



SEEDBANK & WEED MANAGEMENT

CULTIVATING COMMUNITY, PORTLAND ME

Summary

This resource is designed to be a module in Cultivating Community's Advanced Farm Production curriculum. Built for farmers who are familiar with the difficulty of weed management and frustrated by crop quality and pest problems that result from weed competition, this workshop is a standalone class designed to emphasize the value of preventing weeds from going to seed.

The need: Crop quality and pest populations are directly related to efficacy of weed management strategies. All farmers benefit from having cleaner fields and more manageable soil.



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Who made this guide?

Collaboration and Testing

ACKNOWLEDGMENTS: This teaching resource was developed by Alex Redfield of Cultivating Community in Portland ME, in partnership with the Institute for Social and Economic Development (ISED Solutions). Refugee farmer training programs across the country provided feedback on this lesson, which is now integrated throughout the guide. From 2015 to 2017, ISED partnered with twelve refugee farmer training programs through a USDA BFRDP educational enhancement grant, to support the design and testing of new and shareable teaching resources for culturally and linguistically diverse farmers. To learn more about this project, or to access the whole list of newly developed teaching resources for refugee farmer training programs, see the [New American Resource Library at https://nesfp.org/new-american-resources](https://nesfp.org/new-american-resources). For more in-depth explanations of the teaching approaches and activities used in these materials, please see the [‘Refugee Farmer Teaching Handbook’](#). While these resources were designed with refugee audiences in mind, they can be adapted and used in any farmer training or incubator setting.

VARIATION:

Throughout this guide, boxes (like this one) contain variations and adaptations that serve varying programs and farmers. They are suggestions and reflections from other programs based on how they made this workshop work for them.

TEACHING TIP:

Throughout this guide, boxes (like this one) contain teaching tips to help you better facilitate farmer learning. Most come from other programs who have tested and reflected on using this lesson.

DEVELOPER’S NOTE:

Throughout this guide, boxes (like this one) contain notes from this guide’s developer that provide insight into how a lesson is typically taught at the developer’s program.

ICONS: You will find the icons below throughout this guidebook. They are there so you are prepared for the activity and can get an idea of what it will bring at a glance.



POWERPOINT



TALKING POINTS



DISCUSSION



VOCABULARY

Reviews and Core Skills

WHAT TESTERS SAY:

“I love how hands-on/participatory this workshop is, and how “into it” it sounds like Alex’s group got. Good initial focus for farmers (why they care about weeding ‘making a million bucks’). This resource has a great sense of humor—it seems enjoyable and relatable for participants.”

- *Hannah, All Farmers, CT River Valley, MA*

“I appreciated the note in farmer background and experience. Love the bead demonstration, I am definitely going to do this. Bottle idea is great. Great helpful overview that breaks down the purpose/objective of the slideshow vs activities.” - *Elizabeth, International Rescue Committee in Charlottesville VA*

CORE SKILLS:

- Hand tools usage
- Mulch
- Black plastic usage core skill
- Weed ID
- Seed bank concept

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Audience and Objectives

Adaptable except where noted.

OBJECTIVES: At the end of this module, farmers will be able to

- Understand and define 'Weed Seed Bank'
- Identify 3 different methods of physically disrupting weed growth /identify weed management strategies useful on their farm
- Comprehend why weed management increases profitability.
- Identify the 3 stages of weed lifecycles (Germination, white thread, mature.)
- Connect weed management with crop and soil health

TIME / SEASON: 1 hour, Off-season

LANGUAGE / LITERACY: Appropriate for all levels with interpreter

STAFF / INTERPRETER: 2 staff ideal, interpreter required

Some activities will be doable without interpretation - but would need to happen in-season and in-field to be able to use real examples of what the activities are demonstrating.

FARMING EXPERIENCE:

- Farmers with at least a year of growing experience should be able to achieve the learning objectives
- Farmers who have any sort of production experience should be familiar enough with weeds. The importance of the lesson may be best imparted to those managing more than a small garden plot and who have tenure on a piece of land for more than one season at a time.

REGION / CLIMATE: Appropriate for all climates

Specific weeds mentioned in workshop could be adjusted to fit your local weed population.

