

Drought Proofing Communities: Water Resource Planning and Development

Work Group Names: Bruce Lesikar, Billy Kniffen, Mike Mecke

Region: West

Circle which primary base program it addresses - ANR

Section 1. Relevance

Where did this issue surface?

Texas Community Futures Forum

County Committees

Commodity / Industry / Special Interest Groups

Specialist(s)

What is the issue/problem?

Meeting water needs for communities, home owners, and agricultural producers; water infrastructure, waste water infrastructure, storm water management, and development of alternative water supplies availability is limited to the groundwater and surface water. Groundwater has water quality limitations.

Problem size and scope? (How many people does it affect? How wide spread?)

Affects everyone in the region

Problem severity? (How serious is this issue?)

HIGH

Target Audience? (Who does the problem impact and how many?)

homeowners, elected officials, landowners, practitioners

Section 2. Response

Response refers to how Extension intends to address the issue by developing an educational program.

State the goal of the program.

To increase awareness of water resources availability and collection/treatment options for alternative sources to meet our water needs

State the outcome objectives. These are the objectives that describe the intended results of a program (e.g. attitudes, knowledge, skills, adoption of practice/technology, change of behavior).

Client Change	At the end of this program, will....
<i>Knowledge</i>	increase knowledge on water conservation, water resource options, and ways to monitor and reduce water usage. Participation will increase knowledge on water resources available to meet our water needs
<i>Skills</i>	develop skills on water conservation, landscape design to reduce water usage, conserving water inside the home, collecting water samples, reducing leaks and waste.
<i>Attitude</i>	change their attitudes pertaining to water rights, landscape design, frequency and amount of water used in landscapes, the need to conserve water, reducing storm water.
<i>Behavior Change</i>	adopt....Water conservation measures inside the home Consider alternative sources of water and usage of gray water Change landscape design
<i>New Technology</i>	adopt... Rainwater harvesting Wastewater treatment technology Desalination of produced and/or existing water sources PET / Precision Irrigation, drip irrigation and other technologies to improve efficiency of irrigation Xeriscape landscapes Gray water systems
<i>Best Practice</i>	adopt
	Best management practices for implementing rain water harvesting, gray water systems, efficient irrigations methods, and utilize recommended plants in landscapes.

Program Design.

Topic (Subject Matter)	Strategy to Deliver Content (Method)	Existing Resource(s)	Contact Person(s) (Includes CEA's Specialists, Commodity Reps)
Rain water harvesting	Demonstration Publications web sites conferences/meetings	Rainwater harvesting fact sheet	Billy Kniffen - TCE Mike Mecke - TWRI TWDB, City of Austin, San Antonio Water System
Gray water reuse	Demonstration Publication Presentations		Bruce Lesiker and Raymond Bader - TCE Mike Mecke - TWRI San Antonio Water System
Wastewater Reuse -community -clustered -individual residence	Publications Presentations Community Readers	Fact Sheets Videos	Bruce Lesiker - TCE Mike Mecke - TWRI SAWS City of El Paso Bureau of Reclamation
Ground Water -Management -Treatment -Use commodity -Protection	Conference Demonstrations Water Testing Campaigns Groundwater Conservation District Abandoned Well Plugging	Videos Fact Sheets	Monty Dozier and Bruce Lesiker- TCE Mike Mecke - TWRI GCD Managers Val Silvy Ron Kaiser VSGS TWDB EAA TCEQ
Storm Water -Management -Utilization -BMPs for Quality	Publications Onsite Storm water Management Rain Gardens	Fact Sheets	Russell Persyn John Jacob Mike Mecke SAWS City of Austin River Authorities TCEQ

Desalinization -Technologies -Communities -Produced Water	Publication Demonstration of produced water Presentations		Mike Mecke and Bill Fox - TWRI TWDB Bruce Lesiker - TCE El Paso Water Utilization
Surface Water -Management -Availability	Publications BMPs Presentation	EPA Resources Center for Watershed Protection	Mike Mecke - TWRI Corp of Engineers TCEQ River Authorities EPA TWDB Bureau of Reclamation

Section 3. Results

The last section deals with evaluation of this program. The evaluation content should mirror the objectives that are outlined in section two. Please try and list some specific questions that should be asked to the target audience to determine if the intended change took place. List as many potential questions as possible. The goal here is to create a question bank for each client change level so that the educator can review these questions to see if any of them are relevant to their program. If they are, then they can use them to measure change in their program. Remember, not all evaluation strategies have to be written questionnaires. They may also be interviews, direct observation, or focus groups. Please describe your method in this section where appropriate.

Client Change Level	Sample Questions (Review the objectives section to help place questions or statements in the space below)
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<i>Knowledge</i>	<p>What is the source of your drinking water?</p> <p>Who manages the groundwater in your area?</p> <p>How can you use rainwater in your landscape? Home drinking water, livestock, wildlife?</p> <p>How many gallons of water can be harvested form one square foot of roof per 1 inch of rainfall?</p> <p>What “point of use” treatment system can be installed to remove salts, arsenic, radionucleides, nitrogen?</p> <p>How much gray water can be produced on a daily basis from a home?</p> <p>What is the current desalinization use in the region?</p>
<i>Skills</i>	<p>Construct “simple” rainwater harvesting systems</p> <p>Construct “simple” gray water systems</p> <p>Collect a water sample for testing</p>
<i>Attitude</i>	
<i>Behavior Change</i>	

<i>New Technology</i>	
<i>Best Practice</i>	

Economic Indicators. Are there economic indicators that can be measured concerning this issue?

YES **NO**

Please list them below.

