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Research to Nurish Africa

OCDN



Growing Maize commercially in **Nigeria**

a training manual

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a training manual

<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>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>Note to trainer: how to use this trainer's guide. Each page of this guide presents new ideas on how to farm cassava productively. After page 3 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 farmed cassava 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>Materials The materials needed in course: containers clayey soil, stony soil, loamy soil Hoes (one for each participant) Pencil or pens for farmers Variety of Maize plants Cutting knife Basket Chemicals or substitutes Protective equipment Inter-row weeder Knapsack sprayer Measuring equipment Maize 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>
	<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>	

General objectives of the course

At the end of this session the farmers will:

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

Discussion questions

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

How to grow a good maize crop in Nigeria

Pg 1

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 maize cultivation as well as to share in the farmers' traditional knowledge. The principal goal of this course is to introduce improved production techniques to farmers such that will increase their yield thereby convert sustenance farming into commercial farming.*
4. Read story; explain potential of increasing profits by using improved production technologies.
5. Ask discussion questions 1-4.






Specific objectives
By the end of this lesson farmers will:

1. be able to select the best sites for maize cultivation.
2. be able to identify soil quality that are important for production of good maize 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

				
Deep moderately heavy textured, sandy-loam soils are preferable.	Choose flat or fairly-flat well-drained soils	Adequate organic matter is important.	Avoid water-logged field	Avoid shades on the field.

Training method

1. Explain that although maize is grown in all areas of Nigeria, crop quality can be highly dependent on soil quality.
2. Ask discussion question 1 then explain importance of noting 5 identifiers of farm and quality: soil texture, topography, organic matter content, drainage, and vegetation.
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 that flat and gentle slopes are the most advantageous topography for maize 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 a good maize crop
7. Explain the negative effects of shade plant on maize 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 5 land quality identifiers; what are the positive or negative characteristics of your farm land.

<p>Specific objectives By the end of this lesson farmers will:</p> <ol style="list-style-type: none"> 1. judge their current methods of land preparation against new methods for strengths and weaknesses. 2. understand the benefits of minimal tillage and ridge and mound preparation. 3. be able to increase topsoil volume per plant. <p>Discussion questions</p> <ol style="list-style-type: none"> 1. What happens to crops if farmers fail to properly prepare land before planting? 2. What are good land preparation techniques? 	<p style="text-align: center;">Step 2. Land preparation</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td data-bbox="635 206 799 540"></td> <td data-bbox="799 206 969 540"></td> <td data-bbox="969 206 1164 540"></td> <td data-bbox="1164 206 1399 540"></td> </tr> <tr> <td data-bbox="635 540 799 656">Clear land well ahead of the rains.</td> <td data-bbox="799 540 969 656">Till the land properly for good soil aeration. Practice minimum tillage in sandy soils.</td> <td data-bbox="969 540 1164 656">Make ridges or mounds particularly in poorly drained soils.</td> <td data-bbox="1164 540 1399 656">Prepare the land a few days before planting to enhance good weed re-growth for effective herbicide control and avoidance of herbicide wastage.</td> </tr> </table> <p>Training method</p> <ol style="list-style-type: none"> 1. Ask <u>discussion questions 1 + 2</u>. 2. Describe benefits of minimum tillage: to conserve soil, organic matter, moisture, and reduce soil erosion. 3. Judging from the response of the 2nd question proceed with <u>activity 1</u>. 4. In using their plots as models and by making mounds explain how the method could increase topsoil volume per plant and lead to better plant establishment and reduced weed competition. 5. Explain how the time of land preparation will affect the re-growth of weed and effective herbicide use. 					Clear land well ahead of the rains.	Till the land properly for good soil aeration. Practice minimum tillage in sandy soils.	Make ridges or mounds particularly in poorly drained soils.	Prepare the land a few days before planting to enhance good weed re-growth for effective herbicide control and avoidance of herbicide wastage.	<p>Activity</p> <ol style="list-style-type: none"> 1. Ask two or three farmers to physically demonstrate their land preparation methods, comment on all positive characteristics then, if any, note areas which may need improvement. <p>Materials</p> <ul style="list-style-type: none"> • 1 or 2 hoes <p>Review questions</p> <ol style="list-style-type: none"> 1. In what ways is it possible to reduce weed competition and increase production? 2. What are some methods of reducing water logging?
										
