

African Nightshade *(Solanum nigrum)* **Vegetable Growing** **Module Training Set**



FACILITATOR'S GUIDE

This guide will help you use the **African Nightshade Vegetable Growing Module Training Set**. The set is designed to encourage group discussion with farmers as well as provide information on the production techniques of african nightshade. As the facilitator, you are encouraged to read through and familiarize yourself with the entire guide before facilitating any discussion for the first time.

Using Visual Aids and Participatory Learning

We know that people learn better if they are actively engaged in the learning process. Studies have shown that we remember only 20% of the information we hear and 40% of the information we see and hear. However, when we see ideas represented visually and also actively engage with the information through discussion, debates, role-plays or other participatory teaching methods, learners retain 80% or more of the information that is presented to them.

Clearly as facilitators, it is worth the time and effort to create participatory, multi-sensory presentations. The **African Nightshade Vegetable Growing Module Training Set** is a tool designed to assist you in this effort. There is no one way to use it. We are always interested in improving our product, so if you have suggestions, comments, or questions please contact us.

This facilitator's guide is written in English but depending on your audience, you may need to make your presentation in the local language. Read through the guide and consider how you translate concepts into the local language.

PART 1. TRAINING CHECKLIST

Make sure you can answer YES to each question before beginning the session.

- Did you gather background information about the group you are going to train?
- Did you review the facilitator's guide and charts?
- Do you understand the key issues to cover for each chart?
- Does the venue have enough seats and space?
- Do you have all the materials you need for the activities and discussions?

Outline of a training session:

1. Welcome and introductions (5 minutes)
2. Review of the session objectives (5 minutes)
3. Large group presentation and discussion of the charts in the training module (Approximately 5 minutes per chart)
4. Ice breaker (5 minutes)
5. Break into small groups and answer the following: (20 minutes)
 - What are 3 things I learnt today?
 - What is 1 action I will take as a result of this training?
 - What questions do I still have about the topic?
6. Sharing of small group discussions in the large group (10 minutes)
7. Summarize and conclude the session (15 minutes)

PART 2. OBJECTIVES FOR THE TRAINING

By the end of this training, participants will have learnt:

- The benefits of using quality seed
- To conduct a germination test
- To selecting a good site for african nightshade vegetable growing
- To prepare quality seed for planting
- To prepare and apply fertilizer/manure
- To plant african nightshade vegetable
- When and how to weed
- To manage pests and diseases
- To carry out proper harvesting
- The methods used to preserve vegetables

PART 3. HOW TO USE THE TRAINING SET

- Show the first chart to the participants.
- Read the title of the chart.
- Ask participants to explain what they know about the topic and what they understand from the visual.
- Reinforce accurate information given and correct wrong information.
- Read the tagline on the chart if there is one.
- Ask participants if they have any questions about what has been discussed.
- Go to the next chart.

PART 4: THE DISCUSSION SESSION

A) VEGETABLE CHART SET

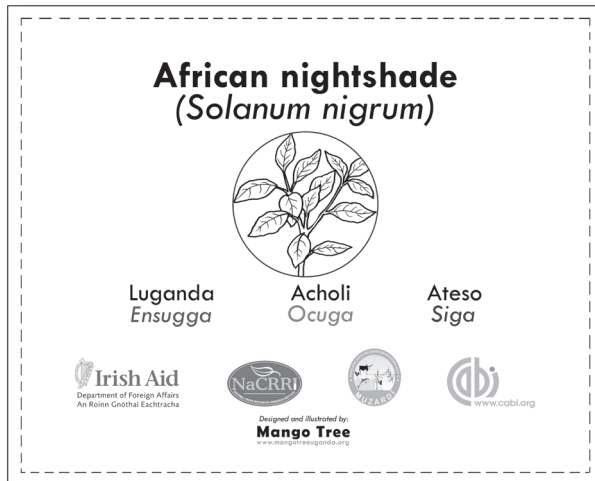


CHART 1: Logo chart*

African nightshade is known by the different names across the country: in Luganda *Ensugga*, in Acholi *Ocuga*, and in Ateso *Siga*. The scientific name for African nightshade is ***Solanum nigrum***.

