

# Education of Best Management Practices in the Arroyo Colorado Watershed

Final Report

TSSWCB Project 05-10

Texas Water Resources Institute Technical Report TR-355

Funding provided through a Clean Water Act §319(h) Nonpoint Source Grant from the Texas State Soil and Water Conservation Board and the U.S. Environmental Protection Agency.

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**Final Report  
July 2009**

**TSSWCB Project 05-10**

**Texas Water Resources Institute Technical Report TR-355**

## **Partners:**

**Texas AgriLife Extension Service  
Texas Water Resources Institute**

**The Texas Water Resources Institute is part of the Texas AgriLife Extension Service,  
Texas AgriLife Research, and the College of Agriculture and Life Sciences at  
Texas A&M University.**

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U.S. Environmental Protection Agency.**

## Executive Summary

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The Texas Water Resources Institute (TWRI) and the Texas AgriLife Extension Service (Extension) implemented an educational program within the three-county area of the Arroyo Colorado watershed to address water quality protection and improvement for the agricultural community. The educational program focusing on nutrient management, best management practices, pesticide safety and compliance with the watershed protection plan was funded through a Clean Water Act Section 319(h) grant from the Texas State Soil and Water Conservation Board (TSSWCB) and the U.S. Environmental Protection Agency (EPA).

Since the program's inception in 2005, Extension educated agricultural producers on proper nutrient management and production techniques, promoted programs associated with the Arroyo Colorado Watershed Protection Plan (WPP) including cost-share programs, provided pesticide safety applicator certification education and continuing education, and conducted a soil testing campaign. To avoid duplication and enhance existing programs, Extension worked with the TSSWCB, the U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) and the local Soil and Water Conservation Districts (SWCDs).

Educational efforts reached 6,273 individuals with 3,640 of those attending outreach programs directly meeting the objectives of this project. A total of 3,311 soil samples were collected (representing over 100,000 acres) in the soil testing campaign and projected fertilizer savings based on soil tests were an estimated 3.3 million lbs of nitrogen and 3.8 million lbs of phosphorus compared to rates planned before testing. These reductions in nutrient loading represent a reduced threat for potential impacts to surface water and groundwater resources. Extension programs funded by this project provided a venue to promote cost-share programs that have assisted in the development of 131 water quality management plans by TSSWCB.

Education of best management practices in the Arroyo Colorado watershed has been and continues to be a key component in the overall effort of the agricultural community to meet the goals outlined in the Arroyo Colorado WPP.

## Acknowledgements

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The Texas Water Resources Institute and the Texas AgriLife Extension Service prepared the following report. Cecilia Wagner, Texas Water Resources Institute, and Brad Cowan, Texas AgriLife Extension Service served as the primary authors. Dr. Enrique Perez and Lucas Garcia, Texas AgriLife Extension Service, contributed information for development of the report. Allen Berthold, Texas Water Resources Institute, assisted with compiling the information used in the appendices. Dr. Allan Jones, Texas AgriLife Research, and Dr. Ruben Saldana, Texas AgriLife Extension Service, served as principal investigators for this project.

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We also appreciate the assistance of Terry Lockamy, who recently retired from the Texas AgriLife Extension Service; Mr. Lockamy played a key role in getting this project started and organizing the workplan and personnel.

We are indebted to Kathy Wythe, Texas Water Resources Institute, and Rod Santa Ana, Texas A&M AgriLife Communications, who both worked with the media to promote education programs and led the effort to develop the story that highlighted the success of the nutrient management program and the soil testing campaign. As a result of their effort, the program gained statewide recognition.

We also thank Pam Casebolt and Aaron Wendt from the Texas State Soil and Water Conservation Board Statewide Resource Management group for their help, oversight and management of the project.

