

Thank you so much for participating in the University of Arizona's and SERI's Project Harvest.

## PROJECT HARVEST OVERVIEW

### What is Project Harvest?

Project Harvest is a co-created citizen science project, meaning: members of the public are involved in most or all steps of the scientific process to generate new knowledge. Project Harvest is designed to improve environmental health education and monitoring in underserved rural and urban communities. Together, we will monitor the quality of harvested water, soil, and plants while learning more about our environmental health. The goals of this project are to:

- Learn about potential pollutants in harvested water such as: microorganisms, inorganics/metals, and organic compounds.
- Learn how these possible pollutants might impact soil, plant and human health
- Evaluate the learning and action-based outcomes of a citizen science and community-engaged research

Project Harvest aims to co-generate a robust environmental monitoring dataset, while informing the safe production of food sources in underserved communities. By participating in Project Harvest, you will: 1) Learn the scientific method and how to collect harvested water, soil, and/or vegetable samples from your garden for environmental analysis and 2) meet others in your community who are interested in environmental and food quality.

### How does Project Harvest work?

Project Harvest is using a peer education model! Our researcher team has trained local community health workers (promotoras) in each of the targeted Arizona communities: Tucson (Southern metropolitan area), Dewey-Humboldt, Hayden-Winkelman, and Globe/Miami.

The trained community health educators are recruiting and training participants at their homes and providing all the necessary materials for sampling harvested water, soil, and/or vegetables. As a participant, you will work with traditional

laboratory (LAB) supplies and Do-It-Yourself (DIY) gear to monitor your environment. Sample collection will begin in Winter 2017 and run through Winter 2020 (see **Master Checklist**). Samples will be analyzed by University of Arizona researchers and you! The data will be interpreted and shared with all participants and communities.

### What is my role in Project Harvest?

You are part of the team! The work you do, and the samples you collect will be used in a scientific study to determine the quality of your harvested water, soil, and plants. This manual provides step-by-step instructions on how to collect samples from your garden for:

- Analysis at University of Arizona laboratories with traditional laboratory (LAB) supplies
- Conducting experiments at home with Do-It-Yourself (DIY) gear

Thank you again for participating in Project Harvest! You are helping us better understand the quality of harvested rainwater, soil, and plants in underserved rural and urban communities. It is an honor to work with you all. If you have questions, please contact me anytime.

Warm regards,



### Mónica Ramírez-Andreotta Project Harvest Director

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# INORGANIC

# MICROBIAL

# ORGANIC

# GENERAL INSTRUCTIONS

For all sampling activities, you will need to follow the directions below.

- **Always sample from the same cistern.** The rainwater harvest cistern that you have chosen to use in this project should be used for all of the rain water sample collections. Please do not switch between cisterns during the project.
- **Label your cistern clearly with kit number so that it can be easily read from 5 feet away.** Use a sharpie pen or paint. You can use a sticker or mark directly on the cistern. Over the course of the project make sure this label remains clearly visible, and repair if needed.
- **Find a nice and clean area to set-up.** Identify a clean, dry area outside (like a picnic table, patio, or a bare and flat surface) in the shade and out of the wind.
- **Gloves are a must!** Wear gloves at all times when sampling. You may keep the same pair of gloves on during all water sampling procedures. Change gloves in between water, soil and plant sampling. Once you are done, remove gloves and place them in provided waste bag.
- **Run water for 10 seconds before sampling.** Before any water sample is collected from the harvesting system, open the faucet and let the water run at full speed for 10 seconds (you can water a plant or catch water in a bucket if you want).
- **Do not worry if your cistern is empty at sample collection time.** It's okay that you do not have any water to sample. You can sample next time. Just let us or your promotora know in advance.
- **Avoid sample contamination. Hold the cap!** Try your best to always hold the cap while taking your water sample. Do not allow sampling vial or bottle to touch the faucet at any time – this may contaminate the sample.