Clear land well ahead of the rains.	Till the land properly for good soil aeration. Practice minimum tillage in sandy soils.	Make ridges or mounds particularly in poorly drained soils.	Prepare the land a few days before planting to enhance good weed re-growth for effective herbicide control and avoidance of herbicide wastage.							

Specific objectives

By the end of the lesson farmers will:

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

Discussion questions

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

Step 3. Choose desirable varieties

Choice of desirable varieties

The agro-ecological zone in which you want to plant determines the choice of varieties

Types of varieties:

Late-maturing varieties, matures in 110-120 days, good for zones with long rainy season.

Early-maturing varieties, matures in 90-100 days, can be planted after a late-maturing variety in zones with two seasons of rainfall.

Extra-early varieties, matures in 80-90 days, can be planted in zones with very short rainy season (12-3 months)

The best maize varieties:

Grow fast,

are high yielding,

mature earlier than the local varieties,

are rich in zinc, iron, vitamin A and quality protein,

utilize soil nitrogen efficiently,

are resistant to major pests and diseases e.g. stem borers, larger grain borers, downy mildew, maize streak virus, Striga etc. In some cases, some are drought tolerant

For high yielding and healthy plants, materials contact

IITA, ICRISAT

State offices of the Agricultural Extension Programme (AEP)

Agro-offices of the local government areas

Agents of registered seed companies

IAR, Zaria

ICRAT, Hoshangabad

NOTE: A list of registered high-yielding resistant maize varieties and the corresponding agro-ecological zones is attached

Training method

1. Ask discussion question 1 + 2.
 2. In addition to responses provided by farmers explain advantages and disadvantages of using improved varieties. Advantages: higher yield through pest and disease resistance; potential for higher income. Disadvantages: may cost money to purchase, may not be suitable for your environment, may require increased inputs.
 3. Explain that improved varieties are maize varieties created in research institutions. Characteristics are: *explain characteristics*.
 4. Ask, of those using improved varieties, have any of you had any problems using improved varieties?
 5. Ask discussion question 3.
 6. Proceed with activity 1.
- Ask review questions 1 + 2.

Activity

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

Materials

- Pencil or pens for farmers.

Review questions

1. Of the varieties available from IITA which would be most beneficial for this region?
2. How is it possible to acquire improved varieties?

Specific objectives

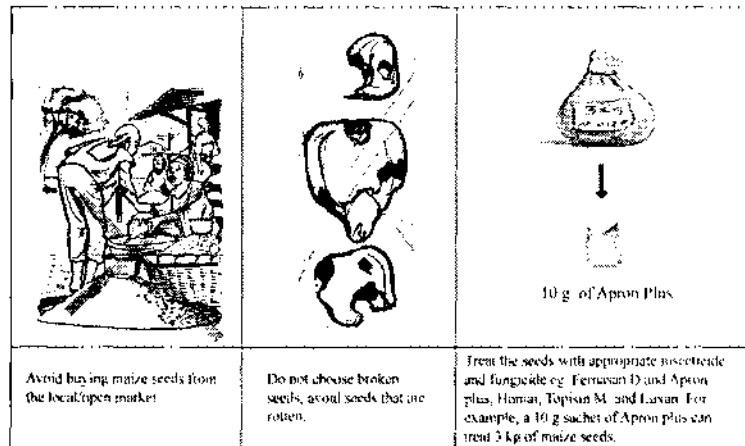
By the end of the lesson farmers will:

1. be able to select healthy planting materials from their crops.
2. describe characteristics of suitable vs. unsuitable planting materials.
3. identify the seed treatment chemicals.

Discussion questions

1. How do you choose the seeds to be used as planting materials?
2. What are the problems you may face if unsuitable seeds are chosen as planting materials?