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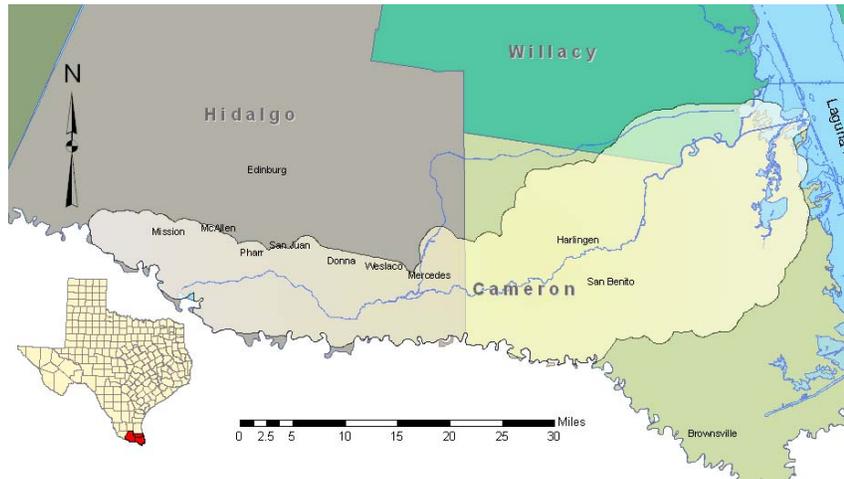
## List of Acronyms and Abbreviations

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BMP – best management practice  
CEU – continuing education unit  
CSREES – Cooperative State Research, Education, and Extension Service  
DO – dissolved oxygen  
EPA – U.S. Environmental Protection Agency  
Extension – Texas AgriLife Extension Service  
GPS – global positioning system  
NRCS – Natural Resources Conservation Service  
RGBI – Rio Grande Basin Initiative  
SWCD – Soil and Water Conservation District  
TCEQ – Texas Commission on Environmental Quality  
TMDL – Total Maximum Daily Load  
TSSWCB – Texas State Soil and Water Conservation Board  
TWRI – Texas Water Resources Institute  
USDA – U.S. Department of Agriculture  
WPP – watershed protection plan  
WQMP – water quality management plan

# Introduction

The Arroyo Colorado is an ancient channel of the Rio Grande that extends eastward for about 90 miles from near the city of Mission through southern Hidalgo County to the city of Harlingen in Cameron County, eventually discharging into the Laguna Madre near the Cameron-Willacy county line. The watershed (Figure 1) of the Arroyo Colorado is approximately 1,828 square kilometers (706 square miles) bounded on the west and south by the drainage divide to the Rio Grande, on the north by the drainage divide to the North Floodway and on the east side by the Lower Laguna Madre. It serves as the major drainage-way for approximately two dozen cities in the area, with the exception of Brownsville. The watershed is a flat coastal plain that slopes gently toward the Gulf of Mexico.



**Figure 1.** Arroyo Colorado Watershed.

Agriculture is the primary land use, with more than half of the area cultivated and almost 300,000 acres in the three counties irrigated for cotton, citrus, vegetables, grain sorghum, corn and sugar cane production (Figures 2 and 3). Thus, much of the watershed is sustained by runoff and return flows from these areas and urban wastewater discharges, irrigation and other agricultural return flows, stormwater runoff and base flows from groundwater.