- **Label everything! Use the provided permanent marker for all labeling.** Be sure each sample has a hand-written label. Remember to circle the sample type and record date and time. Fill out and attach the labels before starting to collect samples.
- **Mark your soil sampling spots with the tent stakes and whiskers (you may need a hammer). Sample at these locations for both irrigated and not irrigated every time (LAB and DIY)!** You will collect soil samples only once a year during Project Harvest.
  - You have the following whisker colors to mark the locations:
    - Blue: Irrigated soil
    - Orange: Non-irrigated soil
    - White: MICROBIAL sampling site to also be used for inorganic in both the irrigated and not irrigated soil
- **Sterile Whirl-pak bags, tips on how to use them!** Open Whirl-pak bags by removing the plastic strip at the top, then pulling the white tabs apart from one another. To close fold the top of the bag over and bending the side wires (like you are closing a coffee bag). Then, close the bag tightly by rolling the top all of the way down and thoroughly wrapping the wires around the top.
- **Take Notes and Pictures!** Document your experience and observations by taking notes in either your Project Harvest Field Notebook or online at <https://projectharvest.arizona.edu/>.
- **Check it off your list!** After you finish collecting a set of samples, go to your “Master Checklist” and check the sampling off your list!
- **Waste Disposal – We got you covered!** Dispose of all waste in the provided waste bag or the Tupperware container if it is liquid waste. We are collecting all of the waste for proper disposal at the University of AZ. For DIY, you can drop off waste at the end of the summer.

You will see each methodology labeled with colors and icons. They are as follows...

Orange=	Organic
Yellow=	Inorganic
Green=	Microbial



Water



Soil



Plant

# SAMPLE DROP-OFF PROCEDURES

## You will need to:

- Keep only **organic** and **inorganic** samples in a refrigerator (not a freezer) until delivery.
- During transport, keep all samples EXCEPT the **microbial** samples under cool conditions, in an ice cooler if possible. The microbial samples should remain close to room temperature during storage and transport.
- **Be sure to complete the COC form right before you drop off your samples.** (See definition on next page)
- Deliver the sample(s) to your designated local drop-off location by 1:00PM.
- If you are unable to access the drop-off location at the designated time set by your promotora, please discuss other options with your promotora.

- **Tucson - University of Arizona Visitor's Center**

Address: 811 N Euclid Ave, Tucson, AZ 85719  
Hours: 9AM-5PM Monday - Friday; closed the weekends  
Phone: 520-621-5130

- **Globe/Miami: Globe Public Library**

Address: 339 S Broad St, Globe, AZ 85501  
Hours: Monday - Tuesday 10:30 am - 5:30 pm  
Wednesday-Thursday - 10:30 am - 6:00 pm  
Friday - 10:30am - 5:30pm  
Saturday - 10:00 am - 2:00 pm  
Closed Sundays  
Phone: 928-425-6111

- **Hayden-Winkelman:**  
**Hayden High School Room 1320**  
Address: 824 Thorne Ave, Winkelman, AZ 85192  
Hours: 7:00AM - 5:00PM, Monday -Thursday;  
closed the weekends
- **Dewey-Humboldt: Town Library**  
Address: 2735 Corral St, Humboldt, AZ 86329  
Phone: (928) 632-5049  
Hours: Tuesday, Wednesday & Friday:  
10:00 am - noon & 12:30pm - 5:00 pm  
Thursday: 12:30 pm - 7:00 pm  
Saturday: 10:00 am - 2:00 pm

# GLOSSARY OF TERMS

**Arsenic** - A naturally occurring toxic metalloid (an element that has properties in common with metals and some in common with non-metals) that can be high in regions associated with mining. In drinking water, the USEPA has set the maximum contaminant level for drinking water at 10 micrograms of arsenic per liter of water (equal to 10 parts per billion); above that level water utilities and private well owners must treat the water to remove arsenic.

**Arsine Gas** - A toxic gas ( $AsH_3$ ) that at elevated levels, may be lethal.

**Chain of Custody (COC)**- Documentation of the control and transfer of samples. The chain of custody establishes the proof that the sample remains the same, and does not get mixed up with other samples, through all of the analyses.