Step 4. Select healthy maize seeds



Training method

1. First ask discussion question 1 + 2.
2. Explain the negative consequences of buying seeds for planting from the open market.
3. Proceed with activity 1.
4. Explain unhealthy/unsuitable seed; show damages on the seeds. Healthy/suitable plantable seeds are dry whole grains, without any broken portion and not shrivelled. Use examples to demonstrate the signs of damage.
5. Explain that healthy seeds are selected/chosen for propagation because they result in strong and healthy plants.
6. Proceed with activity 2.
7. Ask review questions 1.
8. Proceed to activity 3
9. Explain why seeds need to be treated with fungicide and insecticides (this is to prevent the infection of the emerging plants with diseases such as downy mildew. Also to prevent rodents and bird attack)

Activities

1. Display examples of healthy and unhealthy plants. Instruct farmers to pass them round and identify the good and negative characteristics of the plant.
2. Ask farmers to select out of a prepared seed lot, seeds that are not suitable for planting.
3. Show farmers samples of seed treatment chemicals and inform them of the rate of application

Materials

1. A portion of a healthy maize plant.
2. A portion of an unhealthy (seed fungus infected) maize plant.
3. A seed lot.
4. Sachet of seed treatment chemicals.

Review questions

1. Why should healthy seed be used as planting materials?

Specific objectives

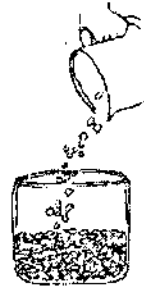
By the end of the lesson farmers will:

1. be able to treat maize seeds with pre-planting broad-based insecticides and fungicides.
2. farmers will explain advantages and disadvantages of treating seeds.

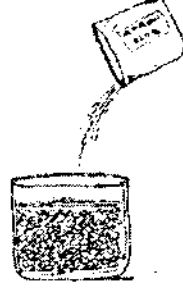
Discussion questions

1. Do any of the farmers here have experience in treating maize seeds with insecticide or fungicide? Was there a noted increase in yield and was there a long-term benefit (i.e., did you recover the cost of purchasing insecticide and fungicide)?

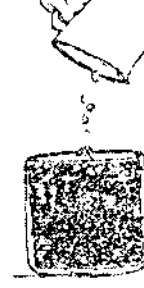
Step 5. Dressing maize seeds



Put half of the seeds you want to treat in a container.



Pour half of the Apron plus on the seeds.



Pour in the remaining half of the seeds.

Training method

1. Explain that infection of seeds by soil-borne disease causing fungus can result in total crop failure because the plants can not be rescued, once infected.
2. Proceed with activity 1.
3. Explain that seeds may or may not be treated with fungicide/insecticide. Explain the advantages and disadvantages of treatment. Advantages: protects plants against insects and disease; may increase yield and profits. Disadvantages: costs; health risks.
4. Explain and use all safety precautions necessary for chemical application.
5. Ask discussion questions 1.
6. Ask review questions 1.

Activities (demonstrations)

1. Demonstrate the treatment of seeds. Prepare solution using correct volumes of chemical and water. Explain the process.

Materials

1. Maize seeds
2. A container
3. Seed treatment chemicals
4. Protective equipment

Review questions

1. What precautions should be taken when using chemicals?

<p>Specific objectives <i>By the end of the lesson farmers will:</i></p> <ol style="list-style-type: none"> 1. choose the best time of year for planting according to their region. 2. understand the necessity of planting in rainy season especially when the rains are stable. 	<p style="text-align: center;">Step 6. Select correct planting time</p> <p>The planting date should be based on the previous history of rains in the agro-ecological zone of your choice and the local farming calendar. However, it is good to plant after 2-3 consecutive rains. This ensures good seed germination and proper plant establishment.</p> <hr/>	<p>Review questions</p> <ol style="list-style-type: none"> 1. Why are crops planted during the dry season unsuccessful? 2. Which times of the year in this specific region is it possible to plant maize?
<p>Discussion questions</p> <ol style="list-style-type: none"> 1. What time of year do farmers start maize planting? 2. What factors influence planting time? 3. What other events or responsibilities coincide with planting season? 	<p>Training method</p> <ol style="list-style-type: none"> 1. Ask <u>discussion questions 1,2 + 3</u>. 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 maize every year. 4. Inform farmers that if irrigation is available, maize could be planted through out the year. 	