LOCATION: Classroom

MATERIALS NEEDED:

- Clear vessel (old aquarium, clear plastic rubbermaid bin, vase)
- Sand/soil
- Beads/Beans/Anything small to stand in as weed seed. You need many of these.
- Plastic bottle/Anything that can hold the weed seeds, will stand in as mature weed plant
- Projector/Computer
- Pipe cleaners

Resources needed

Adaptable except where noted.

TIME: 1 hour

STAFF / INTERPRETERS: 2 Staff Members and 1 Interpreter

LOCATION: Classroom

- SUPPLIES:**
- Clear vessel (old aquarium, clear plastic rubbermaid bin, vase)
 - Sand/soil
 - Beads/Beans/Anything small that will stand in as a weed seed. You need a lot of these.
 - Plastic bottle/Anything that can hold the weed seeds, will stand in as mature weed plant
 - Projector/Computer
 - Pipe cleaners



WEED MANAGEMENT POWERPOINT

Slideshow

1

TIME: 10-20 minutes

OVERVIEW:

This activity is comprised of a slideshow designed to introduce how weed growth can grow exponentially over time and to introduce the concept of reducing weed pressure from year to year. Additional activities mentioned below should be completed at the appropriate point in the slideshow. The slideshow is intended to remind farmers about how weeds can impact profitability and plant growth - pictures of weedy fields, pictures of pest habitat, pictures of poor quality crops are all useful to include.

MATERIALS NEEDED:

- Computer
- Projector

OBJECTIVES / LEARNING:

By the end of this activity, participants can:

- Name/ differentiate between sandy, silty, and clay soils by sight and/or touch
- Know what organic matter is and name at least two sources
- Describe effect of sand, silt, clay, and organic matter on water drainage

VOCABULARY

Seed Bank
Seedbed
Germination



STEP 1: SLIDE 1

Intro! At NASAP, we find it effective to talk about money first and foremost for almost every topic. The strongest motivator we have is to frame workshop conversations in terms of 'how we're going to make a million bucks.' Farmers like to joke about it, but it sets the tone for the additional materials designed to connect weed management and profitability. You could include additional pictures of nice weed-free fields to get farmers interested.

STEP 2: SLIDE 2

- Remember how we talked about plants needing food from the soil. Fertilizer, compost, they need to consume this food to become strong and healthy, just like humans.
- Imagine you have a pizza with 6 slices to share with your family. What happens if more people show up to dinner to eat your pizza? People don't get enough food and are still hungry. Imagine weeds doing the same thing, they show up to eat your crops food.

STEP 3: SLIDE 3

When there are weeds in your field, they make a nice place for pests to stay warm and protected. More weeds = more places for the bugs to live.

STEP 4: SLIDE 4

Why are weeds a problem? They make it harder to see and solve problems with your crops.

STEP 5: SLIDE 5: WEED SEEDBANK ACTIVITY**Key takeaways:**

- There are tons of weeds in the soil all the time. They just need a little bit of light to get started.
- If they mature enough to form seeds - hundreds of thousands more seeds are put back.
- Review 'germination' vocab.
- Introduce 'Seedbed' vocabulary during discussion of how soil is prepared and how exposure to light (less than 1/100th of a second is all that's needed to trigger germination).

VARIATION:

This can be done now as part of this PPT review or during Activity 2. See Activity 2 below for a description.

STEP 6: SLIDE 6

Mature weed pictures

STEP 7: SLIDE 7

The bank metaphor worked well in our delivery of this workshop. The idea of putting something in and taking something out is easily comprehended. 'If you put in \$100 and spent \$100, there's \$0 left. You want to end up with 0 weed seeds left in the bank.'

STEP 8: SLIDE 8

- Pull them out
- Cut off the tops
- No sun

TEACHING TIP:

One reviewer added: "When I talk to farmers about this topic, I talk about how nature does not like to be "naked" and it is not natural for her to have open ground. Weeds are a way of protecting against erosion. Of course, we don't want weed seeds, but we should strive to have covered soil, through planting vegetables closer, mulching, cover crops, to prevent erosion and protect soil. If we do that job, then weeds don't have to."

STEP 9: SLIDE 9

- Cover crops
- If your farmers have received training/TA around cover crops, you can specify which crops do a good job at shading weeds out (buckwheat and Sudan grass, for us.) trigger germination.

TEACHING TIP:

One reviewer suggested prefacing slide 8 with a discussion/demonstration of how farmers like to manage weeds (by hand, different tools?) to gather experience and ideas.

