Seed Saving for Home Gardeners

OVERVIEW

LEARNING OBJECTIVE

Gardeners will review seed saving techniques for home garden use. Gardeners will also gain practical experience in seed processing, grading, and storage.

DURATION

MATERIALS NEEDED

- Flipchart and markers
- Examples of imperfect or perfect flowers (optional)
- Fleshy fruits, such as tomatoes, eggplant, cucumber, or bitter gourd (no hybrid varieties)
- Dried seed pods from either beans, cowpeas, kale, broccoli, cabbage, cauliflower, mung bean, dried okras, or dried chilies (no hybrid varieties)
- Jars and plastic bottles that can be tightly sealed
- Dried rice and/or charcoal
- Filter, old cloth, or colander
- Water
- Knife and spoon
- Examples of airtight containers containing properly stored seeds

KEY CONCEPTS

- Saving your own seed allows gardeners to reproduce the best growing and best tasting plants season after season.
- Saving seeds, particularly from culturally important and locally adapted varieties, helps preserve plant diversity and food traditions.
- Seeds must be carefully selected, processed, dried, and stored so that quality is preserved until planting.

TRAINING AGENDA

1	Introduction and warm-up	DISCUSSION	10 min
2	Why save seeds?	DISCUSSION	20 min
3	Pollination and what it means for seed saving	DISCUSSION	30 min
4	Start saving your own seed	DISCUSSION	1 hour
5	Seed extraction, processing, and storage	PRACTICAL ACTIVITY	45 min
6	Closing	DISCUSSION	10 min

10 min

1. Introduction and warm-up

Welcome gardeners to the training. Do a brief introduction to today's topic and review the training agenda. You may want to outline the training agenda on your flipchart or board so gardeners can see it when they arrive.

Conduct a warm-up exercise or ice-breaker to make sure all gardeners feel welcome and are ready to fully participate. Suggested warm-up and ice-breaker activities can be found in the Facilitator's Guide: Encouraging Learning through Participant Engagement.

Participant Engagement Guide

20 min

2. Why save seeds?

INTERACTIVE DISCUSSION

GOAL OF THE DISCUSSION: Gardeners will share thoughts and experiences on the benefits of seed saving.

1. Ask gardeners if any of them have saved seeds from their gardens in the past. Invite them to share their experiences.
2. Ask gardeners if any of them have ever received garden seeds saved by neighbors or family members. What was good or bad about the experience? What was helpful or unhelpful about the experience?
3. Encourage a discussion among gardeners about why seed saving is important and how it can help them and their community. Why is it important to learn about and teach others how to save seeds?

KEY MESSAGES

- Seed can be saved for species whose seed is not available for sale locally or seed has known quality issues.
- By choosing seeds from the plants that perform the best in your specific landscape you can also be sure to have locally adapted varieties that are well suited to your context and needs.
- Choosing seeds from your best tasting plants also means that you can keep planting that variety and have good quality vegetables available in the future.
- By allowing more plants to go to seed, rather than harvesting them or tilling them into the soil, you are also helping important pollinators who love the flowers. These pollinators help keep our gardens healthy.
- Saving seeds from culturally important varieties that are disappearing over time ensures that these species continue to be part of the dishes and food culture of your region. This means that your children will be able to taste and feel connected to them as well.
- Exchanging your seeds with others in your community is also a wonderful way to connect with your neighbors, gain their trust, and show your support of them. Our community is stronger if we all have a diverse diet and enough to eat. Excess seed can also potentially be sold to generate additional income.
- Learning about and teaching others to save seeds helps maintain cultural heritage and seed security. Seed saving can help prevent local varieties from disappearing. Learning how effectively save seed will also build the quality of seed available locally.

30 min

3. Pollination and what it means for seed saving

INTERACTIVE DISCUSSION

GOAL OF DISCUSSION: Gardeners will have an understanding of the different ways plants pollinate their flowers and how this knowledge can help them save better seed for their gardens.

MATERIALS NEEDED:

- Flipchart and markers
- Examples of imperfect or perfect flowers (optional)

1. Ask gardeners how pollination happens. Discuss and identify the parts of male flowers and female flowers. Identify pollen and stigma from the flowers.
2. Discuss with gardeners that plants pollinate in different ways, which makes it easier or harder to save their seed. Draw pictures of perfect and imperfect flowers to illustrate how pollination can change depending on the crop.
3. Build a list of self-pollinated, cross-pollinated, or mixed pollination crops on your flipchart.
4. Ask gardeners to discuss in pairs the difference between hybrid and open pollinated seeds. Share answers in the whole group. Write down any key points and add any that they missed.
5. Ask gardeners to share any experiences they have planting seeds saved from a plant grown using hybrid seed and compare these to their experiences planting seeds saved from open pollinated plants. Discuss why saving seed from a plant grown from hybrid seed may give disappointing results.