**Compositing** - A technique where multiple samples are taken from different, separate, and distinct locations. These samples are then combined, thoroughly mixed, and treated as a single sample. Composite sampling can improve coverage of an area without increasing the number of samples that have to be taken (sample quantity).

# GLOSSARY OF TERMS

**Control Sample** - The control sample provides a baseline that lets us see if the areas irrigated with harvested water are different and affected by the harvested water. Control samples help assure that results are reliable. Also called controls, known samples, and knowns.

**Escherichia coli (abbreviated as E. coli)** - Bacteria found in the environment, foods, and intestines of people and animals. E. coli are a large and diverse group of bacteria. Although most strains of E. coli are harmless, others can make you sick. Some kinds of E. coli can cause diarrhea, while others cause urinary tract infections, respiratory illness and pneumonia, and other illnesses.

**Fecal Coliforms** - A group of bacteria that generally originates in the intestines of warm-blooded animals. Their presence in food or water indicate water or food contamination.

**Field Blank** - A sample that has been exposed to the site of sampling, but without collecting the material of interest. This is used to assess the presence or absence of contamination that comes from the process of sample collection rather than from the material itself. Field blanks are a measure of data quality (quality control).

**Indicator Bacteria** - Indicator bacteria are types of bacteria used to detect and estimate the level of fecal contamination of water. They are not dangerous to human health but are used to indicate the presence of a health risk.

**Inorganic Compounds** - Metals, minerals, or compounds that contain little or no carbon.

**Microorganism/Microbes/Microbial** - An organism that is microscopic, which means it is too small to be seen by the unaided human eye. Microbes refers to any of the microorganisms, including bacteria,

fungi, protozoa, and viruses. In this study, we will be measuring bacteria that can indicate fecal contamination and pathogens.

**Mercury** - A toxic heavy metal. The mercury in the DIY test kit is mercuric bromide, which is extremely toxic.

**Most Probable Number (MPN)** - A method used to estimate the concentration of viable microorganisms in a sample. For this project, the MPN will be used to estimate the number of sulfur reducing bacteria in the harvested rainwater sample.

**Nanopure** - Free of any elements, organic compounds and/or pathogens

**Organic Chemicals/Compounds** - A chemical (or compound) is a substance consisting of two or more elements (from the periodic table) associated by chemical bonds. An “organic” compound contains the element carbon. Organic compounds may be arranged in rings or chains of carbon atoms, along with atoms of other elements. Common elements besides carbon (C) that are found in organic compounds include hydrogen (H), oxygen (O), nitrogen (N), phosphorus (P), sulfur (S) and halogens like chlorine (Cl) and fluorine (F).

**Pathogens** - Microorganisms (Bacteria, Virus, etc.) that can cause illness (e.g. diarrhea).

**Sulfur Reducing Bacteria (SRB)** - Sulfur-reducing bacteria get their energy by reducing elemental sulfur to hydrogen sulfide. For this project, SRB are going to be used as indicators of fecal contamination.

**Scientific Method** - a process of inquiry that begins with observations which lead to a question. From the question a hypothesis is developed to explain the observation(s). Data are then collected by reproducible experiment(s) to test the hypothesis. Data are then analyzed and interpreted to reach a conclusion. Detailed record keeping is essential to aid in recording and reporting experimental results, and to support the effectiveness and integrity of the procedure.

**Whirl-pak Bag** - Sterile sample bags.

# MASTER CHECKLIST 2017-2018

Kit # \_\_\_\_\_

		2017 - 2018			
		Dec 1- Feb 28		June 15 - Sept 30	
		First Winter rain	Last Winter rain	First monsoon rain	Last monsoon rain
Organic	Water 				
	Inorganic	Water  Soil  Irrigated Non-Irrigated Plant 			
Microbial	Water 				
	Soil 	Irrigated Non-Irrigated			

Collect water samples 4 times per year – 2 in winter and 2 in summer (during monsoon) after a significant amount of rainfall. Collect water sample on either Monday after 5PM or Tuesday morning. Then drop off the sample by 1PM on one of the Tuesdays listed below. You will also collect soil (irrigated and not irrigated) and plant samples once a year. Drop off your soil and plant samples during one of the selected time periods.

