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A photograph of a watermelon is positioned on the left side of the cover. To its right is a black and white outline map of Nigeria, showing its state boundaries. The watermelon and map are set against a light green background that transitions into a white background on the right.

Growing **Watermelon** commercially in Nigeria

a training manual

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Growing

Watermelon Crop

in Nigeria
a trainer's guide

<p>Specific objectives The specific objectives listed here are the specific ideas and skills being taught on the associated page. The trainer should strive to ensure that the objectives for each lesson are met.</p>	<p><u>Note to trainer: how to use this trainer's guide.</u> Each page of this guide presents new ideas on how to successfully grow watermelon in Nigeria. After page 2 this guide treats every page as a distinct lesson with distinct objectives. All information for trainers is only a suggestion and can be used as is, omitted or refined. Not every activity can be carried out or every discussion question asked, therefore it is up to the trainer to use his or her own discretion. This guide assumes that some of the participants will have previously cropped watermelon and is intended to be taught out side in an available field. <i>Pg 2</i></p>	<p>Activity Almost all lessons include at least one activity. Activities are intended to help farmers understand the information concretely and practice the skills and knowledge of the course. Not all activities can be carried out and they will depend on available materials and time.</p>
<p>Discussion questions The discussion questions are intended to link the traditional knowledge held by the participants to the 'new knowledge' passed in each lesson. It is also intended to create a participatory atmosphere where farmers' histories are respected. Finally it is believed that the knowledge and experience an individual farmer possesses is beneficial to the learning of the entire group.</p>	<p>Training method For each page a suggested lesson is given. Each suggested training method makes use of all the discussion questions, activities and review questions and meets all the specific objectives.</p>	<p>Materials The materials needed in course: containers clayey soil, stony soil, loamy soil Hoes (one for each participant) Pencil or pens for farmers Cutting knife Basket Chemicals or substitutes Protective equipment Inter-row weeder Knapsack sprayer Measuring equipment Watermelon seeds.</p> <p>Review question The review questions are intended to reaffirm the information presented in each lesson or to connect the lesson to the farmers' individual practices.</p>

How to grow a good watermelon crop in Nigeria

General objectives of course

At the end of this session farmers will:

1. acquire the knowledge of improved practices of producing watermelon in Nigeria.
2. know how to profitably grow watermelon in Nigeria.

Discussion questions

1. Where do you presently farm?
2. How many participants here are or have ever farmed watermelon?
3. Where do you presently find information on farming?
4. What are your major limitations to production?



Training method

1. Introduce yourself. Provide your name and farming background.
2. Ask participants for names and years of farming experience.
3. Explain purpose of course: *The purpose of the course is to familiarize participants with improved methods of watermelon cultivation as well as to share in the farmer's traditional knowledge. The principal goal of this course is to introduce improved production techniques to farmers such that will increase their yield and change their status as subsistence farmers into commercial farmers.*
4. Explain the potential of increasing profits by using improved production technologies.
5. Ask discussion questions 1-4.

Specific objectives

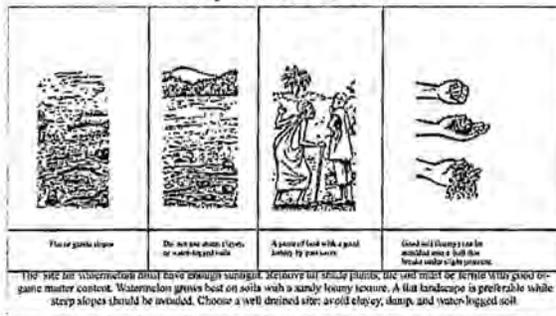
By end of lesson farmers will:

1. Be able to select the best sites for watermelon cultivation.
2. Be able to identify soil qualities that are important for production of good watermelon crop.

Discussion question

1. What are some indicators of good farmland in this region? What are some factors that indicate good farmland?

Step 1. Site selection



Training method

1. Explain that although watermelon could be grown in most agroecologies in Nigeria, crop quality can be highly dependent on climatic and soil factors.
2. Ask [discussion question 1](#) then explain importance of noting the identifiers of farmland quality: soil texture, topography, organic matter content, drainage; vegetation and cropping history.
3. Start with soil textural type; explain characteristics of good soil and how it can be referred to as loamy soil. Proceed with [activities 1](#).
4. Explain flat and gentle slopes are the most advantageous topography for watermelon cropping.
5. Explain: the importance of organic matter as source of nutrient for crop production.
6. Explain how water logging could affect the production of good watermelon crop
7. Explain the negative effects of shade plant on watermelon production.
8. Ask [review question 1](#).