KEY MESSAGES

Vegetables are pollinated in one of three ways:

Pollination Type	What happens?	Example crops
Self-Pollination	Self-pollinating plants can fertilize themselves because the plant's flowers are "complete," meaning they contain both male and female parts. Pollination occurs when the pollen of one flower fertilizes the same flower on the same plant.	Beans, peas, tomatoes, lettuce
Cross-Pollination	Cross-pollinating plants need either a pollinator or wind to get the pollen to another flower of the same species. Pollen can be transferred to another flower on the same plant or another plant in the field.	Pumpkin, squashes, cucumbers, melons, broccoli, radish, carrot
Mixed Pollination	Sometimes mixed pollination occurs. A single plant may either self-pollinate or cross-pollinate, depending on environmental conditions.	Eggplant, okra, pigeon pea, amaranth

What is the difference between hybrid seeds and open pollinated seeds?

Hybrid seeds can be purchased from shops (often indicated as "F1" on the package), but these seeds cannot be saved or created by gardeners. Seed producers develop hybrid seeds by crossing two distinct varieties of a crop. A male plant from one variety is planted close to a female plant of another variety in controlled environment that does not allow for other cross pollination to occur. Skilled workers manage the pollination process to produce the desired crossing. Hybrids are often higher yielding, more resistant to diseases, and mature more uniformly than other varieties. However, seed produced from hybrid plants will not produce offspring with the same characteristics as the parent plant. Hybrid seeds should therefore not be saved.

Open pollinated seed refers to seed that is produced by pollination done by insects, wind, birds, or even humans. Seeds that have been handed down generation to generation are open pollinated seeds. Open pollinated seed includes seed that is self-pollinated (and therefore will produce plants identical to the parent plant) and seed that is cross-pollinated (and therefore is a combination of the two parent plants and may show some small variations generation to generation).

1 hour

4. Starting saving your own seed

INTERACTIVE DISCUSSION

GOAL OF DISCUSSION: Gardeners will learn how to start saving their own seed.

MATERIALS NEEDED: Flipchart and markers

1. Explain to gardeners that the easiest crops to save seeds from are self-pollinated annuals. Have gardeners brainstorm a list of local vegetables that are self-pollinated annuals and write them on your flipchart.
2. Explain to gardeners that the next easiest crops to save seeds from are cross-pollinated annuals. Review the reasons why cross-pollinated crops require more time and attention from gardeners. Have gardeners brainstorm a list of local vegetables that are cross-pollinated annuals and write them on your flipchart.
3. Split gardeners into groups to discuss how to grow plants in your garden that you will save seeds. Groups should also think about how these practices result in better seed. Have each group report back to the larger group. Write the recommended practices on the left side of your flipchart and, on the right, list how this practice helps us save better seed. Ask the group to contribute and add anything they might have missed.
4. Mix the gardeners up into different small groups and now discuss how to select and harvest seed from the garden. Again, have the groups think about how these practices will result in better seed. Bring the groups back together and again write down their recommended practices on the left side of your flipchart and how this practice helps us on the right. Add anything they might have missed.

KEY MESSAGES

Self-pollinated crops

An easy way to start seed saving is to start with self-pollinated annuals. This means flowers can fertilize even before they open and there is less likelihood of failed pollination. Self-pollinated annuals normally produce an abundance of seeds, but it is possible to gently shake the plant when you see pollen to encourage pollen to fall onto the stigma.

Cross-pollinated crops

Cross-pollinated crops rely on wind, insects, or birds for pollination. These plants usually have male and female flowers, such as a pumpkin plant. You need enough plants to ensure that there are male and female flowers open and ready to pollinate on the same day. This means that you need at least four plants near each other that will be used for seed saving. Also, weather conditions need to be favorable for pollination to occur—there needs to be wind—or there needs to be enough pollinators, such as flies or bees, to visit every flower. Without favorable conditions, some flowers will not pollinate and may not produce viable seeds. Crops from closely related families, for example squashes and pumpkins, could cross-pollinate if they are planted close together, so it is typically advised to leave large distances between closely related crops if you are intending to save their seed. Gardeners can manually pollinate pumpkins and other plants by using a soft brush, cotton swab, or soft cloth. Swab some pollen from the male flower with the brush and then touch the centre of the female flower to manually pollinate your crops.

