**Facilitator Instructions**

Detailed directions for local facilitators to assist their community in utilizing the

Water Harvesting Assessment Toolbox

***GOAL AND USE OF THE WATER HARVESTING ASSESSMENT TOOLBOX***

The goal of the Water Harvesting Assessment Toolbox is to help communities in the Southwest US identify water resource challenges, understand the role water harvesting can play in meeting these challenges as well as providing multiple additional benefits, and implement locally-appropriate water harvesting efforts. The Toolbox is intended for use by a wide range of water resource decision-makers and community members. Use of the Toolbox is conducted with the assistance of a local facilitator who oversees the assessment process and utilization of the five tools provided with the Toolbox. The five tools are summarized below. Step-by-step instructions for facilitators are provided in the detailed table that follows.

***THE FIVE TOOLS PROVIDED IN THE WATER HARVESTING ASSESSMENT TOOLBOX***

* **TOOL 1: Water Harvesting Assessment Presentation:** The Guide to Assessing Rainwater and Stormwater Harvesting Potential Presentation is a narrated, 95-slide, 54-minute video that leads users through eight Steps:
	1. Identify local water resource challenges
	2. Evaluate land use sectors with water harvesting potential
	3. Understand water harvesting benefits and strategies
	4. Prioritize water harvesting approaches
	5. Estimate preferred catchment-to-canopy-area ratio
	6. Learn and follow important design guidelines
	7. Manage water harvesting using key implantation steps
	8. Communicate water harvesting recommendations

The presentation prompts periodic pauses in the video for discussions and real-time analysis of local water harvesting potential using the Tool 2 and Tool 3 spreadsheets (see below). Users can access the embedded presentation at [**http://wrrc.arizona.edu/DWHI/toolbox**](http://wrrc.arizona.edu/DWHI/toolbox)

* **TOOL 2: Water Harvesting Assessment Spreadsheet:** This Excel spreadsheet consists of four data tables and associated charts that allow users to insert location-specific data to tabulate their perceptions of water resource challenges, land-use areas to focus efforts on, water harvesting benefits, and future water-harvesting priorities.
* **TOOL 3: Catchment-to-Canopy-Area Ratio Spreadsheet:** This Excel spreadsheet assists users in determining the optimum ratio of water harvesting catchment area to plant-canopy area to meet plant water needs in their location for a portion of each year. Rainfall, evapotranspiration, and plant water demand data are provided within the spreadsheet for the following urban areas in the Southwest US:
	+ Avondale-Goodyear, AZ
	+ Casa Grande, AZ
	+ El Centro, CA
	+ El Paso, TX
	+ Flagstaff, AZ
	+ Indio-Cathedral City, CA
	+ Kingman, AZ
	+ Lake Havasu City, AZ
	+ Lancaster-Palmdale, CA
	+ Las Cruces, NM
	+ Las Vegas-Henderson, NV
	+ Marana, AZ
	+ Phoenix, AZ
	+ Prescott, AZ
	+ Scottsdale, AZ
	+ Sierra Vista, AZ
	+ Tucson, AZ
	+ Victorville-Hesparia, CA
	+ Yuma, AZ

 The formulas and analysis process can also be used for other geographic areas by inserting location-specific data.

* **TOOL 4: Water Harvesting Resource Website:** The Toolbox website contains links to numerous resources and in-depth information about the water harvesting topics introduced in the Presentation, as well as links to download all of the Tools in the Toolbox. Note the 43 numbered orange circles in the bottom right corner of the Presentation slides. These information icons allow users to navigate to corresponding online resources to quickly find more information on the subjects addressed in that slide. They are curated from the main Desert Water Harvesting Initiative website ([**http://wrrc.arizona.edu/DWHI**](http://wrrc.arizona.edu/DWHI)), which hosts extensive water harvesting-related publications and website links.
* **TOOL 5: Decision-Maker Presentation Template:** This customizable PowerPoint presentation allows users to insert their own site-specific water harvesting assessment results, graphs, photographs, and recommendations to provide a concise and effective PowerPoint presentation for decision-makers and the public.

