Efficient Irrigation Methods/Technologies in Agricultural Production

Work Group Names: Kenneth White, Travis Miller, Billy Warrick, Warren Multer, Jaime Iglesias,

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)
County Extension Agents also noted this as a issue in their counties

What is the issue/problem?
Water quantity and quality to meet the domestic, agricultural and industrial needs in the west region

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

Problem severity? (How serious is this issue?) **HIGH**

Target Audience? (Who does the problem impact and how many?)
Producers with Irrigated crop land

What are some general characteristics of the audience this program targets? How will you market this program to others?
Irrigation water users, landowners, producers, groundwater districts

Section 2. Response

State the goal of the program.

Agricultural producers utilize efficient irrigation methods and technologies to conserve water and improve profitability

State the outcome objectives.

Client Change	**At the end of this program, will....** utilization of PET network information
Knowledge	increase knowledge on.... Irrigation technologies, water quality, irrigation scheduling, soil moisture sensors, plant stress physiology, conservation tillage, water conservation, water blending, plant stress measuring devices.
Skills	develop skills....
Attitude	change their attitudes pertaining to...
Behavior Change	adopt....
New Technology	adopt.... Utilization of soil moisture sensors, irrigation scheduling, drip irrigation, irrigation technologies
Best Practice	adopt ..... Irrigation scheduling (timing and amounts) salinity management, nutrient management, conservation tillage, soil moisture management.

Program Design.

Topic (Subject Matter)	Strategy to Deliver Content (Method)	Existing Resource(s)	Contact Person(s) (Includes CEA's Specialists, Commodity Reps)
Irrigation technologies	Educational programs, field days, tours, newsletters, mass media, personal contacts, fact sheets, conferences	Industry Texas ET website Publications TCE faculty TAES faculty	Industry reps TCE Bookstore Biological and Ag Engineering- TCE Soil and Crop Sciences- TCE Roger Havlak, Billy Warrick, Charles Stichler, Larry Stein, Warren Multer, - TCE Giavanni Piccini -TAES
Water Quality and Irrigation Supply	"	Soil and Water Testing Labs TCE Publications Web Sites TCE Faculty TWRI faculty TAES faculty	Mark McFarland- TCE TCE Bookstore TCE, Industry Biological and Ag Engineering- TCE Soil and Crop Sciences- TCE Roger Havlak, Billy Warrick, Charles Stichler, Larry Stein- TCE Mike Mecke- TWRI Giavanni Piccini- TAES
Irrigation scheduling timing and amounts	" Applied Research/Demonstrations	Industry TCE Publications TCE faculty TAES faculty	Industry Reps. TCE Bookstore Biological and Ag Engineering- TCE Soil and Crop Sciences- TCE Billy Warrick, Charles Stichler, Larry Stein, EA's- IPM - TCE Giavanni Piccini -TAES TAES Researchers

Nutrient Management and Irrigation	“ Applied Research/Demonstration	”	”
Salinity Management	“ Applied Research/Demonstrations		Industry Reps. TCE Bookstore Biological and Ag Engineering- TCE Soil and Crop Sciences- TCE Billy Warrick, Charles Stichler, Larry Stein, EA’s- IPM, Jaime Iglesias - TCE
Soil Moisture Management	“ Applied Research/Demonstrations	Industry TCE faculty TAES faculty	Industry Reps. Biological and Ag Engineering Soil and Crop Sciences Charles Stichler, Billy Warrick- TCE Giavanni Piccini- TAES
Irrigation Economics	“ Feasibility studies	Industry TCE faculty	Industry Reps. Ag Economics Department Soil and Crop Sciences- TCE Billy Warrick, Charles Stichler, Jason Johnson, Bill Thompson, Joe Pena- TCE

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)
Knowledge	Has your knowledge of irrigation technologies increased? Water Quality Irrigation Scheduling Soil Moisture sensors Water Conservation Conservation Tillage Plant stress measuring devices Water blending
Skills	
Attitude	
Behavior Change	

New Technology	Has your acreage under irrigation using new technologies increased? Have you changed your irrigation scheduling as a result of participation in these educational programs? Have you changed your tillage operation as a result of your participation in extension activities? Has your acreage under drip irrigation increased? Have you adopted any new irrigation delivery methods
Best Practice	

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

YES NO

Please list them below.