Pumpkin flowers

Male **Female**

Best practices for growing and harvesting seed from a home garden

How to grow plants in a home garden for seed	
Practice	How does this help us save better seed?
Leave some distance between two different varieties or crops from the same family	Prevents cross-pollination by insects or wind-blown pollen.
Select a plot of land that was not cultivated with the same crop last season or year	Seeds will not be contaminated with any soil-borne diseases and carry this contamination into the field again next year.
Selecting and harvesting seed for saving	
Practice	How does this help us save better seed?
Pick seeds only when mature.	Immature seeds may not germinate.
Keep the seeds from only the best plants and best fruits/pods. These should be large, vigorous, and free from disease.	Make sure only the best plants are replanted.
Collect seeds in the dry season rather than the wet season.	Helps to prevent potential problems with moisture, diseases and helps seeds dry thoroughly.
Collect seeds on a dry, sunny day	Helps to prevent seeds from getting moldy.

45 min

5. Seed extraction, processing and storage

PRACTICAL ACTIVITY

GOAL OF ACTIVITY: Gardeners will learn wet and dry seed processing and how to do grading and quality control of collected seeds.

MATERIALS NEEDED:

- Flipchart and markers
- Fleshy fruits, such as tomatoes, eggplant, cucumber, or bitter gourd (no hybrid varieties)
- Dried seed pods from either beans, cowpeas, kale, broccoli, cabbage, cauliflower, mung bean, dried okras, or dried chilies (no hybrid varieties)
- Jars and plastic bottles that can be tightly sealed
- Dried rice and/or charcoal
- Filter, old cloth, or colander
- Water
- Knife and spoon
- Examples of airtight containers containing properly stored seeds

STEP 1. Write 'wet seed processing' and 'dry seed processing' on the flipchart and ask gardeners to give examples of crops where you harvest the seeds wet and crops where you harvest the seeds dry.

STEP 2. Demonstrate how to process wet seeds by cutting open a fleshy fruit and placing it in a jar with water. Explain the process of leaving the fruit and seeds in the jar for 12–24 hours and then separating out the good seeds.

STEP 3. Demonstrate how to process dried seeds.

STEP 4. Ask gardeners how to clean and grade the seeds collected from the wet and the dry process. What materials must be removed? Which seeds should be removed?

STEP 5: Ask participants to work in pairs to list the key considerations for how to store seeds to ensure quality seeds. Share in group and list key considerations on flipchart.

STEP 6: Ask participants to share materials used locally to store seeds. Write these materials on a flipchart.

STEP 7: Show gardeners some examples you have made of properly stored seeds. Discuss how these packages help protect seeds from light, heat, and moisture.

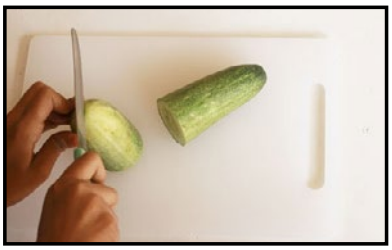
STEP 8: Discuss with gardeners how they can test the viability of their stored seed before they plant it in their gardens.

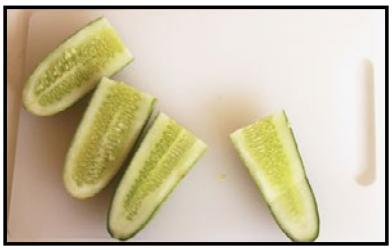
KEY MESSAGES

Wet seed processing

'Wet seeds' can be found in vegetables such as tomato, eggplant, cucumber and bitter gourd. Wet seeds are usually firmly attached to the flesh of the fruit. There are three major steps (and one optional step) in wet seed processing:

1. **Extraction:** Cut the fruit open and scrape the seed and attached pulp out with a knife, spoon, or your hands.





2. **Soaking:** Soak the extracted seeds and pulp in water. After 12–24 hours of soaking, separate the seeds from the flesh and throw away the flesh and seeds that float in the water. Seeds that float in water are not viable.

3. **Fermenting (for certain crops):** Soaking seeds can also be left for up to two days to ferment the seeds. Cucumber, melon, tomatoes, and eggplant seeds require fermentation.

Seeds that float should be discarded

Bubbles form in the water when seeds are fermenting

4. **Drying:** Good seeds sink in water. Collect the sunken seeds, rinse them in clean water two or three times, remove water from the seeds with a filter, dry them in a towel, and then spread them out on a plastic sheet to finish drying. The seeds should be dried quickly in a well-ventilated area to avoid sprouting and the growth of mold. However, avoid drying seeds in harsh sun or at temperatures over 35°C. When drying the seeds, spread them out in a single thin layer and break apart any clumps. Avoid drying on newspapers or cardboards.