Water is Life

Interpretation. The last step in the process is interpreting the results to our stakeholders. List internal and external stakeholders that would be interested in the results of this educational program. Do not forget to think about other state agencies and groups that would be interested in these outcomes.

Internal to Extension Stakeholders	External Stakeholders
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TCE Administration
TAMU System
TWRI
Agricultural and Biological Engineering Department

Elected County and City Officials
Legislators
TWDB
Bureau of Reclamation
GWD's
TCEQ
River Authorities
EPA

Additional Resources. What additional resources are needed to address this issue? In other words, what is needed to design innovative programs that will impact our audiences? Use the space below or the back if needed.

Evaluation Examples # 1 - Knowledge Based Questions

What is the source of your drinking water?

Who manages the groundwater in your area?

How can you use rainwater in your landscape? Home drinking water, livestock, wildlife?

How many gallons of water can be harvested form one square foot of roof per 1 inch of rainfall?

What “point of use” treatment system can be installed to remove salts, arsenic, radionucleides, nitrogen?

How much gray water can be produced on a daily basis from a home?

What is the current desalinization use in the region?

Example Evaluation 2 - Quality and Quantity of Water from Rangeland Watersheds

Thanks for participating in the “*Quality and Quantity of Water from Rangeland Watersheds*” Program. In order for us to put together the most effective educational program for you, please take a few minutes to answer the questions below.

Please rate your level of understanding about with the following statements. Simply place an ‘x’ in the box that best matches your thoughts.

LEVEL OF UNDERSTANDING

Very Poor
1

Poor
2

Average
3

Good
4

Excellent
5

STATEMENTS	LEVEL OF UNDERSTANDING				
Loss of plant cover, resulting in bare ground leads decreases water infiltration.	1	2	3	4	5

Loss of plant cover, resulting in bare ground leads increases runoff.	1	2	3	4	5
Loss of plant cover, resulting in bare ground leads to higher soil erosion.	1	2	3	4	5
Maintaining adequate vegetation and litter cover to intercepts and reduces raindrop impact.	1	2	3	4	5
Maintaining adequate vegetation and litter cover to intercept and reduce improves infiltration.	1	2	3	4	5
Maintaining adequate vegetation and litter cover shade and stabilize soil temperatures.	1	2	3	4	5
Maintaining adequate vegetation and litter cover increases soil organism activity.	1	2	3	4	5
Maintaining adequate vegetation and litter cover lessens wind effects and reduces runoff.	1	2	3	4	5
The loss of topsoil can result in drought like conditions which reduce the soil water holding capacity.	1	2	3	4	5
The loss of topsoil can result in lower fertility and organic matter.	1	2	3	4	5
The loss of topsoil can result in the production of sedimentation flowing into my streams, ponds or other water bodies.	1	2	3	4	5
Soil characteristics that influence water infiltration into the soil include: antecedent moisture, bulk density, depth, slope, organic matter, soil texture, aggregate stability and soil parent material.	1	2	3	4	5
The water cycle process.	1	2	3	4	5
The three major components of the rangeland water cycle that man can affect are soil, vegetation, and soil surface.	1	2	3	4	5

Example Evaluation 3 - Post then Pre Quality and Quantity of Water

For each of the topics listed below, in the LEFT column, circle the ONE number that best reflects your LEVEL OF UNDERSTANDING before the *Quality and Quantity of Water from Rangeland Watersheds*. Then, in the RIGHT column, circle the ONE number that best reflects your LEVEL OF UNDERSTANDING after the *Quality and Quantity of Water from Rangeland Watersheds*.

LEVEL OF UNDERSTANDING

Very Poor
1

Poor
2

Average
3

Good
4

Excellent
5

TOPICS	<u>BEFORE</u> the Program					<u>AFTER</u> the Program				
Loss of plant cover, resulting in bare ground leads decreases water infiltration.	1	2	3	4	5	1	2	3	4	5
Loss of plant cover, resulting in bare ground leads increases runoff.	1	2	3	4	5	1	2	3	4	5
Loss of plant cover, resulting in bare ground leads to higher soil erosion.	1	2	3	4	5	1	2	3	4	5
Maintaining adequate vegetation and litter cover to intercepts and reduces raindrop impact.	1	2	3	4	5	1	2	3	4	5
Maintaining adequate vegetation and litter cover shade and stabilize soil temperatures.	1	2	3	4	5	1	2	3	4	5
Maintaining adequate vegetation and litter cover increases soil organism activity.	1	2	3	4	5	1	2	3	4	5
Maintaining adequate vegetation and litter cover lessens wind effects and reduces runoff.	1	2	3	4	5	1	2	3	4	5
The loss of topsoil can result in drought like conditions which reduce the soil water holding capacity.	1	2	3	4	5	1	2	3	4	5

The loss of topsoil can result in lower fertility and organic matter.	1	2	3	4	5	1	2	3	4	5
The loss of topsoil can result in the production of sedimentation flowing into my streams, ponds or other water bodies.	1	2	3	4	5	1	2	3	4	5
Soil characteristics that influence water infiltration into the soil include: antecedent moisture, bulk density, depth, slope, organic matter, soil texture, aggregate stability and soil parent material.	1	2	3	4	5	1	2	3	4	5
The three major components of the rangeland water cycle that man can affect are soil, vegetation, and soil surface.	1	2	3	4	5	1	2	3	4	5

What is the most significant thing you learned during the Quality and Quantity of Water from Rangeland Watersheds (feel free to list more than one)?

Do you feel like what you learned today provides you the ability to analyze your land situation and make better land management decisions? (Circle the best answer)

YES

NO

- Please explain your answer or provide an example.

Please provide any additional information in the space below.

Thank you very much for your time!!