

Title of Program: Rain Barrel Program

Number of Sessions: One

Length of Lesson: Time Varies (1 hour +)

Audience: KEHA members, Master Gardeners, Homeowners

Facilitator's Guide

Date of Publication: 12/2014

Author(s): A. Osborne

Optimum Group Size: 25

Planning Phase:

Purpose: To increase participants' knowledge of rain barrels (i.e., what a rain barrel is, why a rain barrel is important, how to acquire, install, use, and maintain a rain barrel).

Supporting Research: Kentuckians use nearly 70 gallons of water per person per day. Rain barrels are an inexpensive means of conserving water by collecting and storing rainwater from rooftops. According to the U.S. Environmental Protection Agency, roughly 1,300 gallons of water can be saved during peak summer months by using a rain barrel.

In 2014, the Kentucky Environmental Education Council conducted a survey of Kentucky citizens addressing environmental knowledge, attitudes, and behaviors. When respondents were asked to name the most important environmental problem in Kentucky, 22% reported water pollution, quality, and protection as the primary environmental concern.

FCS Initiative(s): Promoting Healthy Homes and Communities

Initiative Goal(s): Through Family and Consumer Sciences Extension, individuals decrease their environmental footprint.

Sample Success Story: Kentuckians use nearly 70 gallons of water per person per day. By reducing the amount of water we each use, we can conserve energy, save money, and better prepare for water shortages and drought situations. Rain barrels are an inexpensive means of conserving water by collecting and storing rainwater from rooftops. According to the U.S. Environmental Protection Agency, roughly 1,300 gallons of water can be saved during peak summer months by using a rain barrel.

The Rain Barrel program equips participants with the information needed to obtain, install, use and maintain a rain barrel. _____ (Name of County) County presented the Rain Barrel program to (#) participants. As a result of this program, (# or % of participants) (question #7) stated that they will install a rain barrel at their home within the next <insert #> months, and (# or % of participants) (question #8) reported that they will learn more about and adopt other landscaping best management practices that protect and/or conserve water resources.

(Optional Follow-up Evaluation)

Of the (# or % of participants) (question #1) that stated they already had a rain barrel at their home prior to the rain barrel program, (# or % of participants) (question #2a) reported that they

made changes to how they use the harvested rainwater from their rain barrel and (# or % of participants) (question #2b) reported that they made changes to how they maintained their rain barrel. Of the (# or % of participants) that stated they did not have a rain barrel at their home prior to the rain barrel lesson (question #1), (# or % of participants) (question #3) reported that they installed a rain barrel at their home as a result of attending the program.

Suggested Resources:

DIY – Building a Rain Barrel from a Pickle Barrel Factsheet

PowerPoint presentation with talking points

DIY – How to Build a Rain Barrel YouTube Video

Evaluation

Follow-Up Evaluation

Potential Collaborators:

Extension Personnel:

Ashley Osborne, Extension Associate for Environmental and Natural Resource Issues, P: 859-257-2505, E: ashley.osborne@uky.edu

Community Collaborators:

- Municipal Separate Storm Sewer System (MS4) Coordinator
- Conservation District (contact information available online at <http://tinyurl.com/pjtrm5r>)

Objectives:

1. Participants will increase their knowledge of rain barrels (e.g., what a rain barrel is and why it is important).

Supporting Activities (optional):

- Two short YouTube videos are available to use in addition to the PowerPoint presentation when discussing watersheds and stormwater.
 - *What is a Watershed?* (MO and MS Resource Conservation Development Inc.)
<http://tinyurl.com/mw2kkce>
 - *Revenge of the Fish 2- The Swimming Pool* (Kentucky Transportation Cabinet)
<http://tinyurl.com/msbmotz>

2. Participants will understand how to obtain, install, use, and maintain a rain barrel.

Supporting Activities (optional):

- Demonstrate how to build a rain barrel from start to finish. Instructions for building a rain barrel are provided in *DIY – Building a Rain Barrel from a Pickle Barrel* factsheet. A short YouTube video is available showing how to build a rain barrel (based on instructions provided in the factsheet) and how to install a rain barrel. Video available online at https://www.youtube.com/watch?v=sKC8wJU_Uvo&feature=youtu.be.
- After demonstrating how to build a rain barrel, have participants build their own rain barrel to take with home. Ashley Osborne (E: ashley.osborne@uky.edu, P:859-257-2505)

may be available to assist with rain barrel programs where participants are each constructing a rain barrel to take home. Contact Ashley for additional information.