 Significant rainfall = 1/10 of an inch of rainfall. You will use the provided rain gauge. Once you see 1/10 of an inch of rain in the gauge, you can sample. Empty rain gauge after every rainfall event.

## WINTER: December 1- February 28

You will collect a water sample **AFTER** the first significant rainfall in winter.

Drop sample off on **one** of the following Tuesdays:

**2017-2018** → December 12, December 19, January 9

**2018-2019** → December 4, December 11, December 18

**2019-2020** → December 3, December 10, December 17

# 2018-2020

		2018-2019				2019-2020			
		Dec 1- Feb 28		June 15 - Sept 30		Dec 1- Feb 28		June 15 - Sept 30	
		First Winter rain	Last Winter rain	First monsoon rain	Last monsoon rain	First Winter rain	Last Winter rain	First monsoon rain	Last monsoon rain
									
	Irrigated:					Irrigated:			
	Non-Irrigated:					Non-Irrigated:			
									
									
									
	Irrigated:					Irrigated:			
	Non-Irrigated:					Non-Irrigated:			

Then, you will collect a water sample **AFTER one of the last significant rainfall** in winter.

Drop sample off on **one** of the following Tuesdays:

**2017-2018** → February 20, February 27

**2018-2019** → February 19, February 26

**2019-2020** → February 18, February 25

## MONSOON: June 15 - September 30

You will collect a water sample **AFTER** the first significant rainfall in the monsoon season. Drop sample off water sample on **one** of the following Tuesdays:

**2017-2018** → June 19, June 26, July 3, July 10, July 17

**2018-2019** → June 18, June 25, July 2, July 9, July 16

**2019-2020** → June 16, June 23, June 30, July 7, July 14, July 21

Then, you will collect a water sample **AFTER one of the last significant rainfall** in the monsoon season. **If you have not collected a soil or plant samples for the three previous collection periods, this is the time to sample!**

At this time, drop off water, soil and plant samples on **one** of the following Tuesdays:

**2017-2018** → September 11, September 18, September 25

**2018-2019** → September 10, September 17, September 24

**2019-2020** → September 15, September 22, September 29



# INORGANIC

Watch the sampling videos online on our  
Project Harvest website:

**WATER**

<https://www.youtube.com/watch?v=BrGI-tWxHAY>

**SOIL**

<https://www.youtube.com/watch?v=hIDImWYjI04>

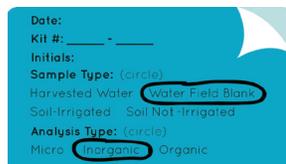
This method allows us to measure the concentration of toxic elements in water, soil, and plants. These toxic elements include arsenic, lead, and cadmium, which are known to cause harm to humans and other living organisms.





# KIT MATERIALS

The illustrations below show the materials for **ONE** sample collection. You will be receiving materials for **ALL FOUR** water collection periods.



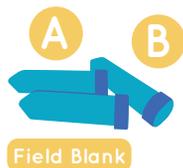
Labels for water and field blank (2)



Gloves



Permanent Marker



3 plastic 50 ml vials  
-empty, labeled "A"  
-empty, labeled "Field Blank"  
-filled with nanopure water labeled "B" for field blank



Waste bag and Sample return bag

**Field Blank** is a sample that has been exposed to the site of sampling, but without collecting the material of interest.

# INSTRUCTIONS

## Collecting Harvested Water Samples

This method allows us to measure the concentration of toxic elements in water. You will collect harvested water samples 4 times each year.