  

| ***INSTRUCTIONS FOR FACILITATORS*** | ***TOOLS AND SUPPLIES*** |
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| **Review the Tools in the Water Harvesting Assessment Toolbox:** * Read these Facilitator Instructions all the way through.
* Open and review all five Tools in the Toolbox.
* Access and watch TOOL 1 Presentation, familiarizing yourself with how to pause the presentation when prompted, resume it, and use the slider button and bar to move forward and backward. (Hovering the mouse pointer over the slider button and then clicking and holding the left mouse button gives a small preview of the slides ahead and behind).
* Download and open TOOLS 2, 3, and 5. Make sure they all open and function properly. Instructions on their use are provided within the TOOLS and in the table below.
* If you have technical questions about any of the TOOLS, contact Susanna Eden at the University of Arizona, Water Resources Research Center, at **seden@cals.arizona.edu**.
 | * *Facilitator Guidelines*
* *TOOL 1: Water Harvesting Assessment Presentation*
* *TOOL 2: Water Harvesting Assessment Spreadsheet*
* *TOOL 3: Catchment-to-Canopy-Area Ratio Spreadsheet*
* *TOOL 4: Water Harvesting Resource Website*
* *TOOL 5: Decision-Maker Presentation Template*
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| **Gather and Process Information About Your Location Prior to Assembling a Community Meeting:*** Open TOOL 2. Follow the instructions in the TOOL 2 spreadsheet for the worksheets named *STEP 1 Challenges, STEP 2 Land Use Sectors, STEP 3 Benefits, and STEP 4 Priorities* to practice entering local data in the yellow boxes. Verify that data entered in the yellow boxes are correctly plotted on the charts provided. These charts may be printed or projected during the meeting.
* Open TOOL 3. Review the data, graphs and contents of the worksheet named *Example for Tucson.* Note the range of climate data and catchment-to-canopy-area graphs that are provided. You will be undertaking a similar analysis for your location.
* Open TOOL 3. Go to the worksheet named *Your Location.* Follow the instructions provided to enter average monthly rainfall, average monthly reference evapotranspiration, and plant water use coefficient data for the population center closest to your area/climate. If you have access to more site-specific data for your area and want to use it, enter those numbers in the spreadsheet instead. Verify that the data entered are correctly plotted in the charts provided. You can print these charts ahead of time for use during the meeting.
* If possible, gather data for your area to have available at the meeting, including current and projected potable water use and future growth projections for various land-use sectors (single-family residential, multifamily and subdivision developments, commercial-scale buildings, street rights-of-way, and stormwater management areas). This information will be useful in group discussions related to the TOOL 2 spreadsheet.
 | * *TOOL 2: Water Harvesting Assessment Spreadsheet*
* *TOOL 3: Catchment-to-Canopy-Area Ratio Spreadsheet*
* *TOOL 4: Water Harvesting Resource Website*
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| **Reserve Room, Invite Participants, Test Computer Projection Capabilities:*** Identify appropriate representatives to participate in assessing your area’s water harvesting potential and strategies. These may include representatives of water providers, flood control agencies, planning departments, stormwater management departments, conservation departments, utilities, transportation departments, elected officials, developers, homeowner’s associations, various water use sectors, environmental groups and/or others.
* Reserve an appropriately-sized room for the number of people you expect to invite. This room should have computer projection capabilities to, at a minimum, project the TOOL 1 Water Harvesting Assessment Presentation.
* If possible, computer projection capabilities should include the ability to toggle between the TOOL 1 Presentation, TOOL 2 and TOOL 3 Excel Spreadsheets, and a method to display the Excel Spreadsheet charts that are generated.
* Reserve the room for a minimum of two hours to allow time for setup, presentation/discussion, and shut down. The prerecorded TOOL 1 Presentation lasts 54 minutes, and will be paused periodically for discussion.
* Test the meeting room ahead of time to verify that all tools work and can be projected, you can toggle between TOOL 1 Presentation, TOOL 2 and TOOL 3 Excel spreadsheets, and you can print/display the Excel spreadsheet charts that are generated.
* Distribute the meeting announcement with date, start time, and meeting length (minimum 90 minutes is recommended). Request RSVPs.
