



# POST-HARVEST HANDLING

TRANSPLANTING TRADITIONS COMMUNITY FARM, CHAPEL HILL NC

## Summary

Farmers will learn why it is important to use correct post-harvest handling techniques with different vegetables. They will learn about temperature, hydration and the proper tools and equipment for post-harvest handling. A post-harvest handling grid handout will be taught to reinforce and extend learning beyond the lesson.

**The need:** Post-harvest handling can be a complicated topic because different vegetables need to be handled differently. The consequences of improper handling are loss of crops, customer dissatisfaction and food safety issues. Farmers would also benefit from learning how their post-harvest handling techniques effect the storage quality and length of the produce they give to CSA customers or sell at market.



United States Department of Agriculture  
National Institute of Food and Agriculture



**ISED** SOLUTIONS  
INSTITUTE FOR SOCIAL AND ECONOMIC DEVELOPMENT

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# Who made this guide?

Collaboration and Testing

**ACKNOWLEDGMENTS:** This teaching resource was developed by Kelly Owensby and Vera Fabien of Transplanting Traditions Community Farm, 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](https://nesfp.org/new-american-resources) at <https://nesfp.org/new-american-resources>. For more in-depth explanations of the teaching approaches and activities used in these materials, please see the '[Teaching Handbook: Refugee farmer training](#)'. 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.



FLASH CARDS



TALKING POINTS



DISCUSSION



VOCABULARY

# Reviews and Core Skills

## WHAT TESTERS SAY:

"I like how all the information about many different vegetables is organized into one chart. What makes this topic tricky is that farmers have to know that the process is slightly different for each veg or group of veg, and this summarizes all that nicely." - *Katie, Global Gardens in Boise ID*

"This resource is so helpful, especially the grid which will be a great reference tool for farmers to use in the field. The sequencing of the lesson and tools are well-conceived too." - *Brooke, International Rescue Committee in Charlottesville VA*

"This is great: good visuals, good structure that farmers can relate to."  
- *Linda, Global Garden Refugee Training Farm in Chicago IL.*

"The post-harvest and handling chart would be a very helpful resource to use, both when teaching the information as well as an in the field resource during the growing season." - *International Rescue Committee in Salt Lake City.*

## CORE SKILLS:

- Post-harvest washing / not washing
- Post-harvest storage
- Harvest maturity standards
- Harvest quality standards
- Harvest time of day
- Appropriate harvest tools and methods for specific crops

# Table of Contents

Adaptable except where noted.

## 5 IS THIS GUIDE RIGHT FOR YOU

- Audience and Objectives
- Resources needed

## 7 RATIONALE AND VOCABULARY OF POST-HARVEST HANDLING ACTIVITY 1 / 20 MINUTES

- Farmers will learn the importance of post-harvest handling, and will learn some key vocabulary words.

## 9 FLASH CARD SORT, USING THE GRID / ACTIVITY 2 / 50 MINUTES

- Farmers will use flashcards to learn the veggie groups and actions, and will learn how to use the guide for the future.

## 11 BEST PRACTICES, REFLECTION, SKITS AND MATERIALS

### ACTIVITY 3 / 25 MINUTES

#### VARIATION:

One reviewer suggested the option to add in more detailed packing methods, how to safely and properly package produce so that it does not encourage more damage. This could be paired with 'Intro to Food Safety' workshop from Global Growers.

# Audience and Objectives

Adaptable except where noted.

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

- Say what will happen if vegetables go bad easily
- Group vegetables based on what post-harvest handling actions are best with them.
- Understand hydration and de-hydration of produce and how to keep produce effectively hydrated
- Name the actions and tools of post-harvest handling
- Name a list of practices they will take this coming season to improve their post-harvest handling.

## **TIME / SEASON:** **2.5 hours**

- Ideally done in the winter / early spring before the CSA season begins

## **LANGUAGE / LITERACY:** **Appropriate for all levels with interpreter**

## **STAFF / INTERPRETER:** **One staff member and one interpreter needed**

- If no interpreter, a literate farmer can help to interpret the words if they have been previously translated.