Step 7. Methods of planting maize seeds

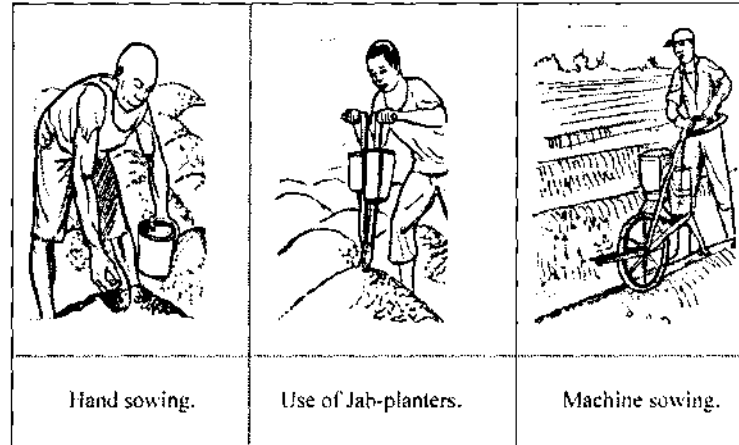
Specific objectives

By the end of this lesson farmers will:

1. understand the benefits of three different planting methods.
2. choose the best planting method considering the scale of production.

Discussion question

1. Can anyone demonstrate how they plant their maize seeds?



Training method

1. Ask discussion question 1. Examine advantages of presented method. Make note of any possible problems which may arise.
2. Proceed with activity 1 and 2. When presenting each method describe the characteristics of each method.
3. Explain choice of planting method depends on method of soil preparation.

Activity

1. Separate entire gathering into smaller groups of 2 or 3. Demonstrate 3 different planting methods.
2. Ask groups to repeat your demonstration in 1 above

Materials

- Maize seeds
- Jab planter
- Portable rotary planter
- Mounds or ridges from step 2

Review questions

1. What are the advantage and disadvantage of each of the planting methods?




Specific objectives
By the end of the lesson farmers will:

1. recognize the relationship between improper planting methods and small yields
2. identify proper spacing to be used depending on situation.

Discussion question

1. How does a maize farmer know how far to space his plants?

Step 8. Plant at correct spacing

			<p style="text-align: center;">Note</p> <ul style="list-style-type: none"> • The practice of alternating rows of maize with other crops is highly recommended, as it will allow the adoption of recommended packages for each crop. • The adequate plant population per hectare is 53,333 plants.
<ul style="list-style-type: none"> • An optimum plant population is essential for maximum yield in maize. • This depends on the cropping system (sole cropping or intercropping) 	<p>Sole crop Plant two seeds in holes that are spaced on ridges 0.25 m apart on the ridge and thin to 1 plant per hill two weeks after planting.</p> <ul style="list-style-type: none"> • Ridge mounds should be spaced 0.75 m apart or plant three seeds in holes 0.50 m apart and thin to 2 plants per hill two weeks after planting. 	<p>Intercrop</p> <p>The intra-row spacing should be wider than that for sole cropping</p>	

Training method

3. Ask discussion question 1. After discussion emphasize that spacing is dependent on the variety of plant and whether plot is sole maize or if it is intercropped.
4. Explain that sole cropped maize needs less space than intercropped maize.
5. Ask review question 1 + 2.
6. Proceed with activity 1. Explain that necessary spacing which depends on the cropping system and maize stands per hill, should be determined during land preparation (step 2) in order to correctly space mounds and ridges.

Activity (demonstration)

1. Demonstrate planting sole crop at the spacing of 0.25 m using a stick of the same length to show the spacing

Materials

- Sticks or pegs of 0.25 m, 0.50 m and 0.75 m

Review questions

1. What cropping system of maize needs the least amount of spacing?
2. What cropping system of maize needs the most amount of spacing?

Step 10. Fertilize your soil



Specific objectives

By the end of the lesson farmers will:

1. understand the reasons for, and the benefits of fertilizing land.
2. be able to use the different fertilizing application techniques suitable for maize plants.
3. be able to apply the recommended dose of fertilizer

Discussion question

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?

	
<ul style="list-style-type: none"> • The need for adequate and balanced nutrition of maize is important. N, P and K are essential for obtaining high yields of maize. • Types of fertilizers needed, NPK, eg. 15-15-15 CAN? urea, organic fertilizers, eg. animal dung, farmyard manure and composts. 	<p>Time of Application</p> <ul style="list-style-type: none"> • Do this in two split doses. For the two applications, nitrogen is critical for maize; ensure that the rate of 100-120 kg ha⁻¹ of nitrogen is applied.