Activity

1. Present containers of loamy, clayey and stony soils. Pick up soil in your hands and show to farmers while explaining characteristics of soil. Ask farmers to approach containers and inspect soil themselves.

Materials

- 3 containers filled with good soil, clayey soil, and stony soil. **Label containers.**

Review question

1. Considering all land quality identifiers, what are the positive or negative characteristics of your farm land.

Step 2. Land preparation

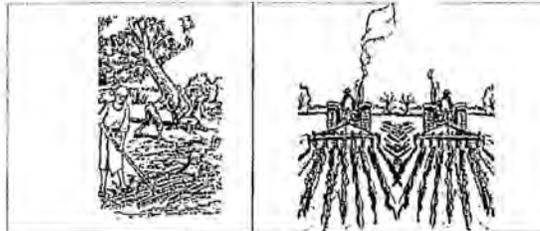
Specific objectives

By the end of this lesson farmers will:

1. be informed on the specific land preparation requirements for a good crop of watermelon.
2. judge their current methods of land clearing and soil preparation against taught method.

Discussion questions

1. What happens to watermelon crop if the farmers fail to properly prepare the land before planting?
2. What are good land preparation techniques?



Remove all shade plants

Ploughing and harrowing is necessary

Clear the land of all vegetation covers and plant debris. Spray a systemic herbicide (Glyphosate) to control rankine weeds such as spear grass, etc. Prune trees, remove other shrubs that could impose shade. Plant residue need not be burned as they could be used as mulch material. Conventional tillage is best for watermelon especially when the soil is of sandy loamy texture class. That in cases where the soil texture is clayey, a little ploughing and harrowing may be necessary to facilitate deeper rooting and moisture penetration.

Training method

1. Ask discussion questions 1 + 2.
2. Describe the benefits of tillage to enhance soil tilt, good seed establishment, good aeration and water drainage
3. Judging from response to the 2nd discussion question proceed with activity 1.
4. Explain how good land preparation could affect the re-growth of weed and effectiveness of applied herbicide.

Activity

1. Ask two or three farmers to describe their current land preparation methods.
2. A critique of the methods described in activity 1 should be made by the group and areas that need improvement should be discussed.

Review questions

1. In what ways is it possible to reduce weed competition and increase production?
2. What are some methods of reducing water logging?
3. Why is ridging not very important in a watermelon crop?

Step 3. Choose desirable varieties

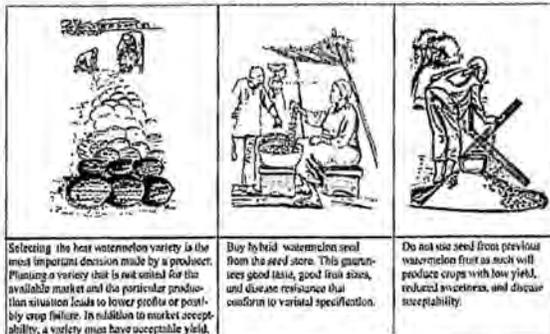
Specific objectives

By end of the lesson farmers will:

1. understand the benefits of using improved varieties.
2. understand the maturity class of watermelon varieties and agro-ecologies they are suited to
3. identify the characteristics of good watermelon varieties.
4. know where to get the improved varieties.

Discussion questions

1. Is anyone currently using or has used improved watermelon varieties? What are the characteristics of these improved varieties?
2. What are some advantages or disadvantages of using improved watermelon varieties
3. What characteristics of watermelon plant would you find beneficial?



Selecting the best watermelon variety is the most important decision made by a producer. Choosing a variety that is not suited for the available market and the particular production situation leads to lower profits or possibly crop failure. In addition to market acceptability, a variety must have acceptable yield, be adapted to the production area, and have the highest level of needed pest resistance.

Buy hybrid watermelon seed from the seed store. This guarantees good taste, good fruit sizes, and disease resistance that conform to varietal specification.

Do not use seed from previous watermelon fruit as such will produce crops with low yield, reduced sweetness, and disease susceptibility.

Training method

1. Ask discussion question 1 + 2.
 2. In addition to responses provided by farmers explain the advantages of using improved varieties. **Adv:** higher yield; pest and disease resistance; potential for higher income; Early maturity etc.
 3. Explain why farmers will need to purchase seeds from the seed store every year. This is because hybrid varieties will display reduction in yield if seed from last crop is grown.
 4. Ask discussion question 3.
 5. Proceed with activity 1.
- Ask review questions 1

Activity

1. An explanation of reliable sources of improved varieties will be this lesson's activity. List sources and contact information. Provide farmers with writing material.