## **FARMING EXPERIENCE:** This is a good workshop for any farmer starting to market. Contextually it will help with comprehension if a farmer has some marketing experience but it should be information presented to any farmer who is starting to sell produce. The information is presented during the workshop and explained in detail. The information is contained in a grid guide for farmers reference throughout the year. Farmers will need to understand how to use a grid to access information.

- Reading numbers (The grid uses numbers to indicate the order of post harvest activities handling)
- Reading a grid

## **REGION / CLIMATE:** **Appropriate for all climates**

those in a very hot climate will need to adapt the practices to suit your needs (for early morning harvest etc.)

# Resources needed

Adaptable except where noted.

**TIME:** 2.5 hours

**STAFF / INTERPRETERS:** 1 Staff Member and 1 Interpreter

**LOCATION:** Classroom / packing shed etc.

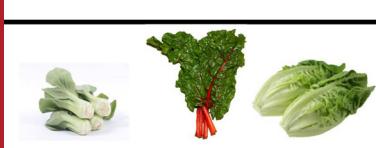
Wherever you have some tables and chairs for the activities.

**SUPPLIES:** Each farmer should receive

- A post-harvest handling guide
- A set of flash cards for interactive activities
- Users Guide for the facilitator
- Picture of the best practices (forthcoming)

 TransplantingTraditions.com	MORNING OR EVENING?	WASH OR SPRAY	NO WATER	WIPE	CRATE	BIN
Lettuce, Swiss Chard, Spinach, Mustard Greens, Asian Greens 						
Salad Mix & Arugula 	1 <small>(only wash if dirty, then SPIN DRY. Otherwise put in cooler unwashed)</small>	2				3

HANDLING GUIDE

	BOK CHOI ASIAN GREENS LETTUCE CHARD SPINACH
	SALAD MIX ARUGULA
	COLLARDS KALE

FLASH CARDS

# Rationale & Definitions

1

**TIME:** 20 minutes

## OVERVIEW:

The facilitator will lead the farmers in a discussion around why it is important to use good post-harvest handling practices.

## MATERIALS NEEDED:

- Post-harvest handling written on index cards

## OBJECTIVES / LEARNING:

By the end of this activity, participants can:

- Say why it is important to use the proper post-harvest handling.

## VOCABULARY

Post-harvest handling

## STEP 1: AFTER WASHING



Ask farmers: ***“What do you do with vegetables right after you wash them?”***

Have them brainstorm things that they do with their produce after it is harvested. Encourage them to make motions with their hands to show what they do, remind them of things they are forgetting about. Here, you are jogging their memory and engaging them in what they learn about in the next activity.

## STEP 2: WHY IMPORTANT?

Ask farmers: ***“Why is it important that you do the right thing after you harvest?”***

- See what farmers say. You would like farmers to bring up the items below, and if they don't you can mention them yourself:
  - Keep vegetables fresh.
  - Make customers happy.
  - Make vegetables last longer.
- Reinforce these ideas:
  - “You grow beautiful produce. You harvest beautiful produce. You sort produce to make sure the best of it goes to customers. A lot can happen to your produce after you harvest it”
  - “How you handle or process your vegetables makes a BIG difference in how

long those vegetables stay fresh after your customer takes them home. It is important for your vegetables to stay as fresh as possible because your customer may not eat them for many days after they get them from you”  
iii. Remember our customer needs your produce to last another 5-10 days!

### **STEP 3: WHAT HAPPENS IF YOU HAVE BAD POST-HARVEST HANDLING?**

- a. Food goes bad fast
- b. Customers don't come back
- c. Food safety problems
- d. Lose my vegetables

### **STEP 4: DEFINE POST HARVEST HANDLING**

- a. Ask: *What does harvest mean?*
- b. Ask: *What does handling mean?* (use your hands and a vegetable to demonstrate)
- c. Ask: *What does post mean?* (Use before and after to describe this word)
- d. *What might post-harvest handling mean if post means after?*

You can write these on the board, or have each on a large index card and add the words one by one as you explain them. Have farmers say this phrase a few times so that they get comfortable saying it!