 | * *TOOL 1: Water Harvesting Assessment Presentation*
* *TOOL 2: Water Harvesting Assessment Spreadsheet*
* *TOOL 3: Catchment-to-Canopy-Area Ratio Spreadsheet*
* Printer/projector
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| **Prepare for the Meeting:*** Have TOOL 1 Presentation open on the projection computer. Have TOOL 2 and TOOL 3 Excel spreadsheets open on your computer and tied to projection capabilities. Practice displaying charts generated in Excel.
* Print the 4 fill-in-the-blank tables at the end of these Instructions. Make enough copies of each table for each attendee to use, plus copies for you to compile consensus results.
* Procure white board or flip charts, as needed, to help facilitate discussion and consensus-building.
 | * *TOOL 1: Water Harvesting Assessment Presentation*
* *TOOL 2: Water Harvesting Assessment Spreadsheet*
* *TOOL 3: Catchment-to-Canopy-Area Ratio Spreadsheet*
* Printer/projector
* Printed handouts
* White board/flip chart/markers
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| **Facilitate the Meeting:*** Watch the presentation with the assembled group. Pause the presentation when prompted and facilitate discussion for STEPS 1-5.
* See listed STEPS, corresponding slide numbers, and corresponding TOOLS below for more specific instructions.
* In general during STEP 1-5 discussions, instruct participants on how to fill out the worksheets and work with them to reach consensus for your area. Record the consensus results on your printed handouts, and enter them in the appropriate spreadsheet locations. Display the resulting graphs for the group. This will help give participants an idea of where and how to focus water harvesting efforts to meet local challenges.
 | * *TOOL 1: Water Harvesting Assessment Presentation*
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| **Slides 1 – 18:** Introduction [NOTE: slide numbers are found in the lower left corner in black font] |  |
| **Slides 19 – 27**STEP 1: Identify the challenges you face.Participants individually rank the urgency of water resource challenges in the community, now and in the future. Discuss people’s rankings, and come to a consensus for your area. Enter the consensus results in the appropriate spreadsheet and display the graph for all participants to see. Knowing your area’s challenges will help users determine the most appropriate water harvesting strategies to meet these challenges. | *TOOL 2: Water Harvesting Assessment Spreadsheet.* *Use worksheet named: STEP 1 CHALLENGES* |
| **Slides 28 – 34**STEP 2: Evaluate land use sectors that have water harvesting potential.This exercise indicates which land use sectors (single-family residential, multi-family & subdivision common areas, commercial, street rights-of-way, and regional stormwater management areas) use the most potable water outdoors, as well as how fast each sector is expected to grow. Participants individually rank current and projected outdoor potable water use. Discuss people’s rankings, and come to a consensus for your area. Enter the consensus results in the appropriate spreadsheet and display the graph for all participants to see. Knowing the relative use of potable water now and in the future will help users determine the land-use sectors on which to focus water harvesting efforts.  | *TOOL 2: Water Harvesting Assessment Spreadsheet.* *Use worksheet named: STEP 2 LAND USE SECTORS* |
| **Slides 35 – 58**STEP 3: Understand the benefits of water harvesting strategies and techniques.Circle or note the rows of this chart that provide the benefits that address the water resource challenges identified in STEP 1. This helps users identify the appropriate land use sectors and water harvesting strategies and techniques on which to focus water harvesting efforts. | *TOOL 2: Water Harvesting Assessment Spreadsheet.* *Use worksheet named: STEP 3 BENEFITS* |
| **Slide 59**STEP 4: Prioritize water harvesting approaches based on assessment and discussion. Taking into account the information and consensus agreements from STEPS 1-3, decide where and how to prioritize your area’s water harvesting efforts. If your community anticipates high growth rates, it might be best to focus on incorporating water harvesting practices into new sites. If your community expects slow to flat growth, it might be more appropriate to focus on retrofitting existing sites to meet water harvesting goals. All participants rank each water harvesting approach, both in terms of retrofitting existing sites and incorporating into new sites. Discuss people’s rankings, and come to a consensus for your area. Enter the consensus results in the appropriate spreadsheet and display the graph for all participants to see.  | *TOOL 2: Water Harvesting Assessment Spreadsheet.* *Use worksheet named: STEP 4 PRIORITIES* |