STEP 10: SLIDE 10: TOOLS

Pictures of tools in use at your farm are useful additions here. I brought in several of the different types of hoes we use frequently and we discussed whether each one was designed to pull out weeds, bury them, or slice off the growing tip.

Key takeaways:

- Using the right tool is easier for you and saves you time.
- Lots of different tools to choose from
- The only way to keep on top of tons of weeds is to get them when they're small with the right tool.

VARIATION:

This can be done now as part of this PPT review or during Activity 3. See Activity 3 below for a description.

STEP 11: ASSESS AND REFLECT

Questions or topics for reflection:

- Why is it important to work on your weed management this year?
- What vegetables is it especially important to keep weeded?
- What tools do you like to use that help manage weeds?
- What can staff do to help you if your weeds get out of control? (We want farmers to actively ask us to help with mowing before seed heads form.)

Weed Seedbank

2

TIME: 30 minutes

OVERVIEW:

In this activity farmers will understand the seedbank as well as the lifecycle of the weed through demonstrations and reflection questions.

MATERIALS NEEDED:

- clear basin (rubbermaid tub, vase, aquarium),
- soil/sand, beads/seeds/beans, soda/water bottle
- pipe cleaners or other immature weed stand in

OBJECTIVES / LEARNING:

By the end of this activity, participants can:

- Understand and define 'Weed Seed Bank'
- Identify the 3 stages of weed lifecycles (Germination, white thread, mature.)

This demonstration is designed to replicate what is happening in the soil in each farmer's' fields.

STEP 1: REPLICATING

Start by filling the basin with soil or sand to represent a small section of a field.



TALKING POINTS: *"In each cubic foot of soil, there can be hundreds of thousands of weed seeds. Some may have blown in on the wind, some may have dropped from mature weeds, some may have been there for years and years. Pigweed seeds, for example, can last 30 years in the soil without any sunlight, just waiting to wake up."*

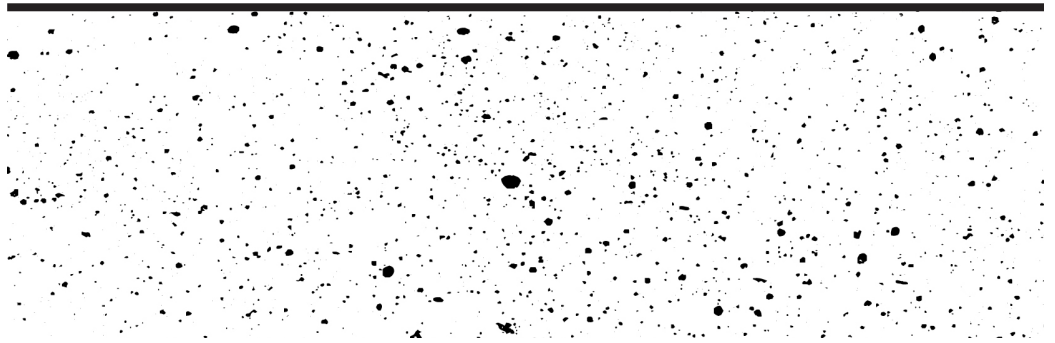
Some seeds only need a fraction of a second of sunlight to wake up, when we use our rototiller or tractor to prepare the soil, we mix up the soil and give the seeds the signal that it's time to start growing.

STEP 5: POUR AND MIX

The beans or beads will stand in for our weeds - pour them in the basin and mix them thoroughly in the soil.

STEP 3: DRAW

On a chalkboard or whiteboard, draw a single line and lots of dots underneath it to represent the soil surface.



VARIATION:

A reviewer suggested a way to demonstrate the benefit of no-till over the course of a year or more, you could set up the activity slightly differently: "Make two identical containers with beads mixed well into the soil. In each bin, we would till one time (beginning of the season) and for every exposed bead, would have farmers replace it with a pipe cleaner "seedling". Then we would have them weed them. Then we would have a farmer till only one bed, unearthing more beads, while the other one is no longer tilled, exposing more beads which turn into seedlings, to represent the weeding effort required for more tilling."



TALKING POINTS:

1. "Each dot here represents a weed seed, just like the beans the soil in the basin. These seeds can be buried deep in the soil for years, asleep. But just a little bit of light or disturbance can wake them up and tell the seed it's time to start growing."
2. "Each time you till or dig or disturb the soil, a certain number of weeds wake up and start to grow. Some of them will never make it if they're too deep or too old or too weak, but lots of them will - these are the weeds that grow in your field."