Training method

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 method of using commercial fertilizer, type and contact information of providers. Discuss associated prices.
 5. Ask discussion questions 1 + 2.
 6. Proceed to activity 1 + 2 + 3
- Ask review questions 1 + 2.

Activity (demonstration)

1. Use a representative container e.g. an empty matchbox to demonstrate the quantity of mineral fertilizer needed by a maize 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)

Materials

- Matchboxes
- Different fertilizer materials

Review questions

1. Why does continuous cropping eventually reduce the yield of future crops?
2. Why does fertilizing have the potential to increase yields?

Step 9. Weeds 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.

		
<p>When pre-emergence herbicides are used, the field should remain weed-free for most of the time that maize is on the field. Pre-emergence herbicides that are good for maize include . . . Pre-emergence herbicides are used after planting and before emergence. The amount to use is . . .</p>	<p>Manual or hand weeding -- Do hand weeding after planting, just before the second dose of fertilizer application. NOTE: If the field is weedy at the time of application of the first dose of fertilizer, do weeding before the application.</p>	<p>Post-emergence weed control can be done with careful use of post-emergence herbicides. Apply Graminaxone only about 8-9 weeks after planting, using spray guards NOTE: The 2nd application of Graminaxone might not be necessary if you don't have weeds on the field.</p>

Training method

1. Ask discussion question 1. Emphasize the importance of weeding.
2. *Describe each method indicating proper technique and advantages and disadvantages.*
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.
6. Ask review question 1.

Activity (demonstration)

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

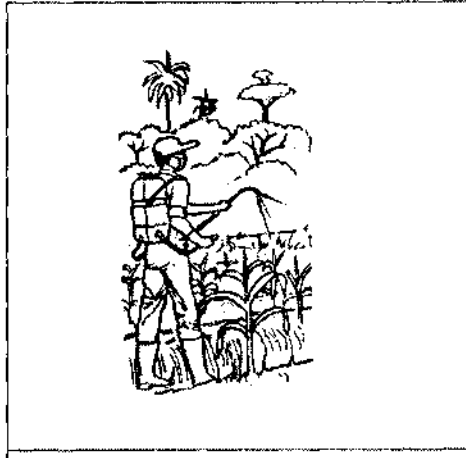
Materials

- 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 holdings what weed control method is suitable for your farm?

Step 9b. Herbicide use in root and tuber crops



Specific objectives

By the end of the lesson farmers will:

1. be able to differentiate between the different herbicides available.
2. obtain information on how to acquire chemicals.
3. correctly prepare chemical solution to use in a backpack sprayer.

Discussion question

1. Has anyone used herbicide on their crops (need not be restricted to maize) before? Ask farmers to share experience and advice for other farmers.
2. Is anyone familiar with prices of herbicide? Of those who have used it before did the increase in yield equal or surpass the price of the chemical?

Training method

1. Open with discussion question 1 + 2.
 2. Explain the difference between the two types of herbicides: selective and complete killing.
 3. Introduce selective killing herbicides for use on maize crop *alachlor, atrazine+metolachor, atrazine+alachor, floumeturon.*
 4. Instruct farmers on how to use the table on page 14 and identify differences among herbicides.
 5. Introduce total killing herbicides *paraquat, glyphosate* for use on maize crop.
 6. Explain the characteristics of total killing herbicides, how to use properly, in what situations and what damages to expect if used improperly.
 7. Proceed with activity 1.
- Ask review question 1 + 2.

Activity (demonstration)

1. Using a backpack sprayer, a container, chemical and water prepare a solution to use in backpack sprayer. Carefully explain that the product rate shown on the table on pg. 13 indicates how much chemical is to be used per hectare **when 200L/ha of solution is delivered.** Explain to determine how much chemical is needed in sprayer; divide product rate by delivery rate and multiply by size of sprayer in liters.

Materials

- Backpack sprayer
- Container
- Water
- Herbicide (need not be herbicide but some other liquid other than water).
- Measuring equipment

Review questions

1. Give chemical and ask what type of herbicide, complete or selective, is it? What type of weeds does it control?
2. Give chemical and ask for a 20 L backpack sprayer; how much chemical is needed?