The African nightshade leaves are usually picked when green and eaten as a vegetable.

* *This is a logo chart.*

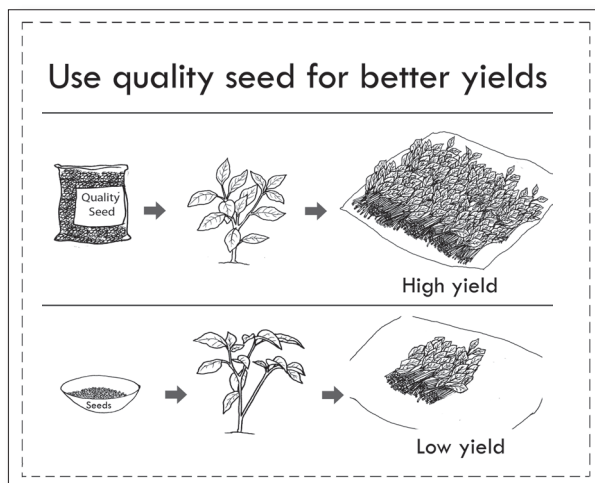


CHART 2: Use quality seed for better yields

Use quality seeds of a recommended variety. Quality seeds are a fundamental requirement for good production. Home processed seed can also be of good quality if it is well processed and stored. Using quality seeds ensures:

- Lower seeding rate
- Higher seedling emergence, usually above 85%
- Vigorous seedlings
- More uniform plant stand
- Faster growth rate
- Better resistance to pests and diseases
- Uniformity in maturity
- The plant is more tolerant to drought

Quality seed should be of uniform size, colour and shape. It should also be free of foreign matter such as weed seed, chaff and should be pest and disease free.

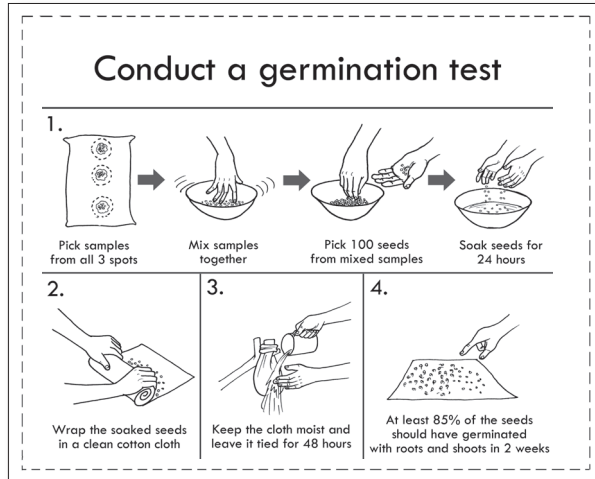


CHART 3: Conduct a germination test

Before sowing, test seed for viability and germination potential by conducting a quick germination test. Follow the steps below:

- Get representative samples of seeds from the top, middle and bottom of the seed bag.
- Mix the sample seeds and count 100 seeds to use for the test (for small seed quantities, farmers can count 20 seeds).
- Put the seeds in a container of water for 24 hours.
- Drain off the water and wrap the seeds in the soaked cotton cloth to create a bag holding the seeds.
- Tie the cloth bag to a stick. Tilt the stick to encourage drainage from the cloth bag. Keep the cloth moist by watering 3 times a day. Leave it tied for 48 hours.
- Untie the cloth bag and count the number of seeds that have fully germinated (both the shoot and roots have emerged).
- If 85 of the 100 seeds or 17 of the 20 seeds or more have both the shoot and roots emerged within 2 weeks, then it is quality seed which can be used for planting.
- If the percentage is slightly less than 85 of the 100 seeds, increase the seed rate at planting. If the percentage is less than 40%, discard the seed. Do not use the seed because it will have poor yields.