1. Fill out two labels, one will be for the "Harvested Water" (empty 50 ml plastic tube pre-labeled "A") and the other is for the "Field Blank" (empty 50 ml plastic tube pre-labeled "Field Blank") with all the information requested. Put label on tubes.
2. Open the cistern faucet so your rain barrel water flows at full speed and let it flow out for 10 seconds (feel free to capture this water and use it for gardening purposes).
3. With your gloves on, remove the lid and carefully fill vial "A", and turn off faucet.
4. Once full, quickly cap vial, tightly seal and turn the bottle upside down to ensure that no leakage will occur.
5. Once you are done collecting the sample from the rain barrel, you will need to prepare a field blank sample. **Standing in the same place near your rain barrel**, remove the cap of the second empty vial labeled "Field Blank". Open the vial labeled "B", which has nanopure water in it. Carefully pour the clean water into the "Field Blank" vial. Once full, quickly cap vial, tightly seal and turn the bottle upside down to ensure that no leakage will occur.
6. Place the "A" (harvested water sample) and "Field Blank" sample in the provided sample return bag and store in the refrigerator until you are ready to drop off at the designated location.





# KIT MATERIALS

Date: \_\_\_\_\_  
Kit #: \_\_\_\_\_  
Initials: \_\_\_\_\_  
Sample Type: (circle)  
Harvested Water Water Field Blank  
Soil Irrigated Soil Not Irrigated  
Analysis Type: (circle)  
Micro Inorganic Organic

Label for Soil -  
Irrigated



Hand trowel



Irrigated Bucket



Irrigated Paper Bag



Sharpie pen



Project Harvest  
Field Notebook  
(hard copy or online)



Whiskers (4 blue,  
2 white)



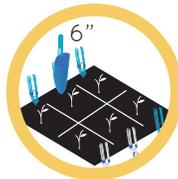
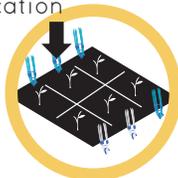
Tent stakes (6)



Waste bag and  
Sample return bag

Camera (not included)

Sample  
location



# INSTRUCTIONS

7. Login to the [projectharvest.arizona.edu](http://projectharvest.arizona.edu) website and upload your images and type up your observations. If you do not have access to a computer or smart phone, please take notes in you Project Harvest journal.

## Soil and Plant Sampling:

**Important Notes:** You will collect soil samples only once a year during Project Harvest. Try to collect your soil samples after you have prepared your garden for the season. Time sampling so it lines up with when you are submitting a set of water samples! **Mark your soil sampling spots with the tent stakes and whiskers. Sample at these locations for both irrigated and not irrigated every time!**

You have the following whisker colors to mark the locations (see illustrations on page 15):

**Blue:** Irrigated soil

**Orange:** Not irrigated soil

**White:** **Microbial** sampling site to also be used for inorganic soil sampling.

## Collecting Soil samples

**..where you have irrigated with harvested rain water**

1. Fill out all requested information on label and label the paper bag.
2. Select 6 spots to sample in your garden in a grid (checker board) pattern. Mark these with the tent stakes and whiskers (4 will be blue, 2 will be white)
3. With your gloves on and using the hand trowel provided, loosen the top 6 inches (length of the hand trowel blade) of each of the 6 soil spots.





# KIT MATERIALS



4. At each location, take one full scoop of soil and place it into the 1-gallon bucket labeled Irrigated.
5. Mix the six soil samples thoroughly inside the bucket. This process is called *compositing*.
6. Pick out rocks and gravel that are pea-sized or larger.
7. Fill the paper bag with the “composite” soil sample to the line drawn on the bag.
8. Place the soil paper bag into the 1-gallon plastic bag making sure that the label on the brown paper bag is clearly visible
9. Also label the plastic bag with kit number and “Soil – Irrigated”.
10. Put in sample return bag. Soils should be kept refrigerated until you are ready to drop-off at your area’s drop-off location.
11. Login to the [projectharvest.arizona.edu](http://projectharvest.arizona.edu) website and upload your images and type up your observations. If you do not have access to a computer or smart phone, please take notes in your Project Harvest notebook.
12. Return the un-used soil to your gardens.
13. Rinse your buckets so they will be ready for the next use.