### **STEP 5: ASSESS AND REFLECT**

- a. Ask farmers what happens if they don't use good post-harvest handling. Have them say the four outcomes they mentioned earlier. Remind them if they have forgotten.
- a. Ask farmers for the four good reasons to practice good post-harvest handling. Remind them if they have forgotten.

# Flash Card Groupings

2



**TIME:** 50 minutes

## OVERVIEW:

Farmers will demonstrate their understanding of the 14 vegetable 'types' for post-harvest handling, and will learn how to use the post-harvest handling grid through organizing and sorting flashcards that represent the same items on the grid. Use the flash cards so that farmers can interact with the post-harvest handling guide in an interactive way.

## MATERIALS NEEDED:

- A post-harvest handling guide
- A set of flash cards for interactive activities

## OBJECTIVES / LEARNING:

By the end of this activity, participants can:

- Group vegetables into families or categories based on their post-harvest handling actions

## VOCABULARY

- "What time?"
- "Wash if dirty"
- "Keep dry"
- "Wipe"
- "Crate"
- "Tote"
- "Walk in"

## STEP 1: AFTER VEGETABLE HARVEST

**Ask farmers: What do you do after you harvest vegetables?**

Now when farmers show their motions or words, make a list on the board.

- Wash
- No water
- Keep cold
- Wipe
- No cold



## STEP 2: TOOLS

**Ask farmers: What equipment / tools do you use after harvesting?**

Have them brainstorm but add what you need to, showing the pictures from the grid with the flashcards.

- Crate
- Tote
- Walk in

### STEP 3: WHEN

**Ask farmers: When do you harvest?**

- Show farmers the pictures representing morning and evening.

#### DEVELOPERS NOTE:

The grid is intended to allow farmers to match certain vegetable grids with the post-harvest handling treatment those vegetables should receive. Farmers can use this two ways:

1. Farmers can make check marks for each post-harvest handling action that is appropriate for that vegetable group (for example, tender greens are “WASH” “CRATE” and “WALK IN”
2. Farmers can make numbers instead of check marks to show the order of operations: for example, 1 for wash, 2 for crate and 3 for walk-in.

### STEP 4: GRID

Now farmers have seen all the actions at the top of the grid. Show them the grid itself and make sure they understand what each picture represents.

#### TEACHING TIP:

One reviewer suggested reviewing how to use a grid if you think farmers would benefit from that. See “Grids” in “*Refugee Farmers Teaching Handbook*”

### STEP 5: VEGETABLE CARDS

Now introduce the individual vegetable cards. Show how each vegetable can get a check mark from the different actions on the grid.



### STEP 6: ROLE PLAY

Have them play out this ordering of actions with their own flashcard set. For example:

- a. “Okay, here are carrots / beets. What do we do first? Okay, but the wash card first. What is next? Okay put that card next”
- b. Continue to give farmers vegetable flash cards from the rows on the guide and have them use the column flash cards to put the actions in the correct order as they correspond to the vegetable flash cards.

#### TEACHING TIP:

One reviewer suggested making the grid a large wall chart and flashcards. Chart to stay up to reinforce learning. Maybe make a big wall chart that farmers could put flashcards onto, and could stay on the wall.

# Best Practices Review & Reflect

3

**TIME:** 25 minutes

## OVERVIEW:

In this activity, farmers will learn about overall best practices for post-harvest handling, and choose which actions, practices and tools they want to do more of this coming season.

## OBJECTIVES / LEARNING:

By the end of this activity, participants can:

- farmers understand hydration and de-hydration of produce and how to keep produce effectively hydrated

- Name the actions and tools of post-harvest handling
- Name a list of practices they will take this coming season to improve their post-harvest handling.

