparation:
   ✓ Depending on the type of soil it requires three to four times plowing when the soil has good moisture content, this is to avoid the formation of large clods and to get good texture.
   ✓ 25-30cm deep cultivation is required.
   ✓ Mark the plot and dig the hole or make an open 10 cm depth.
   ✓ No tuber part should be exposed to light.

MANAGEMENT PRACTICES OF THE CROP

Manures and fertilizers

- Potato is a heavy feeder and plants respond well to application of manures and fertilizers.
- Fertilizer recommendation varies with the type of soil and even with variety but generally, 165KG/ha urea and 195KG/ha DAP is recommended.
- Manure is also important for potato production. It requires 200-400kg/ha of well.

Harvesting and Yield

- The leaves or stem will turn to Yellow at maturity and harvesting should be 10-15 days after the
stems and leaves dry, this is to prevent the tubers from bruising.

- It will be harvested 90-120 days depending on varieties.
- Harvesting of potato is done before temperature rises above 30°C.
- Harvesting is done manually with help of a spade or bullock-driven single row plough.
- Decomposed compost.

2. BEETROOT

Ecological requirement

Climate

- Beet root is hardy to low temperature and prefers cool climate. Though it grows in warm weather, development of color, texture, sugar content etc. of roots is the best under cool weather.

Soil

- Deep well drained loam or sandy loam is the best for beet root cultivation.
- Heavy clayey soils result in poor germination and stand of crop due to formation of a soil crust after rains or irrigation.

Land preparation and sowing

- Land is ploughed to a fine tilt by thorough ploughing making it loose and friable. Clods are to be removed completely. Apply well decomposed farmyard manure at the time of final ploughing.
- Flat beds or ridges and furrows are prepared. Water-soaked 'seed balls' which contain 2-6 seeds are drilled 2.5 cm deep in rows at spacing of 45-60 x 8-10 cm. 5-6 kg of seeds is required for one hectare. Staggered sowing at 1-2 weeks interval ensures steady supply of roots during the season.

Manures and fertilizers

- Well-rotted FYM at 50-60 t/ha should be incorporated during soil preparation, or preferably applied to the previous crop.

Harvesting

- Medium sized tubers are of great demand and tubers are harvested after attaining a diameter of 3-5 cm.
- Harvesting is done 8-10 weeks after sowing by pulling the top with hand.

3. CARROT

Ecological requirement

Climate

- Climatic and soil factors have great-influence on shape and color development of roots. Ideal temperature for germination of seeds is 7.2-23.9°C, while for root growth and development it is 18.3-23.9°C.

Soil

- Deep and well drained friable soil is essential for proper root development.
- For early crop, sandy loam and for heavy yield, silt loam is preferred.
Land preparation, sowing and manuring

- Soil is ploughed to a fine tilt. Utmost care should be taken to remove clods, stones etc. Land is then made to ridges and furrows at 30-45 cm apart, in small plots of convenient size for irrigation.
- Seeds are shown on ridges or on flat beds either by dibbling in lines or by broadcasting.

Manuring/fertilization

- In addition to 20-25 tones of farmyard manure.

Harvesting

- Roots grown on ridges are usually harvested after loosening soil with a spade and by pulling out roots by grasping top. In flat ground, top is removed close to ground and roots are dug out with a spade.

4. TOMATO

Ecological Requirement and planting

Tomato is a day neutral warm season crop which cannot tolerate frost.

Planting

- Under mild climatic conditions, where there is no danger of frost, three crops can be raised in a year. Tomato seedlings require 5 to 7 weeks at 65 to 75 degrees F day and 60 to 65 degrees F night temperatures to be ready for transplanting to the field.
- If necessary, it is usually possible to use older or younger transplants successfully.

Main field preparation and transplanting

- Seedlings are transplanted on raised beds or on sides of ridges. Field is ploughed 4-5 times and raised beds of 80-90 cm width or ridges and furrows are prepared.
- Spacing depends on the growth habit (determinate, indeterminate or semi determinate) of variety and various spacing followed are 60 x 30-45cm, 75 x 60cm and 75 x 75cm.
- Usually closer spacing results in early and higher yield, but it may affect size of fruits.

Fertilization and irrigation

Fertilization

- Manure and fertilizer recommendation for tomato depends on the growth habit and productivity of variety and it varies from state to state.
- In most cases 15-20 tones of FYM, 100-125 kg N, 50-60 kg P_2O_5 and 50-60 kg K_2O are recommended for one hectare.

Training and pruning
✓ All indeterminate varieties are trained with wires, strings or stacks to prevent lodging and loss of fruits by coming in contact with soil.

Harvesting

Average time from transplanting to harvest
Early cultivars: 50 to 65 days. Mid-season cultivars: 70 to 80 days. Late cultivars: 85 to 95 days
Yield: Open pollinated varieties =20-25 t/ha. F₁ hybrids 50 t/ha.

4. Fertilizer usage

Generally proper management of nutrients:
– Tree crops are normally fertilized yearly on precautionary basis.
– Rate is based on soil and tissue analysis.
– Use of OM, cover crops and green manure.

5. Crop protection

1. PEST AND DISEASE MANAGEMENT

Pest and disease control begins with the use of pest-disease free planting material. The saplings should be healthy with good vigor. Do not buy saplings with unknown origins or without certificates.

2. Weeding

We have to remove weed from field to protect competition and disease and pest development.

6. Equipments required for planting

✓ Spade
✓ Watering can
✓ Scissor
✓ Meter
✓ Hand fork
✓ Rake
✓ Shovel
7. Conclusions

Environmental awareness and protection of natural resource is an integral part of Islamic beliefs. As viceroys of Allah on this earth, we have to utilize natural resources in a sustainable manner in order to ensure that Allah’s Bounties to continue. The principle of conservation is beautifully illustrated by the rule which says that while making ablutions (wudu) we should be abstemious in the use of water even if we have a river at our disposal. As humans, we are keepers of all creation, including soil, air, water, animals and trees. A major objective of Islamic teachings and Prophet (Peace Be Upon Him) traditions is to build and maintain a healthy and clean environment which is devoid of any source of pollution and misuse.
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