# KIT MATERIALS

Date: \_\_\_\_\_  
 Kit #: \_\_\_\_\_  
 Initials: \_\_\_\_\_  
 Sample Type: (circle)  
 Harvested Water Water Field Blank  
 Soil-Irrigated **Soil Not-Irrigated**  
 Analysis Type: (circle)  
 Micro **Inorganic** Organic

Label for Soil -  
Not Irrigated



Hand trowel



Not Irrigated Bucket



Not Irrigated Paper Bag



Sharpie pen



Project Harvest  
Field Notebook  
(hard copy or online)



Whiskers (4 orange,  
2 white)



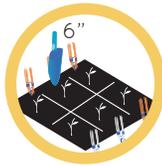
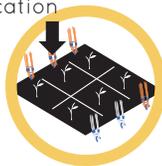
Tent stakes (6)



Waste bag and  
Sample return bag

Camera (not included)

Sample  
location



# INSTRUCTIONS

## Collecting Soil samples

..where you have NOT irrigated with harvested rain water (control sample)

You will do the same soil sampling process as described above, but now for your not irrigated soil. **Identify an area in the yard that has not been exposed to rainwater from the rain barrels AND has not been exposed to rain running off of the roof. This will be the control sample.**

**Important notes:** You will be using the same hand trowel to collect the “Soil – Not Irrigated” sample. Please thoroughly rinse the hand trowel with water and completely dry before use. **Always collect the soil samples from the exact same area each year.**

**Complete steps 1-13 on page 16-18, with the following exceptions:**

Step 1 and 9 - Label the paper and plastic bag with kit number and “Soil – Not Irrigated”.  
Step 2 - You will now use 4 orange and 2 white whiskers.  
Step 4 - You will now use the 1-gallon bucket labeled “Not Irrigated”

## What is a control sample?

Many of the elements we are testing occur naturally in soils. The control sample will provide the “natural” levels of the selected elements in the soil sample. We will compare the “natural” elemental concentrations to the elemental concentrations in the rainwater-irrigated soils to see if there are differences between the two (irrigated with harvested rainwater and not irrigated).





# KIT MATERIALS



Whirl-pak plastic bags for different-sized vegetable samples (2 large, 1 medium, 1 small)



Vegetable write-on labels (4)



Project Harvest Field Notebook (hard copy or online)



Sample return bag

Camera (not included)

# INSTRUCTIONS

## Collecting Plant Samples

..where you have irrigated with harvested rain water

Select 4 vegetables you want to sample. You will collect duplicates (2 samples of the same vegetable), and have a total of 8 vegetable samples (2 of the same vegetables per bag). **Only collect the edible part of the plant and submit the entire piece (do not cut).** You will collect plant samples only once a year. **Be sure to grow the same plant each year.**

Important Note: Due to differences in plant growing seasons, you can collect your plant samples at anytime, just be sure to do it! Time it so it lines up with when you are submitting your water samples!

We are interested in studying the vegetables that you are growing, as well the following vegetables and herbs: **Lettuce, Carrot, Mint, Cilantro, Cabbage, Kale**

**You may submit vegetables that you are currently growing and/or use the seeds provided.**

1. Fill out the vegetable label for the selected vegetable and place the label on the whirl-pak bag.
2. With gloves on, collect two samples of the same vegetable (duplicates) and place them in the whirl-pak bag.
3. Remove all air from bag before sealing.
4. Do steps 1 through 3 for all four vegetable samples.
5. Promptly place the bag in the refrigerator until you are ready to drop off.
6. Login to the [projectharvest.arizona.edu](http://projectharvest.arizona.edu) website and upload your images and type up your observations. If you do not have access to a computer or smart phone, please take notes in your Project Harvest notebook.