Production per acre inch of water applied

Cost of acre inch of water

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**

County committees Commissioners courts civic leaders water districts regional program directors administrators	state legislators Texas Water Development USDA agencies State agencies power suppliers agribusiness

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.

Comprehensive irrigation guide

Evaluation #1 -
Management Survey for Sub-surface Drip Irrigation System Operators

1) **Do you currently manage or own drip irrigation equipment?**

Yes_____ No_____

If yes, how many acres?_____. If yes, please complete remaining questions:

2) **Regarding the majority of drip systems you own or manage, how are they designed?**

Tape spacing: 40 inch_____; 80 inch_____; other_____.

Tape placement: bottom of furrow_____; bottom of row_____.

Tape depth:_____.

Emitter spacing: _____.
Average number of zones per system:_____.
Type of filter system: screens_____; discs_____; sand media_____;
other_____.
Average installation cost per acre: $_____ (This question is optional. All answers will only be reported as an average.)

3) **If you manage drip systems, do you currently practice the following management? Please check the appropriate box.**

Management Practices	**YES**	**NO**
Soil testing to determine nutrient needs		
Water quality testing to determine potential clogging problems		
Monitoring and buffering pH of irrigation water		
Use of South Plains ET network for irrigation scheduling		
Fertigation		
Foliar Feed		
Occasionally monitoring flow rates		
Use of cotton growth regulators *If yes: at early bloom_____ or multiple applications_____*		

4) **Please rate your current knowledge level regarding the following topics on a scale of 1 to 5.**
1=No Knowledge 2=Vaguely Familiar 3=Some Knowledge 4=Knowledgeable 5=Very Knowledgeable

	No knowledge				Very knowledgeable
Drip System Design	1	2	3	4	5
Drip System Management	1	2	3	4	5
South Plains ET Network	1	2	3	4	5
Nutrient Management - Drip Irrigation	1	2	3	4	5
Plant Growth Regulators - Drip Irrigation	1	2	3	4	5
Prevention of Clogged Emitters	1	2	3	4	5
Timing Irrigation Termination	1	2	3	4	5

Would you be interested in receiving 2004 e-mail updates regarding drip irrigation?
If yes, please list e-mail address_____.
Thanks!

Example #2 - Irrigation Survey

The following questions were developed to help determine your usage of irrigation systems. Please answer these questions as best you can. Your responses will determine the educational programs that will be designed for you.

1. Do you currently use irrigation systems? ____ Yes ____ No

2. How many acres do you currently have with the listed irrigation systems? Please put the total number of aces in the blank next to the system.

_____ *Acres*
_____ Center Pivot
_____ Drip
_____ Flood/Furrow

3. What crops do you produce using irrigation? Please circle all that apply. Also, estimate the total acres of the crop that is irrigated.

Crop Type	**Acres**
Cotton	
Corn	_____
Grain	_____
Sorghum	_____
Wheat	_____
Other***	_____

****Please explain what other is:*

4. What do you use to determine the proper time to irrigate your crop? Check the following choices that you do use to determine proper time to irrigate. Feel free to check multiple responses.

____ Crop Appears Moisture Stressed
____ Soil is Cracking
____ Soil Moisture Sensors to 1 to 2 feet depths
____ ET Network Data
____ Gut Feeling Crop Needs Water

5. What helps you determine what variety/hybrid to plant? Feel free to check multiple responses.

____ Extension Variety/Hybrid Tests
____ Seed Company Tests
____ Seed Company Representative
____ Personal Experience

6. Do you monitor the amount of rainfall you receive at each irrigated field?

____ Yes ____ No

7. How do you determine the proper fertility program for each crop?

8. Do you used the Texas ET website?

____ Yes ____ No

9. Circle the number that best reflects you concerning the following statements:

Topic	Not knowledgeable about	Limited knowledgeable about	Somewhat knowledgeable about	Very knowledgeable about
life cycles of crops I am growing				
critical growth developmental stages of the crops I grow				

*****Thanks for your time!*****