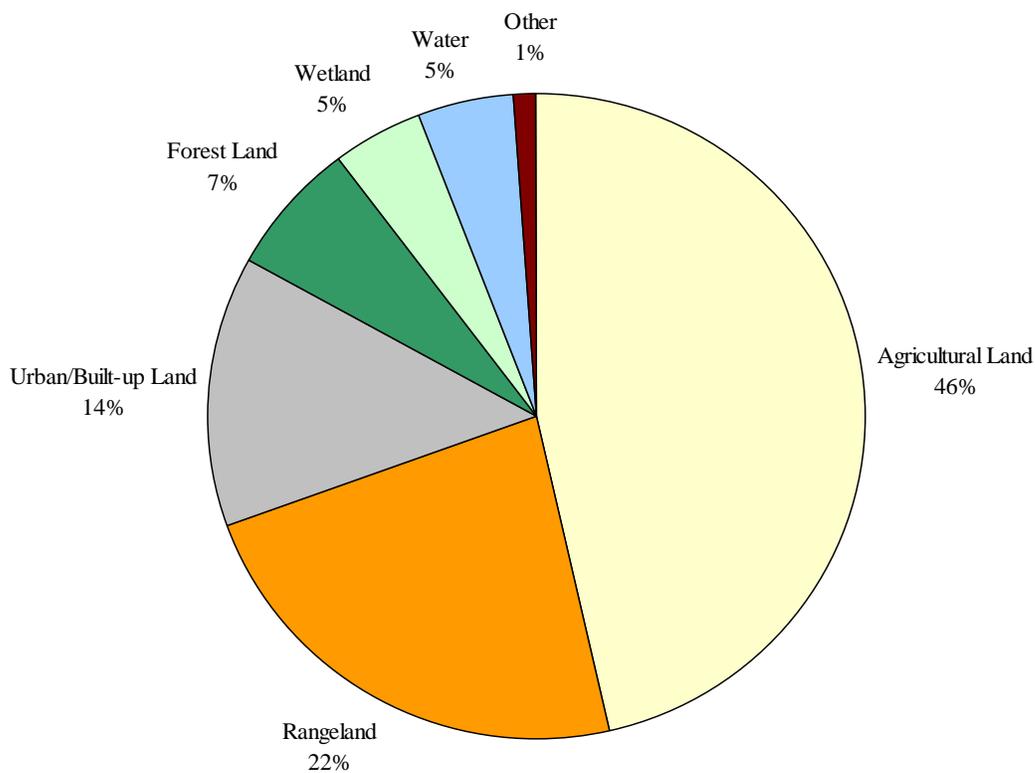


**Figure 2.** The sun rises over a cotton field in the Arroyo Colorado watershed.

Use of the water in the Arroyo Colorado for municipal, industrial or irrigation purposes is severely limited because of poor water quality conditions. Salinity concentrations in the Arroyo typically exceed the limits considered desirable for human consumption as well as those acceptable for irrigation of crops. Furthermore, water quality and fish tissue testing have found that: (1) low dissolved oxygen (DO) levels have impaired the fish

community and other aquatic life downstream from the Port of Harlingen; (2) elevated levels of pesticides have resulted in a fish consumption advisory for the entire Arroyo Colorado; and, (3) bacteria levels are occasionally elevated indicating potential health risks to people who swim or wade in the Arroyo.

In fact, the 2008 Texas Water Quality Inventory and 303(d) List include both segments of the Arroyo Colorado for failing to meet the state's water quality standards designed to protect aquatic life use. The Arroyo Colorado Tidal, Segment 2201, is listed for bacteria, depressed DO, and mercury and PCBs in edible fish tissue. Segment 2202, Arroyo Colorado Above Tidal, is also listed for elevated bacteria and mercury and PCBs in edible fish tissue.



**Figure 3.** Land use in the Arroyo Colorado Watershed.

In 1998 the Texas Commission on Environmental Quality (TCEQ) initiated an effort to develop a Total Maximum Daily Load (TMDL) for pollutants causing low DO in the tidal segment of the Arroyo Colorado. The TMDL effort was completed in 2002. However, because of lingering uncertainty surrounding cause-and-effect relationships associated with the observed DO impairment, the TMDL analysis was unable to support a quantitative, water quality target-based allocation of loadings of constituents associated with DO dynamics in the tidal segment of the Arroyo Colorado.

The Arroyo Colorado TMDL study also concluded the following:

- DO dynamics in the Arroyo Colorado are highly influenced by physical characteristics of the stream (i.e. dredged tidal channel hydraulics).
- Load reductions necessary to comply with current DO criteria are not realistically achievable (i.e. the study found that a 90 percent reduction in loading would be necessary).
- The need for further study to better understand the cause-and-effect relationships associated with the observed impairment and also to reduce uncertainty in the analysis.

The (2002) TMDL effort did not result in TCEQ adoption. In response, the TCEQ initiated the development of a comprehensive strategy to address low DO in the tidal segment of the Arroyo Colorado and identify ways to reduce pollutant loadings, improve aquatic habitat, and conduct additional monitoring and modeling for refinement of the existing TMDL analysis. Development of the Arroyo Colorado Watershed Protection Plan (WPP) was a consensus-based effort initiated by a group of local and regional stakeholders with assistance from several state and federal agencies. In July 2003, the stakeholder group formed the Arroyo Colorado Watershed Partnership in Weslaco, Texas and included members of the previous Arroyo Colorado TMDL Stakeholder Committee and the Arroyo Colorado TMDL Science and Technical Advisory Committee, both of which were formed in 1998.