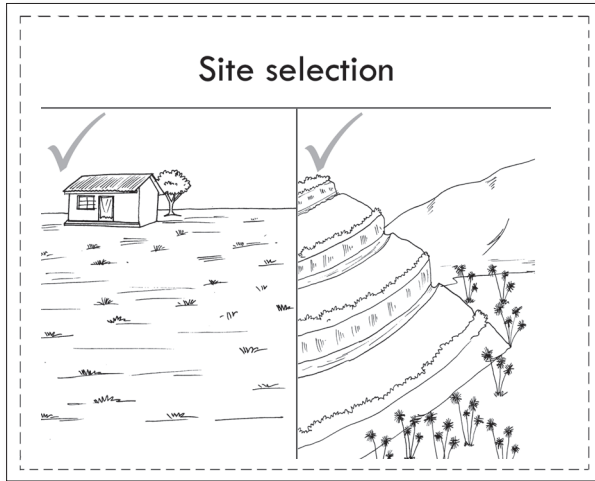


CHART 4: Site selection

- Vegetables grow well on flatland, lowland and upland if terracing and raising of beds is practiced to control soil erosion.
- In lowlands, dig channels to drain or divert excessive water. Vegetables grow well in lowlands during the dry season (off season).
- Fertile loam soil is the best soil for growing vegetables.
- The site should not have tree shades as some trees have pests and diseases. They could damage the plants.
- The soil should not be rocky.
- The soil should be fertile or manure should be added.
- The soil should be well drained.
- Close proximity to home is ideal but vegetables are threatened by domestic birds and animals.
- The site should have good access to a water source.

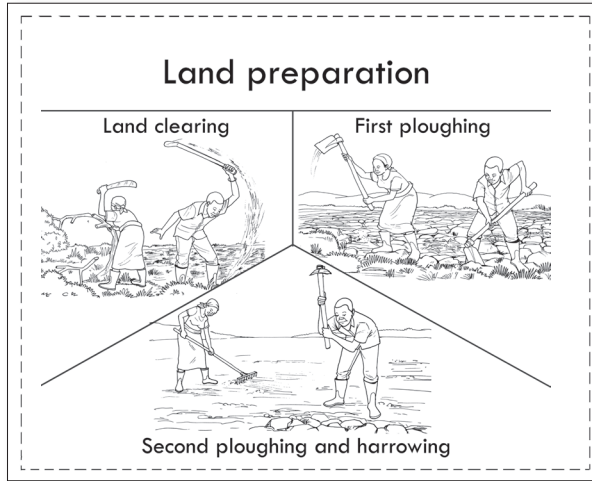


CHART 5: Land preparation

- Land preparation starts with clearing or cutting of all the tall grasses, removing trees including stumps, cutting down bushes, and removing stones and other obstacles from the field. This is done to ease the ploughing processes and all other farming activities.
- Do not burn the bushes because burning exposes the soil to erosion and also reduces soil fertility due to loss of nutrients.
- After clearing the land, plough the field for the first time and ensure that the soil has very small debris.
- If the field has perennial weeds, spray with glyphosate herbicide such as weedmaster or round up. Remember to contact an agriculture extension worker for guidance on herbicide.
- A second ploughing is followed by harrowing until the soil makes fine tilth (very small particles).