Seeds stored in a glass jar with paper insert to block light

Dry seed processing

Dry seeds are extracted from dried pods or fruit. For pods, allow the pods to dry on the plant until they are light brown but not yet open. When extracting seeds from 'fruits,' like chilies or okras, pick the fruits when they are ripe and dry them in the sun before extracting the seeds.

Complete the drying process by laying the pods or fruits on a tarpaulin in the sun until they are hard and dry. Place seeds from small pods, like kale or cauliflower, inside a bag with good airflow to finish drying. The bag will collect the small seeds that drop from the drying pods. When the pod shells are beginning to open, extract the seeds by hand or thresh the pods inside a bag.

Cleaning and grading seed

Cleaning and grading are important for maintaining seed quality. In the cleaning process, materials that are not seeds for storage are removed (such as dirt, plant parts, and seeds of other crops or weeds). The process of cleaning should also remove lightly damaged or deteriorated seeds.

Grading is the process of separating undesirable materials from desired ones. Gardeners can have higher quality seeds if they grade them.

Seed drying

It is necessary to dry seeds properly before treating and storing. Seeds with high moisture content are easily attacked by pests and diseases, are susceptible to damage, and lose viability quickly.

It is important to avoid extremely high temperatures when drying seed. High temperatures can reduce the germination capacity of the seeds. Instead, dry seeds in a well ventilated, dry area during the morning or late afternoon to avoid mid-day sun. Spread seed out in thin layers when drying and use plastic sheets or jute mats rather than drying seeds on the ground or on newspaper/cardboard. Turn seeds over gently 4–5 times a day to ensure they dry evenly.

To check that the seed has dried properly, try to bend it with your finger. If it bends, it needs more drying. A properly dried seed will not bend. You can also put a few seeds in a dry, airtight bottle and let the seed stay for a day or two in a warm and sunny place. If no moisture forms inside the bottle, then the seed is dry enough for long-term storage.

Seed storage

After cleaning and drying, seeds should be stored carefully so that they remain dry and safe from insect attacks. Seeds for different crops can be stored in different bottles or plastics for easy identification. It is important that the seed is labelled when storing. When storing seeds with sharp points or appendages, double bags can be used to reduce the problem of damage to the storage bag.

Traditionally seed has been treated with ash to reduce insect damage, but seeds treated with ash tend to have lower viability after six months. Charcoal and well-dried rice can also be added to the bottom of the storage containers to draw moisture away from the seeds.

Good storage should:

- Provide maximum possible protection from moisture, high temperatures, light, and pests:
    - **Moisture:** Storage containers should be completely dry before seeds stored in them. Containers should be airtight to not allow moisture to enter, and seeds should be properly dried before put into storage. Do not use paper, leaves or grass to plug a bottle, as these will allow moisture to enter.
    - **Temperature:** Seeds should be kept as close to 4°C as possible. Keep seeds in the coolest place within the house if refrigeration is not possible. Do not keep seeds over a fire or in the kitchen.
    - **Light:** Choose dark colored storage containers or wrap inside of containers with newspaper to block light. Do not keep seeds in the direct sunlight.
    - **Insect and other pests:** Storage containers should be airtight and protect seeds from insects, molds, rodents, and birds. Containers should allow gardeners to frequently inspect, clean, and repackage seed to remove insects or moldy seeds.

- Contain proper labeling and separation of seeds from different crops. Do not mix seeds collected from different seasons so that older seed can be used first.
- Be economical and suitable for a particular situation. Good containers for storing seed are: glass jars with lids, metal containers with lids, sealable plastic bags with no air space, earthen pots that are well sealed (for short term storage).
- Be appropriate in size for the amount of seed to be saved. Do not put a small amount of seed in a large container as it will expose the seed to a lot of air. Instead, small quantities of seed can be placed in separate, sealable plastic bags and then placed all together into large tins or glass jars.

Testing seed viability

Seed that is stored for a long time may lose its viability (ability to germinate), even if seed is kept in good storage conditions. Gardeners should test the germination of their seeds before planting them in a garden bed—this is a good practice for all seeds gardeners wish to plant, not just seed saved by them!

Plant a small sample of seeds in a container or tray prior to sowing in the garden. Keep the seeds moist and well protected until they germinate. Keep track of how many seeds you planted so you can know how many germinated out of the total; ten seeds is a good number to test because it does not waste too much seed, but it is enough to know how well the seeds will do in a garden bed. If you find that the number of seeds that germinated during your test is low, you can increase your seeding rate or find a new source of seed. Seed quality can be tested at any time so that old seed is not stored unnecessarily.

10 min

7. Closing

Ask gardeners to share their plans to save seed, teach others to save seed, or anything else they have found particularly interesting from this session.

NEXT MODULE: 07-Pests & Diseases