3. Participants will install a rain barrel at their home or office (if applicable).

Materials List:

Presentation Materials:

- Computer
- Projector

Props:

- Rain barrel(s) (if possible have several rain barrels that differ in size and design for participants to see)

Handouts/Publications:

- *DIY – Building a Rain Barrel from a Pickle Barrel* Factsheet
- Evaluation

Project Supplies:

- Tools and materials will be needed if demonstrating or having participants build rain barrel(s) (see *DIY – Building a Rain Barrel from a Pickle Barrel* Factsheet for list of tools and materials)

Facilities Required: Power outlets, computer and internet access, and if demonstrating how to build a rain barrel and/or if participants are each building a rain barrel a large space to construct rain barrels will be needed

Prior to Lesson: (Outline all preparations needed prior to presenting this program, i.e. gather props, copy publications, etc.)

1. Review and familiarize yourself with the PowerPoint presentation (with talking points).
2. If you are demonstrating how to build a rain barrel during the lesson, prior to the event familiarize yourself with the *DIY – Building a Rain Barrel from a Pickle Barrel* Factsheet and practice building a rain barrel. Gather the tools and materials needed for the demonstration. If each participant is building a rain barrel to take home, gather additional tools and materials needed. Each barrel (the demonstration barrel and each barrel being given to a participant to construct) will need to be prepped prior to the program. For information on prepping the rain barrel view the video on how to build a rain barrel.
3. Copy the factsheet (one per participant)

4. Copy the evaluation (one per participant)

Adaptations for other Audiences:

If adapting this lesson for youth consider the following:

- Construct a rain barrel with youth to install at the Extension office, a school, or park. Collaborate with school or park personnel if installing at their facility.
- Conduct this lesson in succession with lessons related to water conservation, water quality (e.g., nonpoint source and point source pollution), stormwater, watersheds, and/or gardening. Numerous hands-on activities related to these topics are available through various curriculum guides, including Project Water Education for Teachers (WET), Project Learning Tree (PLT), and 4-H₂O Ambassadors. For information on these or other water education curriculum contact Ashley Osborne, E: ashley.osborne@uky.edu, P: 859-257-2505.

Presenting the Program:

Note that the PowerPoint presentation slides corresponding with each section are listed in parenthesis.

Lesson Introduction (3 minutes): The objectives of this lesson are that each participant will (1) increase their knowledge of what a rain barrel is and why a rain barrel is important, (2) understand how to obtain, install, use, and maintain a rain barrel, and (3) install a rain barrel at their home or office (if applicable). Begin the lesson by reviewing the objectives and discussing what a rain barrel is (i.e., a rain barrel is a simple and inexpensive means of conserving fresh water by collecting and storing rainwater from rooftops). Have a rain barrel to show participants as you presenting the information. Encourage interaction with participants by asking if any of them have a rain barrel. (PowerPoint slides #1-2)

Procedures:

Step1 (5 minutes): This section addresses the question of “*Why use a rain barrel?*”

Rain barrels can reduce stormwater runoff. (PowerPoint slide #4)

- To understand stormwater, it’s important to understand what a watershed is.
- A watershed is an area of land that sheds (drains) water to a single waterbody, such as a stream, river, or lake. No matter where you are, you are always in a watershed.
- Impervious surfaces such as rooftops, parking lots, and roads in a watershed prevent rainwater from soaking into the soil. As the water runs off it becomes stormwater.
- As stormwater flows across impervious surfaces anything that is on the ground (e.g., cigarette butts, pop cans, automotive fluids, paint, etc.) eventually ends up in our streams, rivers, or lakes untreated by way of storm drains.
- Rain barrels can be used to capture and store rainwater or even detain and slowly release rainwater so that the amount of runoff from rooftops is decreased.

- Presenter – (optional) Show two short YouTube videos listed below. Internet access is needed.
 - *What is a Watershed?* (MO and MS Resource Conservation Development Inc.)
<http://tinyurl.com/mw2kkce>
 - *Revenge of the Fish 2- The Swimming Pool* (Kentucky Transportation Cabinet)
<http://tinyurl.com/msbmotz>

Rain barrels can decrease municipal water use. (PowerPoint slides #5-8)

- By decreasing municipal water usage, you can save money on your water bill.
- According to the U.S. Environmental Protection Agency, “Lawn and garden watering make up nearly 40% of total household water use during summer months.”
- According to the U.S. Environmental Protection Agency, “A rain barrel will save most homeowners about 1,300 gallons of water during the peak summer months.”
- The process that water goes through to be treated requires large amounts of energy. By conserving the amount of municipal water used, we decrease our demand for energy-intensive systems that obtain, treat, and distribute water. Simply put, by conserving municipal water, we save energy.