## VOCABULARY

temperature	damp
hydration	water loss
dehydrate	wilt
moisture	rot

## STEP 1: INTRODUCTION



Introduce the best practices with a picture representing each one. You can use the talking points below to describe the best practices associated with each category: BINS, TIMING, TEMPERATURE and HYDRATION



### Bins

- You should have serious bins, they have to be easy to clean---what would happen if someone got sick?! Harvest bins are used over and over and can cause vegetable contamination. If one harvest bin is dirty and you harvest into it over and over you are getting all the vegetables that go into that bin contaminated. If a customer gets sick the whole farm could shut down.
- Sometimes bacteria will just cause your vegetables to rot faster sometimes it will make a customer sick. Both are bad!
- Wash harvest totes & bins with soapy bleach water. Only totes that can be cleaned easily are allowed.
- Ask farmers how we can facilitate a way to incorporate washing bins before each use at the farm. Do we need a wash station with bleach water always at the farm to make this easy?

- Harvest into bins/boxes they'll be stored in. Sort and bunch in the field. Think about how to save time and moving around of produce.

**TEACHING TIP:**

If in season, show actual vegetables with different kinds of damage, or pictures of what not to do. Another 'do not' thing that happens is wrapping bunches too tightly with rubber bands or twist ties, which causes rotting around the band.

**Timing**

- What to harvest in AM or PM? When really hot, harvest everything early (though tomatoes, beans, summer squash, and okra don't want to be too wet)
- Move to shade right away
- What do you need to be extra gentle with? Tomatoes in one layer. Summer squash. Storage—potatoes, winter squash
- REMEMBER: customers want to stay with us for years, but they won't if their produce doesn't keep/is rotting before they can eat it

**TEACHING TIP:**

One reviewer suggested teaching and reviewing the 7 and 8 words multiple times since that is a large amount of words for an activity.

**Temperature**

- Get crops down towards optimal temperature as soon as possible!
- Most damage occurs while picking. It's 85 outside. You're picking strawberries (optimal storage temp = 32). Get them in the cooler quickly! Make a couple trips back and forth if need be.
- Bring damp towels with you to the field to cover boxes of produce with.
- HYDRO-COOLING: use cold water to gently spray crops once picked or dunk in water. This is only for crops that don't mind water or already need to be washed.
- What can we pick ahead of time and store in the cooler? What should we pick right before CSA?

**Hydration**

- What does produce look like if it isn't stored well? Wilting or rotted. What cause these two things?
  - Water loss is the number one cause of wilting.
  - Too much water is the number one cause of rotting.
  - You have to get hydration just right.
- Cooler is dehydrating. Have you noticed what happens if you leave greens uncovered in cooler? They wilt!
- If you use a cardboard box, you may want to line it with a plastic bag to prevent dehydration.
- Vegetables also need to breathe a little. Don't want storage to be air tight.
- Ideal storage for most crops: a bin with holes in it. Or towels to help absorb extra water. Sitting water = rot!
- REMEMBER to label and date everything that goes in cooler so you can stay on top of it.

## STEP 2: REFLECT AND ASSESS

Ask farmers to choose a best practice or two they want to do better with this year. You can also ask them to choose something they think they are doing well. They can come up in front of the group and point to the pictures as they refer to them.

### BEST PRACTICES SKIT ADDITION IF TIME:

"It's a hot day. Farmer Nicole wants to pick her lettuce for CSA tomorrow. Vera comes along: wait, don't harvest now! Wait til right before sunset. Later in the day Farmer Nicole goes out to pick her lettuce. She's done picking and she wants to water and feed her chickens. She leaves the lettuce box in the sun. Vera: Wait, don't leave your lettuce in the sun! Really, you should take it straight back to the wash station, give it a quick spray, cover the top with a damp cloth and get it in the fridge ASAP!"

### FOLLOW UP CHALLENGE

Take home some of your produce, put it in your fridge and see how long it lasts for. Does it still look fresh after 5 days? If so, great! If not, what can you do differently to make it stay fresh longer?