Watch the sampling videos online on our Project Harvest website:

**WATER**

<https://www.youtube.com/watch?v=HYZ2tSemcAl>

**SOIL**

<https://www.youtube.com/watch?v=tYEmzxBLm1s>



# MICROBIAL

This method involves testing for fecal coliforms, and E. coli also known as indicator bacteria. They are known as indicator bacteria because they naturally occur in the intestines of living organisms and their presence serves as an indicator that there may be fecal contamination and pathogens in water.

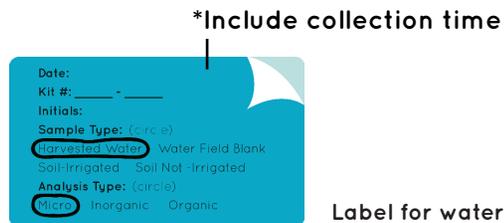
All water samples will be collected and transported to the laboratory for testing.





# KIT MATERIALS

The illustrations below show the materials for **ONE** sample collection. You will be receiving materials for **ALL FOUR** water collection periods.



# INSTRUCTIONS

## Water sample collection

1. Fill out the label (record collection time) and place on sampling bottle.
2. Put gloves on.
3. Loosen the lid from the sampling bottle without completely removing the lid.
4. Clean the rim of the cistern faucet using one of the alcohol swabs (Chloraprep) provided in the kit.
5. Open the cistern faucet so your rain barrel water flows at full speed and let it flow out for 10 seconds (feel free to capture this water and use it for gardening purposes).
6. Quickly open the lid from the sampling bottle and fill water to the top. Immediately cap the bottle to avoid any contamination.
7. Dry off the outside of the bottle.
8. If you will be collecting more water samples, keep gloves on. If you have finished collecting water samples, remove gloves and place them in the waste bag.
9. Place water samples in the provided microbial sample return bag and store at room temperature (25 °C) until pickup/delivery.
10. Place all waste in the provided waste bag. Save this waste bag for when you submit samples to the lab.
11. Login to the [projectharvest.arizona.edu](http://projectharvest.arizona.edu) website and upload your images and type up your observations. If you do not have access to a computer or smart phone, please take notes in your Project Harvest notebook.





# KIT MATERIALS



Permanent Marker



Gloves



Hand trowel



Sterile plastic scoop



Sterile plastic Whirl-pak bag



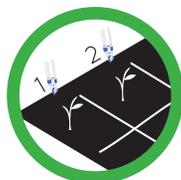
Whiskers (2 white)  
already set-up in  
Inorganic soil methods



Tent stakes (6) already set  
up in Inorganic soil methods



Waste bag and  
Sample return bag



# INSTRUCTIONS

## Collecting Soil Samples for Bacterial Pathogen Analysis from garden irrigated with harvested water

You will collect soil samples only once a year during Project Harvest. Try to collect your soil samples after you have prepared your garden for the season. Time sampling so it lines up with when you are submitting a set of water samples! **Mark your soil sampling spot with the tent stakes and whiskers provided and sample at these locations for both irrigated and not irrigated every time!** These soil sampling spots are also used for **Inorganic**, see details in that section.

1. Put gloves on.
2. Select two spots to sample in your garden and label with the white whiskers. You may have already done this for **Inorganic**. If you have raised beds, you could sample your soil from two different raised beds.
3. Using the marker, write on the whirl-pak bag **"Irrigated Soil" and your kit number**.
4. At the 2 white whisker locations, using the provided hand trowel (get from Inorganic soil kit) clean any debris on the surface. Scrape away the top inch of soil, then use a sterile scoop to remove a small amount (approximately the size of a thumbnail) of soil.
5. Open the Whirl-pak bag and place the small soil sample inside the bag.
6. Repeat steps 3-5 at the second site. Place both irrigated soil samples in the small Whirl-pak bag.
7. Close the Whirl-pak bag by folding the top of the bag over and bending the side wires (like you are closing a coffee bag).
8. Soils should be kept refrigerated until you are ready to drop-off at the designated location.