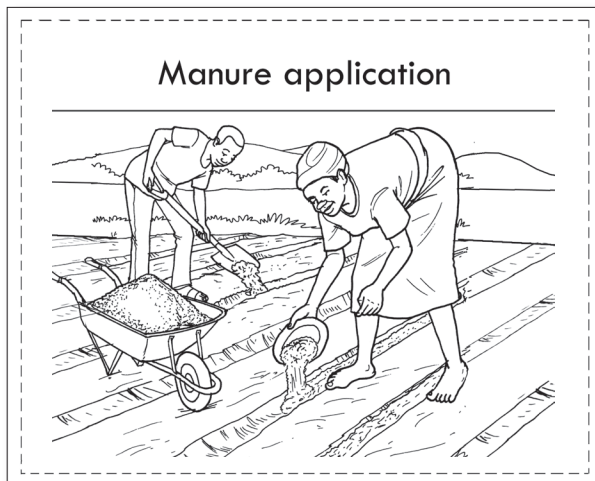


Chart 6: Manure application

All african indigenous vegetables need manure/fertilizers for vigorous plants, resistance to pests and diseases and high yields. Farm yard manure is a low-cost alternative to inorganic fertilizers, and it still helps farmers to achieve higher yields.

Farm yard manure is made from animal dung from either cow, goat or from chicken droppings. If a farmer already has a kraal, it is an easy and cost effective way to use animal dung to make manure and use it in the garden.

It is good practice for farmers to always collect their animal dung and heap it so there is always enough available to make manure.

How to make and apply farmyard manure:

1. Collect animal dung from the kraal.
2. Heap the dung in small, knee-height piles. It can be heaped directly in the garden during the dry season when there are no plants or it can be stored in a flat area closer to the kraal.
3. Leave it to properly decompose as this will give the best results.
4. Before applying the manure, mix it with soil.

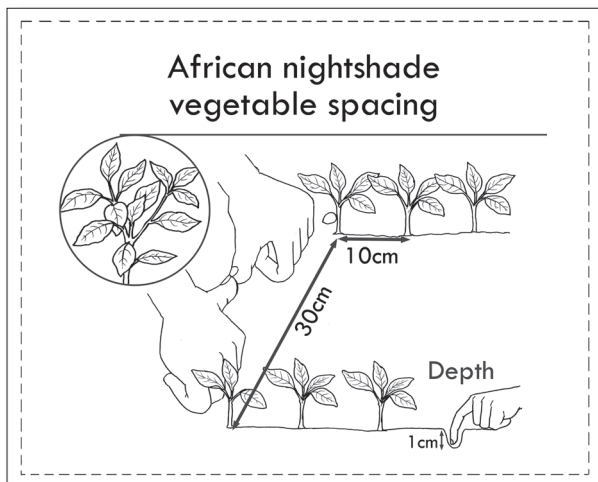


Chart 7: African nightshade vegetable spacing

- **Timely planting:** Plant at onset of rains. Farmers who have the capacity to irrigate can grow african nightshade year round.
- **Planting in lines:** Planting in lines ensures the crop is well spaced whilst it also becomes easier to weed and manage the crop.
- In addition, the recommended plant population is attained and the farmer will plant adequate seed (not too much or too little) for the given area.
- The african nightshade should be spaced at 30cm between rows and 10cm between plants for leafy vegetables when thinning.

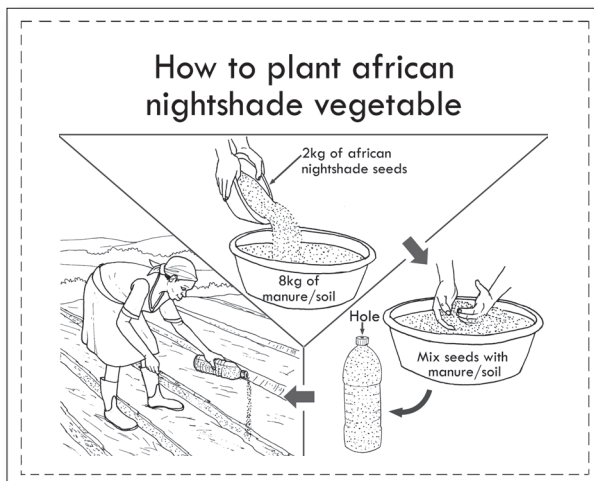


Chart 8: How to plant african nightshade vegetable

The seeds of african nightshade are very small and the farmer risks pouring too many seeds in the same spot during planting. This can result in crowding of plants which will reduce the yields.