Materials

- Pencil or pens for farmers.

Review questions:

1. How is it possible to acquire improved varieties?

Step 6. Planting watermelon

Specific objectives

By the end of the lesson farmers will:

1. choose the best time of year for planting according to their region.
2. choose the best planting method.

Discussion questions

1. What time of year do farmers start watermelon planting?
2. What factors influence planting time?
3. What other events or responsibilities coincide with planting season?
4. How deep should watermelon be planted and why that depth?
5. Which spacing is most appropriate for watermelon crop?



Plant 2 seeds of watermelon per hill at the depth of 3 cm; space at 100 cm apart on the row and 175 cm between the rows. Watermelon vines require considerable space.

Two crops can be planted in a year. Plant the first crop with the first or second rain, which occur mostly around February or early March (at this time moisture is just as much as the plants establish; the moisture increases later in the growing season). The crop sown at this time will hit the market between May and June, when the supply from the northern part of the country must have diminished completely.

Plant the second crop in September (at this time, the moisture is reduced as the season is gradually fading out). The crop planted at this time will hit the market around December, a time when there will not be supply from the north as most commercial production is done with irrigation in the off season. Planting in the north is done between October or November as the crop depend on irrigation.

Training method

1. Ask discussion questions 1, 2 + 3. Determine when planting usually occurs.
2. Explain that seeds planted when rains are steady establish better. Give times of wet season for forest region and savanna region.
3. Explain the two peaks of rain in the forest /forest transition zone that enable two crops of watermelon every year.
4. Inform farmers that if irrigation is available, watermelon could be planted through out the year.
5. Ask discussion question 4, and explain that the depth of 3 cm is best for watermelon, since it is a shallow feeder and it takes a long time to sprout if the seed is buried too deep into the soil.
6. Ask discussion question question 5, explain why the spacing of 100 cm by 175 cm is best for watermelon. Then move to Activity 1.

Activity 1.

1. Ask the farmers to demonstrate planting depth and spacing of watermelon.

Materials

- ❖ Pegs, cutlass, and a planting rope.

Review questions:

1. Why are crops planted during dry season unsuccessful?
2. Which times of the year in this specific region is it possible to plant watermelon

<p>Specific objectives By the end of the lesson farmers will:</p> <ol style="list-style-type: none"> 1. understand the reasons for and the benefits of fertilizing land. 2. be able to use the different fertilizing application techniques suitable for watermelon plants. 3. be able to apply the recommended dose of fertilizer <p>Discussion question</p> <ol style="list-style-type: none"> 1. Which farmers here are using fertilizers? Ask the relevant farmers their methods of applying fertilizer. 2. What are the prices of the three different fertilizers? 	<p style="text-align: center;">Step 7. Fertilize your soil</p> <div style="text-align: center;">  </div> <p>Training method</p> <ol style="list-style-type: none"> 1. Explain why fertilizing is important. Explain how plants take the nutrients they need from the soil worsening soil condition. Fertilizing puts the necessary nutrients back into the soil allowing future crops to prosper. 2. Explain that plants in poor soil are prone to disease and pests and they develop poorly. 3. Describe three different methods of fertilizing land: manure, cover crops and commercial fertilizing. 4. Describe the proper methods of using commercial fertilizer, type and contact information of providers. Discuss associated prices. 5. Ask <u>discussion questions 1 + 2.</u> 6. Proceed to activity 1 + 2 +3 <p>Ask <u>review questions 1 + 2.</u></p>	<p>Activity (demonstration)</p> <ol style="list-style-type: none"> 1. Use a representative container e.g. empty match-box to demonstrate the quantity of mineral fertilizer needed by a watermelon plant. 2. Demonstrate the splitting of Nitrogen fertilizer application to two. Use a smaller matchbox. 3. Demonstrate the 3 methods of fertilizer placement (ring application, side dressing and band application) <p>Materials</p> <ul style="list-style-type: none"> • Match boxes • Different fertilizer materials <p>Review questions:</p> <ol style="list-style-type: none"> 1. Why does continuous cropping eventually reduce the yield of future crops? 2. Why does fertilizing have the potential to increase yields?
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Step 9. Weed control

Specific objectives

By the end of the lesson farmers will:

1. understand how yields are reduced from weed competition.
2. be able to use the different weeding techniques discussed.
3. understand the benefits and disadvantages of each technique.

Discussion question

1. Ask farmers to share any negative experiences they have encountered from weed competition.



Apply pre-emergence herbicide prior to or within 12 hours of planting.



Shallow mechanical cultivation or hoe weeding are needed to control weeds before the vines start trailing. Pruning roots and vines with cultivating equipment slows melon development and reduces yield.