Step 9. Recognition of weeds

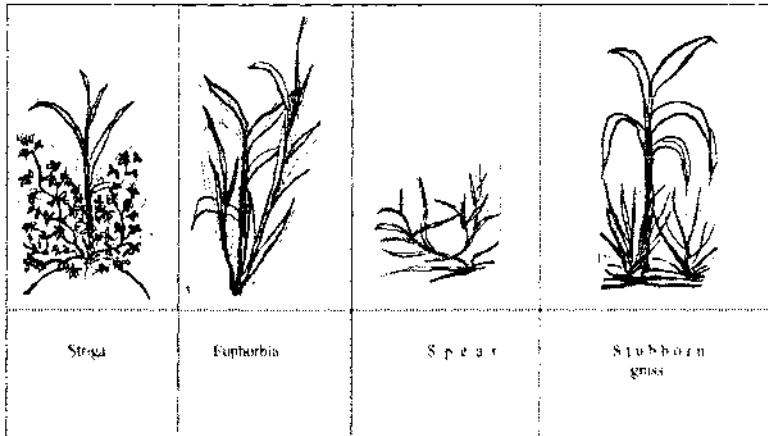
Specific objectives

By the end of the lesson farmers will:

1. recognize the noxious weeds that could affect their maize crop.
2. know how best to control each of these weeds

Discussion question

1. Has anyone encountered any of these weeds on his maize farm? If yes what was the effect of such on the maize yield?



Training method

1. Explain the potential damage noxious weeds could have on maize crop.
2. Proceed to activity 1 and explain the threshold of damage each could have on the maize crop
3. Ask discussion question 1.
4. Explain some of the ways of controlling the weeds. For example, for *Striga*, the farmer should plant *Striga*-tolerant varieties; for spear grass preemergent herbicide could be used.
5. Proceed with review question 1.

Activity



1. Identify the 4 noxious weeds affecting the maize crop (as shown in section 9)

Materials

- Potted plants of the weeds possibly at their full maturity stage

Review question

1. If any of these weeds were to be on a farmer's field, what step should the farmer take to have a good crop of maize?

Step 10 -12. Pests and disease control		
<p>Specific objectives By the end of the lesson farmers will:</p> <ol style="list-style-type: none"> 1. understand the negative impact of pests and diseases on yields. 2. know the methods of controlling pests and diseases <p>Discussion question</p> <ol style="list-style-type: none"> 1. Ask farmers to share their experiences about pests and diseases. 	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p data-bbox="820 603 1185 643">Spray with insecticides eg. Pyrethex, Karate, etc., at the rate of 1 liter per hectare.</p> </div> <div style="text-align: center;">  <p data-bbox="1229 603 1588 659">Ensure proper field cleanliness and remove all alternative hosts. In the case of rodents, clear surrounding bush</p> </div> </div>	<p>Activities</p> <ol style="list-style-type: none"> 1. Show to farmers examples of diseased maize leaves and stems. Ask farmers to identify signs of diseases. 2. Show to farmers examples of maize plants suffering from pest infestation. Ask farmers to identify signs of pest damage. <p>Materials</p> <ul style="list-style-type: none"> • Examples or pictures of diseased and pest infested maize plants. <p>Review questions</p> <ol style="list-style-type: none"> 1. How can you obtaining pesticide? 2. How can you obtaining resistant varieties?
	<p>Training method</p> <ol style="list-style-type: none"> 1. Ask <u>discussion question 1</u>. 2. Perform <u>activity 1</u>. Identify definite signs of disease which farmers may not have identified in activity. 3. Explain possible methods of disease control: <ul style="list-style-type: none"> • Pre-planting treatment of seeds with fungicide and insecticide. • burning all diseased plants to prevent disease spread • communicating with other farmers about diseases and resistant varieties. • using resistant varieties. 4. Perform <u>activity 2</u>. Identify definite signs of pest infestation that farmers may not have identified in activity. 5. Explain possible methods of pest control: <ul style="list-style-type: none"> • Selecting healthy seeds for planting. • Planting resistant varieties • Using pesticide. 6. Ask review questions. 	

Step 13. Harvest your maize at the appropriate time

Specific objectives

By the end of the lesson farmers will:

1. identify the best time to harvest maize in their region considering local schedule.
2. understand the potential damage to maize grains if harvesting is delayed.