STEP 5: DEMONSTRATE

At this point, stick in your pipe cleaners or popsicle sticks or whatever else you have to demonstrate short, immature weeds.

TALKING POINTS: "These are little weeds that are growing - you woke them up, now they're competing with your crop for food and water and sunlight."

STEP 6: VOCAB

What's this called?

Review of germination vocabulary

"Letting them continue to grow can starve your crop or make it sick, meaning you don't have as much to harvest, meaning less money. What happens if you let them keep growing?"



STEP7: SLIDE 6

Progress to the slide with the mature lambsquarter picture

“These weeds act like any other plant - they keep growing and getting old. Once they’re big enough, they’ll make more and more seeds.”

STEP 6: BOTTLE

- Put your soda/water bottle filled with beans/seeds in the soil. I taped a picture of a mature weed with seed heads forming to the bottle to stand in.

TALKING POINTS:

“Imagine this is a big pigweed and you missed it when you were weeding your fields. A plant like this, if you don’t kill it early, can make another 100,000 seeds to put back in the soil.”

“If you don’t pull it out or cut it down, it’ll drop those seeds right back in the soil, where they’ll go to sleep until next year, leading to more and more weeds every year.”

- Pour the seeds from the bottle into the soil, demonstrating how you’re making a deposit in the seedbank.
- This is the time to emphasize how preventing weeds from going to seed makes your farm cleaner year after year and that frequent disturbances of the soil bring new seeds to the surface.

STEP 7: ASSESS AND REFLECT

- What does letting weeds go to seed do to your field in the future?
- Put flashcards in order from seed to mature weed.
- At what stage in the growth cycle is it easiest to prevent weeds?

VARIATION:

If the season permits, replicate this experiment with a real seed bed and hoe! One reviewer suggested even planting a quick weed seed bed beforehand to give a great demo. If doing this in the field, you can relay the oral parts of the ppt without needing to show the pictures.

Importance of Tools

3

TIME: 5 minutes

OVERVIEW:

Through demonstration, this activity shows how different tools address the problem of weeds. Farmers reflect on the different tools and methods for killing weeds.

MATERIALS NEEDED:

- setup from previous activity
- handhoe
- stopwatch or phone with timer

OBJECTIVES / LEARNING:

By the end of this activity, participants can:

- Identify 3 different methods of physically disrupting weed growth / identify weed management strategies useful on their farm

VOCABULARY

'White Thread'

'Going to seed'

Crop Rotation

STEP 1: DEMONSTRATION

So, we have this tub of soil and seeds with tiny little pipe cleaner weeds sticking up. The next activity is a demonstration of how using tools is faster than weeding by hand. This is obviously done easily in the field with real tools and small weeds, but we ran a time trial in the workshop as an off-season reminder.

STEP 2: HANDS

Ask a volunteer to pull each of your pipe cleaner weeds out of the bed, and another volunteer to time them. It took about 15 seconds when we ran it.

STEP 3: TOOLS

Then, put the weeds back in and get a different volunteer to use the hand hoe to scrape them out and time them. It took 3 seconds in our trial. *This gives you an opportunity to demonstrate that, on long beds of weeds - it can be five times faster to use a cheap, simple tool than to work by hand.*

TEACHING TIP:

One reviewer suggested giving farmers some idea of how often to go through with a hoe to catch most all weeds at the thread stage.

NOTE: The following workshop in our curriculum focuses on introducing appropriate tools for weed control. We've found farmers are often excited by looking at the wide variety of tools that are available and introducing the concepts of '3 ways to kill a weed' informs that discussion well.

STEP 4: ASSESS AND REFLECT



1. What are the three ways to kill a weed? (Desiccation, decapitation, burial - somber, I know or plain language equivalent.)
2. What tools work well for each method of weed control?
3. Which tools do you have on your farm and when are they most effective?
4. What other tools have you seen farmers use to prevent weeds?

VARIATION:

One reviewer suggested: “With this activity set up, you could even do a demonstration of occultation, by sticking pipe cleaners in the soil, and then laying a tarp on them and pressing down, causing all the pipe cleaners to fall over, representing their death.”