Several brands of pre-emergence herbicides are available to control germinating broadleaf weeds and grasses in seeded watermelons if used properly. Herbicides are economical when used appropriately. The following herbicides are commonly used in Nigeria.

Training method

1. Ask discussion question 1. Emphasize the importance of weeding.
2. Describe the 2 methods of weeding watermelon crop, the manual weeding that should be done before the plants start trailing and flowering. Preemergent herbicide should be used within 12 hours of planting
3. Manual weeding: **Adv:** possible to fully weed plot. **Dis:** time and labor intensive.
4. Herbicide: **Adv:** Fast and highly effective. **Dis:** Associated costs, potential health risks and crop risks if used ineffectively.
5. Perform activity 1. Ask review question 1.

Activity (demonstration)

1. Demonstrate the proper use of the knapsack sprayer. Use all the protective gadgets.

Materials

- Knapsack sprayer
- Solution to use in sprayer (need not be a herbicide solution)
- All necessary safety equipment

Review question

1. Considering your means and farming techniques and size of holding what weed control method is suitable for your farm?

Step 10 -12. Pest and disease control

Specific objectives

By the end of the lesson farmers will:

1. understand the negative impact of pests and diseases on yields.
2. know methods of controlling pests and diseases

Discussion question

1. Ask farmers to share their experiences with pests and diseases.

		<p>Dis- A preventive program that combines the use of cultural practices, genetic resistance, and chemical control as needed usually provides the best results.</p> 
<p>Treat fields previously in sod or fields with heavy infestations of weeds in the previous year with a soil applied insecticide at planting in control soil insect pests including curculionids.</p>	<p>Seedling plants are extremely susceptible to feeding damage from adult striped and spotted cucumber beetles, you may need to treat plants with a foliar applied insecticide to prevent complete defoliation.</p>	<p>Many of the fungal, bacterial and nematode pathogens survive in old crop debris and in soil. Rotate fields with non-susceptible crops for at least three years to reduce pathogen levels.</p>

Training method

1. Ask discussion question 1.
2. Perform activity 1. Identify definite signs of disease, which farmers may not have identified in activity.
3. Explain possible methods of disease control:
 - Treatment of seeds with nematicide and insecticide before planting.
 - Crop rotation.
 - Burning all diseased plants to prevent spreading
 - Communicating with other farmers about diseases and resistant varieties.
 - using resistant varieties.
4. Perform activity 2. Identify definite signs of pest infestation that farmers may not have identified in activity.
5. Explain possible methods of pest control:
 - Planting resistant varieties
 - Using pesticide.
6. Ask review questions.

Activities

1. Show farmers examples of diseased watermelon leaves and stems. Ask farmers to identify signs of diseases.
2. Show farmers examples of watermelon plants suffering from pest infestation. Ask farmers to identify signs of pest damage.

Materials

- Examples or pictures of diseased and pest infested watermelon plants.

Review questions

1. What is the method of obtaining pesticide?
2. What is the method of obtaining resistant varieties?

Step 13. Harvest your watermelon at the appropriate time.

Specific objectives

By the end of the lesson farmers will:

1. Identify the best time to harvest watermelon in their region considering local schedule.
2. understand the potential damage to watermelon fruits if harvesting is delayed.

Discussion question

1. At what time of the year does watermelon fetch the highest prices? Why? Does this coincide with harvest period?
2. How much time after planting does harvesting begin?

Watermelon reach harvest maturity 25-45 days after planting. Indications of ripeness include a change in the color of the ground spot from white to light yellow, a change of rind/rin color from the blue to green or brown and dry, shriveling the fruit, a noticeable ringing sound indicates immaturity, and a green mottled or dull sound indicates maturity or over-maturity. There is a reliable method to detect over-maturity or under-ripened melons.

The best method is to cut a few melons in various parts of the field. Harvesting and marketing goes on in ripe melons, harvest the demand by the consuming public. Sugar content does not increase after harvest; later in the melon will continue to develop after a slightly immature melon is picked.



Cut melons from the vine rather than pulling, twisting, or breaking off in random places of stem decay. Leave a long stem on the fruit.



Do not place melons with bottom sides turned up as the ground acts as easily sun scalded. Place melons from the field in straw or paper-padded vehicles. Do not allow field hands to ride on top of the load. After harvest load melons directly into trucks for shipment to markets.

Training method

1. Ask discussion question 1 + 2.
2. Ask in this region what the normal times are for harvesting cassava.
3. Explain that the optimum time for harvesting watermelon depends on the variety planted. Describe the signs of maturity to watch out for.
4. Ask which farmers are planting early maturing varieties and which farmers are planting full season variety.
5. Ask review question 1.