To avoid this, the farmer can use the following method:

1. Take 2kgs of african nightshade seeds and 8kgs of well decomposed and dry soil/manure to plant 1 acre. Fresh manure will destroy the seed so only use well decomposed dry manure mixed with soil, as this will not destroy the seeds.
2. Mix the seeds with the soil/manure in a big basin.
3. Put the mixture in a large mineral water bottle and make a hole in the bottle top.

Planting in lines:

- Use a string to make rows. Spacing between rows should be 45cm.
- Use a stick to make a 1cm deep farrow following the string.
- Plant the seeds in this farrow and cover with light soil.

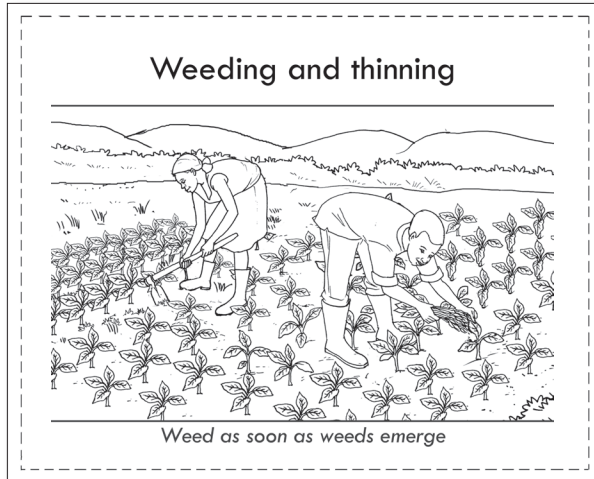


CHART 9: Weeding and thinning

- Timely weeding will lead to increases in the yield.
- Timely weeding minimizes competition for food and light between weeds and african nightshade. It will give african nightshade better conditions to grow.
- Weeding also reduces pest and disease infestation at the early stages which will lead to increased yields.
- Weeding should be done as soon as weeds emerge and before the flowering of weeds. This will reduce the risk of weeds spreading.
- Thinning is done at the time of weeding. During thinning the less vigorous, off-types or relatives and diseased plants are removed. The good quality thinned plants can be sold or consumed at home.
- Rouging of off-types should be done at flowering and at fruiting (early maturity) when its easy to identify the off-types.

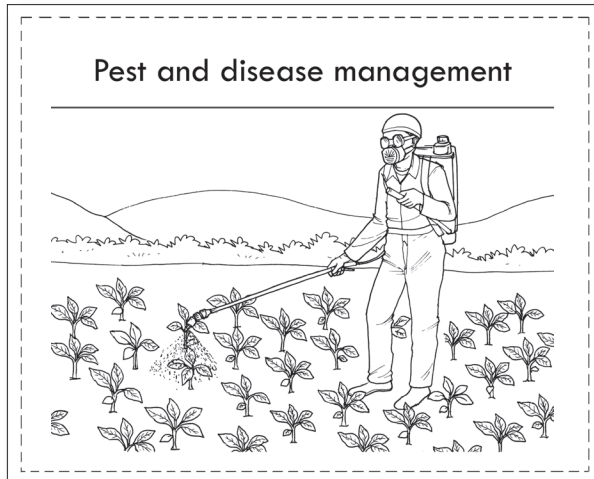


CHART 10: Pest and disease management

- Pest and disease management should be a continuous effort by the farmer to ensure early intervention in case of an outbreak.
- Both organic and inorganic pesticides can be used to control pests and diseases.
- It is recommended to always seek advice from an agriculture extension worker on pest and disease identification and management.