Rain barrels can help control erosion. (PowerPoint slide #9)

- Rain barrels can help control soil erosion caused by water gushing out of downspouts and can potentially help control the settling of water near foundations by containing and redirecting water to more desirable locations such as a rain garden.

Step 2 (5 minutes): This section addresses using rainwater collected in a rain barrel.

Once captured in a rain barrel, rainwater can be used to water your lawn and garden, moisten compost bins, and rinse gardening tools. (PowerPoint slides #10)

Harvested rainwater is not suitable for cooking or drinking. (PowerPoint slides #11)

Is water from my rain barrel safe for my vegetable garden? Issues in regards to pathogens, metals, pesticides, and polycyclic aromatic hydrocarbons (PAHs) in harvested rainwater are discussed. (PowerPoint slides #12-17)

Pathogens:

- U.S. Food and Drug Administration (FDA) has standards in regards to agricultural water used in growing and harvesting crops. Certain standards pertain to pathogens present in agricultural water.
- U.S. EPA also has regulations in regards to pathogens present in not only drinking water but also water used during recreational purposes, such as swimming and fishing.

- Research studies have shown that pathogens (such as total coliform, fecal coliform, and E. coli) may be present in rooftop runoff in levels that exceed these standards and regulations.
- The cause of these pathogens is likely birds and small mammals depositing fecal matter on rooftops.

Metals

- Studies have shown that rooftop runoff may contain metals (such as zinc and copper) in concentrations that exceed irrigation recommendations (U.S. EPA reclaimed water guidelines for agricultural irrigation).
- Metals may result from roofing materials.

Pesticides:

- Very few studies are available that provide information in regards to pesticides being detected in harvested rainwater.
- One study conducted in Texas did detect 2,4-dinitrophenol and benzyl alcohol (pesticides) in the first-flush. (The first-flush is the first ½ to 1 inch of precipitation collected during a rain event.)

Polycyclic Aromatic Hydrocarbons (PAHs)

- PAHs are a group of over 100 various chemicals.
- PAHs may be used in coal tar, creosote, crude oil, roofing tar, plastics, pesticides, dyes, and even some medicines.
- Individuals can be exposed to PAHs through fumes from vehicle emissions, coal, asphalt, wildfires, agricultural burning, and hazardous waste sites; breathing tobacco smoke; eating foods grown in soil contaminated with PAHs; eating charred or grilled food (grilling and charring increases PAHs in food).
- PAHs from atmospheric deposition on rooftops and the breakdown of roofing materials may be an issue in harvested rainwater.
- More research is needed.

Recommendations for using harvested rainwater from a rain barrel on a vegetable garden vary.

- Examples of recommendations include:
 - Not using harvested water on edible plants.
 - Using harvested water but directing the water at the base of the plant on the surrounding soil, not directing the water on the edible part of the plant.
 - Treating the harvested rainwater with bleach (1 ounce of bleach for a 55 gallon barrel and waiting 24 hours) before using it.
- Our recommendation is to not use harvested water on edible plants. However, if you do choose to use on edibles we recommend directing the water at the base of the plant and

not directing the water on the plant. And regardless wash plants thoroughly before consuming.

- UK is continuing to investigate the use of harvested rainwater on edible plants.

Step 3 (10 minutes to present the information; 20 minutes to demonstrate building the barrel; time varies if each participant is building a rain barrel - - time will depend on the number of participants and the participants past experience and level of comfort with building): This section addresses how to obtain and install a rain barrel.

Rain barrels are available for purchase online or from a variety of home improvement stores and gardening stores. (PowerPoint slide #18)

Rain barrels can also be constructed. Introduce the *DIY – Building a Rain Barrel From a Pickle Barrel* factsheet. This section discusses constructing and installing a rain barrel. (PowerPoint Slides #19-24)

- Show the DIY YouTube video on how to build and install a rain barrel. Video available online at https://www.youtube.com/watch?v=sKC8wJU_Uvo&feature=youtu.be. Internet access is needed.
- Optional: Have each participant build a rain barrel to install at home, at the office, at a school, etc.