Review question

1. Of the farmers who are presently farming watermelon, depending on variety how many are harvesting at the optimum time?

Transportation and storage of watermelon fruits

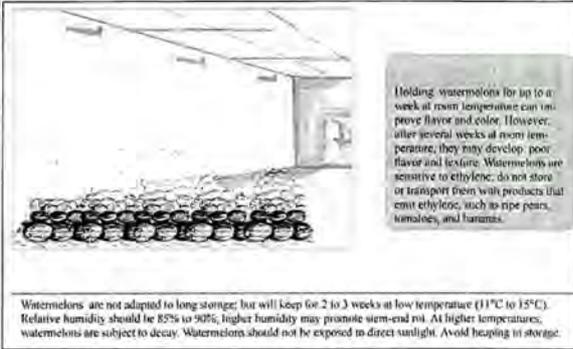
Specific objectives

By the end of the lesson farmers will:

1. know how to properly pack and transport watermelon fruits out of the field.
2. understand the length of storage and the attached conditions.
3. understand the risk of quality damage in storage.

Discussion question

1. What happens to watermelon if it is improperly stored? Are there any observable characteristics of watermelon that are not properly stored?



Training method

1. Explain that it is possible to store watermelon cob for as long as possible.
 2. Explain that storage can be difficult due the risk of insect pest attack
 3. Ask discussion question 1.
 4. Proceed to activity 1.
 5. Emphasize the importance of only storing healthy cobs.
 6. Proceed to activity 2
- Ask review question 1.

Activity

(demonstration)

1. Demonstrate the sorting and treatment of watermelon cobs to prevent field to store pests.
1. Show the picture of a watermelon storage crib and explain its peculiarities

Materials

- Watermelon cobs (good and damaged or a picture of a good and damaged watermelon cob)
- A picture of a good storage crib for watermelon

Review question

1. How can watermelon cob be stored for a long time?

Marketing of watermelon fruits



An important consideration in successful marketing is to have adequate facilities for transportation of the crop to the market outlets.

Although earliness usually results in higher prices, quality and maturity should be of prime importance in marketing watermelons.

Synchronizing the local harvest time with time of short fall in supply from the northern part of Nigeria where large scale production is carried out with irrigation is a good way to sell at higher price.

Watermelons usually are sold by weight at harvest time. Many are sold through temporary or permanent roadside stands or at farmers' markets.

Specific objectives

By the end of the lesson farmers will:

1. know how to properly store watermelon seeds.
2. understand the risk of insect and other pest when storing grains.

Discussion question

Ask a farmer to explain how he has been storing his watermelon seeds.

Training method

3. Explain that it is possible to store watermelon grains for as long as possible.
 4. Explain that storage can be difficult due the risk of insect pest attack
 5. Ask discussion question 1.
 6. Proceed to activity 1 and 2.
 7. Explain the activities of phostoxin and explain how detoxify the seeds when ready for use (remove from store and expose to fresh air for some hours)
 8. Explain the bagging of watermelon seeds and its storage in a ventilated place as illustrated in step15
1. Ask review question

Activity

(demonstration):

2. Demonstrate the shelling and proper cleaning of shelled seeds.
2. Demonstrate the fumigation of watermelon seeds in bags with phostoxin tablets

Materials

- watermelon Sheller
- tablets of phostoxin

Review question

2. *How can watermelon grains be stored for a long time?*

Good harvest and profits bring joy!



Training method

To end the session restate purpose of course. Explain to farmers that the methods presented in the book are researched and proven ways of increasing yield and profit given proper conditions. Explain that in using some of these methods farmers should be able to increase their yearly profit.

Discussion questions

2. Ask farmers which information provided in the course was new to them.
3. Ask farmers what methods they think they will be able to use in their farm.

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Total Development International Foundation (TODEV) is a Non governmental organization in Nigeria, that started operation in 1995 as WorldReach International. The focus of TODEV is to empower women, children and youths in the rural and urban area by making available information required for development. TODEV packages information required for setting up and managing agricultural enterprises profitably in a format easy to understand by all and sundry. Enterprise development, financing, career based guidance and social advocacy on technological issues are significant thrust of this vision.

e-mail: totaldevinternational@yahoo.com

Oke-Ogun Community Development Network (OCDN) is a grassroot organisation interested in the dissemination of information for development. OCDN has an information centre in Ago-Are and hopes to set up more information Centre in other locations in Oke-Ogun area of Oyo State in Nigeria.