Note: *The farmer should monitor the field to ensure quick action is taken in case of break out of pests and diseases. The farmer must also mulch.*

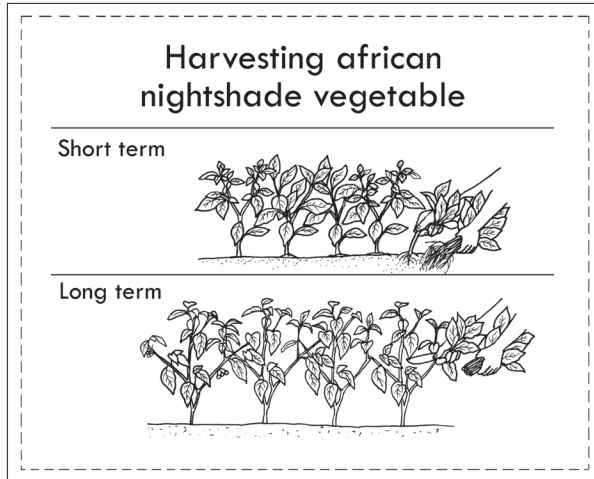


CHART 11: Harvesting african nightshade vegetable

African nightshade is ready for harvesting starting from 45 days after germination. The crop can be harvested in two ways:

- 1. Uprooting (Week 10-11):** This is mostly done in commercial production by uprooting the whole plant.
- 2. Cutting tender stems (Week 12-16):** This is commonly done in kitchen gardens for home consumption. The tender stems are cut every 1-2 weeks until the plant flowers.



CHART 12: How to preserve vegetables

There are several ways to preserve vegetables as explained below:

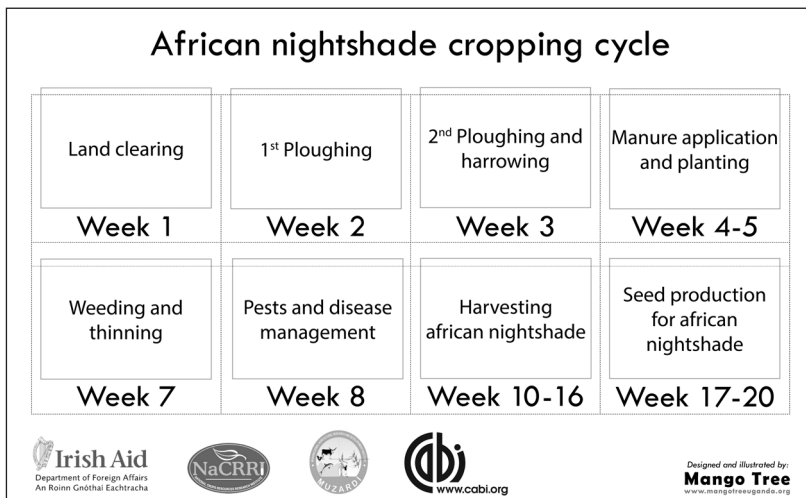
Local refrigeration: This is a 1m high construction made of bricks with 2 separate walls and sand/charcoal dust between the walls, preferably under a shade. Add an elevated water tank and use a small pipe to allow water to keep the sand/charcoal dust moist. The vegetables should be placed inside the structure on racks.

Preservation using a pot: African indigenous vegetables can also be stored for future consumption by placing harvested vegetables in a pot under a shade. Pile sand or charcoal dust around the pot and continue to keep the sand charcoal moist by regularly adding water. Do not pour water in the pot.

Preservation using a solar dryer: Vegetables can also be preserved by drying them using solar dryers after which they will be packaged for use during the dry season. Though vegetables can be dried traditionally under the sun, more nutrients are lost compared to the use of solar dryers, and it is therefore not a recommended practise.

PART 4. THE DISCUSSION SESSION

B) THE CROPPING CYCLE



Week 1:

Land preparation is the first step for your farming venture. If you prepare the land properly, the rest of your farming activities will become much easier to complete.

Start with clearing or cutting all the tall grasses.

Remove trees and all heavy bushes and tree stumps.

Take care to also remove stones and any other obstacles from your field.