Additional talking points:

- When selecting a used barrel to construct your rain barrel, make sure the material previously stored in the barrel was not harmful to plants or animals and be sure to thoroughly rinse the barrel prior to use with a dilute bleach solution. Barrels should be dark in color or painted to reduce sunlight exposure and thus prevent or minimize algae growth.
- If painting your rain barrel, note that most types of paint will stick to a plastic surface, after the proper preparation steps are performed. Plastic is slick and nonporous, making it unsuitable for most paints. Without the proper preparation, plastic sheds its painted finish relatively fast after application. Plastic must be conditioned to accept paint through abrasion. To determine the proper preparation, check the label on the paint can. In general, best results can be achieved by sanding the rain barrel with fine sand paper (~ 200 grit) and then cleaning the barrel with soap and water and rinsing thoroughly. Let the barrel dry and apply paint. Newer acrylic plastic paints (e.g. Krylon, Valspar Plastic, Rustoleum Plastic) are appropriate for plastic surfaces. These paints provide elasticity and resist cracks and chips as the plastic bends. (Presenter – Have a painted rain barrel for participants to see if possible.)
- Note to Presenter – Depending on your audience, you may want to show the DIY YouTube video after you have presented the information on installation and maintenance.
- Discuss how to calculate the size rain event that will fill your barrel. See PowerPoint slides #24-25 which show the equation to use and provide an example.

Step 4 (3 minutes): This section addresses maintenance considerations for a rain barrel.

Though rain barrels require minimal maintenance, proper upkeep will help ensure your rain barrel continues to work well. (PowerPoint slides #25-31)

- Periodically clean your filter screen and downspout outlet. Remove any accumulated debris such as leaves and twigs. If needed, guards can be installed on gutters to minimize the amount of rooftop debris entering the barrel.
- Place your barrel on level and solid surface. A full barrel can weigh 400 + pounds!
- Make sure the lid is properly sealed and the screen is free of cuts and tears. Securing the lid will make the barrel safer for children and pets and will prevent insects such as mosquitoes from entering the barrel. However, if mosquitoes still become an issue, products such as biological larvicides are available at pond supply stores to control mosquito breeding. Note that the image on PowerPoint slide #28 shows a mosquito's life cycle from egg to adult.
- To discourage algae growth, keep your barrel out of direct sunlight and use a barrel dark in color. Plus, for your rain barrel to be most effective at capturing runoff, it should be empty before each rain event.
- During the winter months, store your rain barrel indoors or open all spigots and leave it outdoors. It is recommended that you drain your barrel completely, including any connecting piping or hoses. If you disconnect your rain barrel from your downspout, you will need to extend your downspout and direct the flow away from your foundation.

Lesson Review (2 minutes): (PowerPoint slide #32)

- Rain barrels provide an easy and inexpensive way to conserve fresh water.
- By capturing runoff from your rooftop, a rain barrel decreases the amount of stormwater entering streams and other local waterbodies.
- Rain barrels also reduce the amount of municipal water used, thus saving money on water bills and conserving energy used in obtaining, treating, and distributing municipal water, and in addition, can help control soil erosion near your home's foundation.
- Rain barrels can be installed relatively easily and require minimum maintenance.
- If you have additional questions regarding rain barrels contact your county Extension agent or Ashley Osborne, Extension Associate for Environmental and Natural Resource Issues, E: ashley.osborne@uky.edu, P: 859-257-2505.

Evaluations:

1. Give each participant an evaluation form to complete and turn in.
2. Give each participant an envelope. Have participants write their name and mailing address on the envelope. In 6 months, send a follow-up evaluation (and self-addressed envelope) to participants using the addressed envelope. Ask participants to complete the follow-up evaluation and mail back to you.
3. Please send all evaluations to Ashley Osborne at ashley.osborne@uky.edu. Ashley will compile data and send back to you electronically.

***Invite participants to sign-up for other CES programming. Distribute newsletters, program invites, informational materials, etc. promoting CES programming.

***Remind participants to complete and return prior to leaving the program.

After the Program:

Reflection: Document strengths and weaknesses of program for future improvements. Note additional needs, props, etc. Incorporate participant ideas to refine program for future presentations.

Suggestions for additional program supports:

This lesson can be taught in succession with the following lessons:

- Rain Gardens
- Saving Water at Home