The Arroyo Colorado Watershed Partnership, in close cooperation with TCEQ, formed the Arroyo Colorado Watershed Partnership Steering Committee and five separate workgroups to provide direction for the Partnership and to address and develop five major components of the WPP. These components were identified as a result of TMDL development efforts in the Arroyo Colorado and are as follows:

- Wastewater Infrastructure
- Agricultural Issues
- Habitat Restoration
- Further Study and Monitoring/ Refinement of TMDL Analysis
- Outreach and Education

The five workgroups developed recommendations for each of the components above and how they will improve water quality. Recommendations were integrated into the WPP.

The Agricultural Issues Workgroup identified needs specific to water quality protection and improvement for the agricultural community including an educational program focusing on nutrient management, best management practices (BMPs), pesticide safety and compliance with the WPP. Therefore, the Texas Water Resources Institute (TWRI) proposed to work with the Texas AgriLife Extension Service to implement an educational program within Cameron, Hidalgo and Willacy counties to address issues related to agricultural production identified by the workgroups.

Specifically, the educational program, which began in September 2005, served two purposes. First, Extension used its already developed resources and delivery system to educate producers on proper management and production techniques. Programs addressed cotton, grain sorghum, sugar cane, citrus and vegetable production and proper nutrient management practices including a soil testing campaign. Second, Extension promoted programs associated with Arroyo Colorado water quality protection. For example, some cost-share programs that supported implementation

of BMPs and technologies in the area previously did not reach full potential because producers were unaware of the programs. Extension worked with the Texas State Soil and Water Conservation Board (TSSWCB), U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) and the local Soil and Water Conservation Districts (SWCDs) to promote these programs and provide education on the proper use of these technologies following installation.

## Objectives

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The overall objective of this project was to educate agricultural producers on how to economically produce crops and better manage their acreage and in doing so reduce the potential for nonpoint source pollution (Figure 4). Secondly, the project supported and promoted associated programs that implement BMPs related to water quality protection.

This project was designed to capitalize on the work of multiple agencies that have an existing relationship with the agricultural producers in the watershed. TWRI administered and organized an integrated team among the multiple agencies and groups involved with the project to develop a comprehensive and effective educational effort and worked to convey project achievements to TSSWCB throughout the project. Extension, TSSWCB, NRCS and SWCDs all contributed their various outreach and education programs and through this effort, worked together to enhance their programs to target and address water quality issues in the Arroyo Colorado.

Specifically, the project was split into two tasks focusing on project coordination and educational outreach.



**Figure 4.** Irrigation return flows from a sugarcane field flow into a drainage ditch, which feeds into the Arroyo Colorado. As a primary source of water to the Arroyo Colorado, irrigation return flows can potentially carry nutrients and sediment from agricultural fields.

## Project Coordination and Administration

TWRI facilitated this education program through continued communication, consistent and timely reporting and active involvement with the WPP implementation process. A detailed listing of all activities related to project administration is included in Appendix A.

Specifically, TWRI drafted reports each quarter and submitted them to TSSWCB to provide a summary of related activities during the previous three months. These reports as well as other relevant project information were posted on the Arroyo Colorado website (<http://www.arroyocolorado.org/Projects.php>). Quarterly reports included information on the overall WPP effort, meetings held concerning this project and a list of all educational programs (including

attendance) held. Quarterly reports also provided an overview of activities to be completed in the next quarter and highlighted related issues or problems associated with the project.

As administrator of this project, TWRI also provided an update to the Arroyo Colorado Watershed Partnership Steering Committee during their quarterly meetings and to the Arroyo Colorado Agricultural Issues Workgroup, which met at least twice a year. At these meetings, TWRI provided participants with an estimate of the number of producers reached in educational programs and a summary of the programs most recently held. By keeping in close contact with the WPP effort and the steering committee, TWRI was able to link this education program to others in the area and document group achievements of WPP milestones.