The result should be a field that is ready for ploughing.

Do not burn the bushes because burning exposes the soil to erosion and also causes loss of soil nutrients.



Week 2:

First ploughing is done before the onset of rains to turn plant material into organic manure while also breaking the soil to allow more water to enter. This process also increases the amount of air available in the soil.

Depending on the resources available, the farmer can use a hand hoe, an ox plough or a tractor with a plough.

If your field has perennial weeds such as couch grass, spear grass or wandering jew, you need to spray the field using herbicides like glyphosate, round up and weedmaster. Always contact an agriculture extension worker or an agrodealer for more guidance on herbicides.

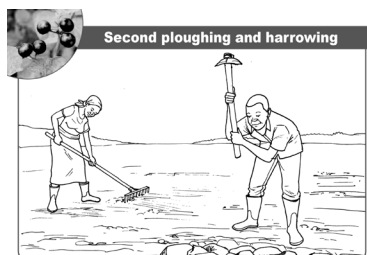
A germination test should be carried out during this period to ensure that seeds are capable of germinating. It should also be of high germination percentage-not less than 85% in 2 weeks. Contact agro-dealers and seed producers for quality seed.



Week 3:

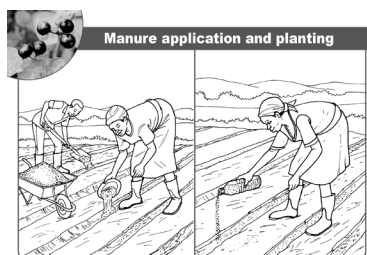
Carry out second ploughing followed by harrowing to obtain a finer tilth.

Remove any trash and other obstacles which can hinder seed germination.



Week 4-5:

Farmers are encouraged to apply organic fertilizer to improve the soil fertility. This will result in higher yields. Decomposed chicken litter is the most preferred.



Note: Other fertilizers can also be good as long as these are also decomposed. Inorganic fertilizers e.g UREA, NPK can also be used but only after advice from your agriculture extension worker or agrodealer.

Planting in lines:

- Use a string to make rows in your field. Spacing between rows should be 30cm.
- Using a stick to make a 1cm deep farrow following the string.
- Mix seed with soil/manure in a ratio of 1:4 (1 quantity of seed to 4 quantities of soil/manure) before planting to avoid congestion and seed wastage.
- Plant the seed in the farrow and cover with light soil.

Week 7:

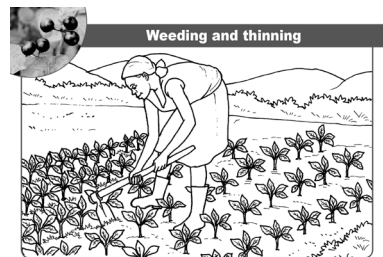
Timely weeding will lead to increased yields because it will minimize competition for nutrients and light between the african nightshade plant and weeds.

Weeding will also reduce pest and disease infestation at the early stages which will again lead to increased yields.

Weeding should be done as soon as weeds emerge and especially before the flowering of weeds. This will reduce the spreading of the weeds.

Thinning is done at the time of weeding. During thinning the less vigorous, off-types or relatives and diseased plants are also removed.

The good quality thinned plants can be sold or consumed at home.



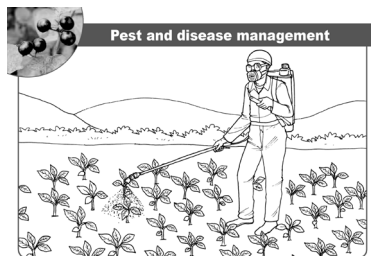
Week 8:

Pest and disease management should be a continuous effort.

Both organic and inorganic pesticides can be used to control pests and diseases.

It is recommended to always seek advice from an agriculture extension worker on pest and disease identification and management.