# KIT MATERIALS



Permanent Marker



Gloves



Hand trowel



Sterile plastic scoop



Sterile plastic Whirl-pak bag



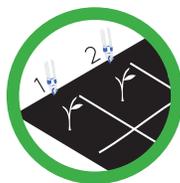
Whiskers (2 white)  
already set-up in  
Inorganic soil methods



Tent stakes (6) already set  
up in Inorganic soil methods



Waste bag and  
Sample return bag



## Collecting Soil Samples for Bacterial Pathogen Analysis from area NOT irrigated with harvested water

1. Identify an area in the yard that has not been exposed to rainwater from the rain barrels AND has not been exposed to rain running off of the roof.
2. Repeat steps 1-8 on page 28, using the another sterile scoop. Placing soil samples into the second Whirl-pak bag provided. Be certain to write on the whirl-pak bag **“Not Irrigated Soil”** and **kit number**.

### This second soil sample is a “control” sample.

Since many of the pathogens we’re testing for also occur naturally in soils, this sample will allow us to calculate the “natural” levels, and compare the pathogen levels in the rainwater-irrigated soils to see if pathogen numbers have increased or decreased.





# ORGANIC

Watch the sampling videos online on our Project Harvest website:

## WATER

<https://www.youtube.com/watch?v=dW0bVtif-pA>

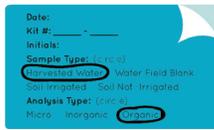
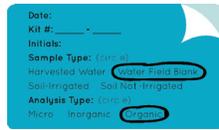
The following describes the method for collecting harvested rainwater samples that can be analyzed for organic chemical contaminants, like pesticides and endocrine disrupting compounds. In modern society, there are thousands of potential organic chemicals of concern. In this project, we have selected a short list of organic chemicals to measure based on local Arizona environmental factors that we believe are most likely to affect harvested rainwater.





# KIT MATERIALS

# INSTRUCTIONS



## Labels for water and field blank



Gloves



Sharpie Pen



Empty 500 ml amber glass bottles labeled "A"



Empty 500 ml amber glass bottles -labeled "Field Blank"



Sealed, 500 ml amber glass bottle filled with nanopure water labeled "B"



Waste bag and Sample return bag

**Field Blank** is a sample that has been exposed to the site of sampling, but without collecting the material of interest.

## Water sample collection

**Important Note: Mid-year (between sampling period two and three) your promotora will drop off the amber bottles for sampling periods three and four.**

1. Fill out the two labels, one will be for the "Harvested Water" (empty amber bottle pre-labeled "A") and the other is for the "Field Blank" (empty amber bottle pre-labeled "Field Blank") with all the information requested. Put label on bottles.
2. Bring the two bottles labeled in Step 1 and the bottle labeled "B" to the cistern.
3. Put on your gloves.
4. Open the cistern faucet so your rain barrel water flows at full speed and let it flow out for 10 seconds (feel free to capture this water and use it for gardening purposes).
5. After 10 seconds, with the flow still going at full speed, open and fill up the first bottle you labeled Harvested Rainwater.
6. Put the clean cap on the bottle and screw it on tightly. Place **Harvested Rainwater** sample to the side.
7. Close your cistern faucet.
8. Now, **standing in the same place near your cistern**, remove the cap of the second empty bottle that you labeled **Field Blank**. Open bottle that has nanopure water in it, labeled **B**. Carefully pour the nanopure water from **B** into the bottle labeled **Field Blank**. After transfer of clean water is complete, put the clean cap on the bottle and screw it on tightly.



9. Put the remaining cap on the bottle **B** (what you just emptied). Save it for return to University of AZ along with the two full bottles of water labeled **A** and **Field Blank**.
10. Keep the samples - **Field Blank** and **Harvested Rainwater** in a refrigerator (not a freezer) until you are ready to drop-off at the designated location.
11. Login to the [projectharvest.arizona.edu](http://projectharvest.arizona.edu) website and upload your images and type up your observations. If you do not have access to a computer or smart phone, please take notes in your Project Harvest journal.