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| **Slides 60 – 77** STEP 5: Estimate an effective catchment-to-canopy area ratio for your area. Enter appropriate local data into the Catchment-to-Canopy Area spreadsheet. This can be done ahead of time, and your area’s charts can be printed and ready for the meeting. Print or display the resulting graphs to enable group discussion to decide on an effective catchment ratio that balances canopy area (shaded area) and catchment area (area generating harvestable water).  | *TOOL 3: Catchment-to-Canopy-Area Ratio Spreadsheet* |
| **Slides 78 – 84**STEP 6: Follow important design guidelines to ensure benefits from water harvesting.Properly designing, installing, and maintaining water harvesting practices is essential. The information provided in the presentation is just the starting point. Use the numbered orange circles found below the embedded TOOL 1 Presentation to learn much more information about effective water harvesting.  | *TOOL 4: Water Harvesting Resource Website* |
| **Slides 85 – 92**STEP 7: Manage water harvesting using key implementation steps. Once the group has decided on the most effective water harvesting strategies to meet community water resource challenges, you will see recommended implementation steps and time frames to implement water harvesting in your area. This section presents policies and regulations used by other communities to implement water harvesting. Pause the Presentation to discuss these implementation steps with the group. Determine which to emphasize in your area, and within what time frame to do them. Note the group’s recommendations and use this information when assembling the implementation steps in the TOOL 5 Decision-Maker Presentation Template.  | *TOOL 4: Water Harvesting Resource Website* |
| **Slide 93 – 94**STEP 8: Communicate your water harvesting recommendations using TOOL 5 Decision-Maker Presentation Template.This Water Harvesting Assessment process may be repeated as necessary. Use TOOL 5 Decision-Maker Presentation Template as the starting point for creating a presentation about water harvesting potential for your area. Retain slides that provide useful context for your area. Retain existing photographs or replace with local images. Charts, graphs, and text in red can be replaced with information generated during your water harvesting assessment process and the water harvesting approach recommendations that resulted. The TOOL 5 presentation may be shown to key local decision-makers and community members to put forward water harvesting assessment results and recommendations to a larger audience and to build the support needed to undertake implementation.  | *TOOL 5: Decision-Maker Presentation Template* |
| **Slide 95:** Contact information | *TOOL 4: Water Harvesting Resource Website* |

***WATER HARVESTING ASSESSMENT TABLES FOR STEPS 1 THROUGH 4***

***FOR USE DURING WATER HARVESTING ASSESSMENT PRESENTATION***

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| **STEP 2. LAND USE SECTORS: POTABLE WATER USE AND GROWTH RATES INDICATING WATER HARVESTING POTENTIAL** | RANK THE RELATIVE EXISTING **OUTDOOR** POTABLE WATER USE BY THESE LAND USE SECTORS FROM 1 (LOW) TO 10 (HIGH), AND ESTIMATE PERCENT GROWTH IN THESE SECTORS IN 10 YEARS AND 25 YEARS |
| SINGLE-FAMILY RESIDENTIAL SECTOR | MULTIFAMILY + SUBDIVISION COMMON AREA SECTOR | COMMERCIAL-SCALE BUILDING SECTOR | STREET RIGHT-OF-WAY SECTOR | STORMWATER MANAGEMENT SECTOR |
| EXISTING RELATIVE OUTDOOR POTABLE WATER USE  |  |  |  |  |  |
| PROJECTED PERCENT GROWTH OF SECTOR IN 10 YEARS |  |  |  |  |  |
| PROJECTED PERCENT GROWTH OF SECTOR IN 25 YEARS |  |  |  |  |  |