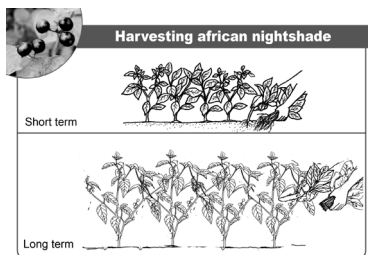
Note: The farmer should monitor the field to ensure quick action is taken in case of break out of pests and diseases. The farmer must also mulch.



Week 10-16:

African nightshade vegetable is ready for harvesting starting from 45 days after germination. The crop can be harvested in 2 ways:

1. **Uprooting (Week 10-11):** This is mostly done in commercial production by uprooting the whole plant.
2. **Cutting tender stems (Week 12-16):** This is commonly done in kitchen gardens for home consumption. The tender stems are cut every 1-2 weeks until the plant flowers.



Week 17-20:

Step 1: Hand pick and collect mature fruits that have turned purple/black in color and place them in the shade for about 24 hours.

Step 2: Put the fruits in a mortar and lightly crush them using a pestle.

Step 3: Place the crushed fruit and seeds in an open plastic container. Fill the container with water and stir to allow the pieces of fruit flesh and gel to float.

Step 4: Gently remove the floating fruit flesh skin and tilt the container to allow more floating seed to pour out. Quality seeds will remain at the bottom. Repeat the washing several times with fresh water until all the flesh and gel are completely removed.

Step 5: Place the washed seeds in a bag/wrap in a cotton cloth and hang in the shade for about 24 hours to remove excess water.

Step 6: Place the partially dried seeds on a flat plastic surface like a tarpaulin which is raised off the ground under little heat (not in direct sunlight). Loosen any clump of seeds and stir 2 to 3 times per day so that seeds dry uniformly.

Step 7: Store clean seed in a cool, well ventilated and dry place.



Facilitator's Notes

How to make compost manure

Materials:

Dry materials: Sorghum, maize, millet straws, bean, soybean, groundnut haulms, napier grass

Green materials: Weeds, hedge trimmings and food peelings

Animal wastes: Cow dung, poultry litter, goat and sheep droppings

Covers: Top soil, wood, plastic sheeting, carpet scraps and dry grass

Mixer: Water and a turn stick

1. Prepare a pit of reasonable depth. It can be any length depending on the amount of materials available.
2. Lay twigs or chopped dry materials at the bottom.
3. Add compost materials in layers, alternating moist and dry. Moist ingredients: food scraps, tea bags and seaweed. Dry materials: straw, leaves, sawdust pellets and wood ashes.
4. Add manure, green manure (napier grass and grass clippings) or any nitrogen source.
5. Keep compost moist. Water occasionally, or let rain do the job.
6. Cover with anything you have - wood, plastic sheeting, carpet scraps, topsoil or dry grass/straw to keep it moist, but not soaked and sodden.
7. Turn every few weeks give the pile a quick turn with a pitchfork or shovel.
8. Once your compost pile is established, add new materials by mixing them in, rather than by adding them in layers. Mixing or turning the compost pile is key to aerating the composting materials and speeding the process to completion.

Note: *If you want to buy a composter rather than build your own compost pile, you may consider buying a rotating compost tumbler which makes it easy to mix the compost regularly.*

References:

Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA-2012); Production of Quality Seed of African Indigenous Vegetables - ***Training Manual***

National Agricultural Research Organisation; African nightshade (Solanum aethiopicum) - ***Seed Production Brochure***.

For more information contact:

Christine Alokite
CABI
C.Alokite@cabi.org

Robinah Naggayi
MuZARDI
naggayirobinah@gmail.com

Sophy Musaana
NaCCRI
sophymusaana@yahoo.co.uk

Daniel Karanja
CABI
D.Karanja@cabi.org



1479 Naalya Road, Kiwatule, P.O. Box 25312, Kampala, Uganda
Tel: 256-312-263-263, Email: mangotree@mangotreeuganda.org
www.mangotreeuganda.org