Discussion question

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



(Harvest as soon as the maize cobs are mature. Time of harvesting depends on Type of maize variety planted (extra-early, early, intermediate or late) and utilization (fresh cobs, grains)

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 maize depends on the variety planted and the use of the grains.
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 maize, depending on variety how many are harvesting at the optimum time?

Specific objectives

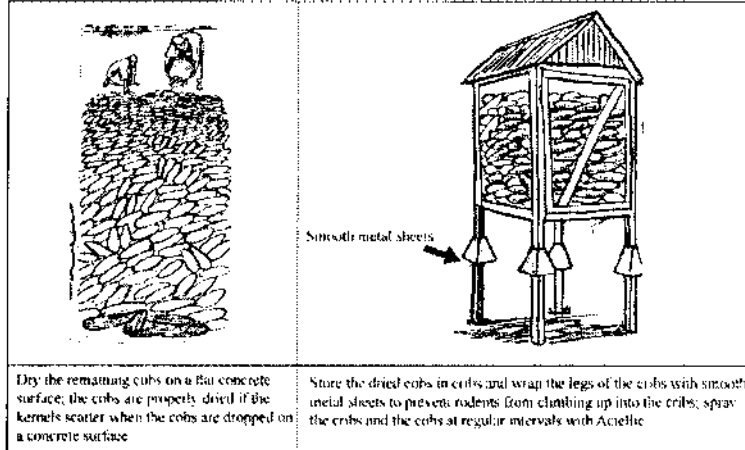
By the end of the lesson farmers will:

1. know how to properly store maize cobs or seeds depending on length of storage and climatic conditions.
2. understand the risk of insect and other pest when storing grains.

Discussion question

1. What happens to maize cobs if improperly stored? Are there any observable characteristics of maize cobs that are not properly stored?

Storage of cobs



Training method

1. Explain that it is possible to store maize cobs 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 storing only healthy cobs
 6. Proceed to activity 2
- Ask review question 1.

Activity (demonstration)

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

Materials

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

Review question

1. *How can maize cobs be stored for a long time?*

Specific objectives

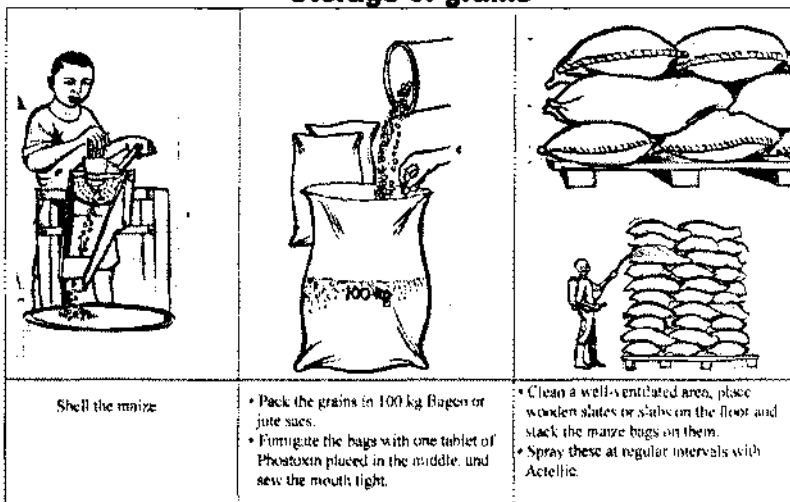
By the end of the lesson farmers will:

1. know how to properly store maize 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 maize seeds.

Storage of grains



Training method

3. Explain that it is possible to store maize 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 maize seeds and its storage in a ventilated place as illustrated in step15

Ask review question

Activity (demonstration)

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

Materials

- maize sheller
- tablets of phostoxin

Review question

2. *How can maize 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

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

The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to encourage the development of open learning and distance education, through the fostering and sharing of knowledge, resources and technologies. Headquartered in Vancouver, Canada, COL is the world's only intergovernmental organisation dedicated solely to promoting and delivering distance education and open learning, and is the only official Commonwealth agency located outside Britain.

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The International Institute of Tropical Agriculture (IITA) was founded in 1967 with a mandate for improving food production in the humid tropics and to develop sustainable production systems. It became the first African link in the worldwide network of agricultural research centers supported by the Consultative Group on International Agricultural Research (CGIAR).

www.iita.org

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 grassroots 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.