In addition to TWRI efforts, Extension interacted directly with TSSWCB and NRCS on the local level to ensure that personnel were aware of training programs and were included on agendas where needed. Extension, tasked with providing education programs and outreach, sought support from TSSWCB and NRCS in publicizing cost-share programs and assisting producers in these programs. As a local team, Extension, TSSWCB and NRCS were able to provide hands-on assistance and leadership to benefit the producers in the Arroyo Colorado watershed.

## Local Educational Meetings

Over the course of this project, Extension hosted and conducted multiple training programs (Figure 5) and educational events focusing on everything from crop production to rainwater harvesting. Per the confines of this project, however, Extension's main focus was on nutrient management and implementing best management practices to reduce the potential for nonpoint



**Figure 5.** A watershed-wide education program focusing solely on nutrient management was held annually to target adoption of better nutrient management practices such as soil testing and proper application of fertilizers.

source pollution from agriculture. Overall, Extension reached 6,273 individuals through education efforts (Table 1), with 3,640 of those attending outreach programs directly meeting the objectives of this project.

Specific crop production trainings provided information on enhancing production of cotton, sorghum, sugar cane, citrus and vegetables while reducing associated environmental impacts. At least one program addressing each crop was hosted annually. Multi-county Pesticide Applicator Safety Training and Continuing Education programs were also held on a quarterly basis. Appendix B includes a list of all crop production and pesticide safety training programs held during this project.

**Table 1.** Total attendance documented at education programs

<b>Subtask</b>	<b>Topic</b>	<b>Attendees</b>
2.1	Crop production and pesticide applicator safety	2532
2.2	Nutrient management and soil testing campaign.	629
2.3	Advertise related water quality programs	479
--	Related efforts	2633

Meetings that focused on nutrient management included the promotion and implementation of the soil testing campaign, which was held annually during the winter. These meetings, often held in conjunction with the crop production meetings, focused on the proper application and rate of fertilizer use and the necessity of soil testing prior to planning fertilizer applications. Appendix C includes a list of all nutrient management programs held during this project.

Cost-share programs for implementing best management practices (Figure 6) were promoted at select events and as opportunities arose. Extension worked with TSSWCB and NRCS to assist producers in applying for cost-share and helped advertise those programs when they came available. Like nutrient management, cost-share programs were often included on agendas of crop production meetings. A list of education activities where Extension discussed or included cost-share programs is included in Appendix D.



**Figure 6.** Land leveling is one of the best management practices cost-shared in the Arroyo Colorado watershed that levels the surface of the field to allow for uniform and efficient application of irrigation water and enhances conservation of soil and water resources.

Appendix D also lists the interaction of Extension and TWRI with the Arroyo Colorado Watershed Partnership Steering Committee and the Arroyo Colorado Agricultural Issues Workgroup. Continued communication was imperative over the course of this project to build partnerships in education and outreach efforts, avoid duplication and ensure stakeholders that actions were being taken by the agricultural industry to reduce the potential for nonpoint source pollution. Through the promotion and success of this program, Extension was able to secure additional funds from two separate, federally funded programs to continue this work upon completion of this project.

To advertise the educational events, Extension used its existing network of newspaper coverage, weekly radio shows, flyers and direct mailings. Appendix E has sample flyers and agendas from select education programs during the project.

Finally, during this project Extension hosted several educational programs that did not directly fit into one of the three tasks: crop production and best management practice implementation, proper nutrient management and participation in cost-share programs. While they did not meet a specific project objective, these programs did support the overall mission of the Arroyo Colorado Watershed Partnership of enhancing environmental stewardship and working towards water quality protection and an improved watershed. A broad range of topics were covered and included such applicable items as reducing chemical use and proper nutrient management in the home landscape, composting to encourage nutrient recycling and waste reduction, irrigation water quality, soil testing in the urban environment, rainwater harvesting and selecting drought tolerant landscapes to conserve water, and organic gardening and pest control. A list of these related and supporting educational events is included in Appendix F.

## Soil Testing Campaign

In addition to nutrient management programs, Extension promoted and implemented a soil testing campaign each year during the fall-winter of 2002, 2003, 2004, 2005, 2006, 2007 and 2008. The soil testing campaign involved Cameron, Hidalgo, Willacy and Starr counties and



**Figure 7.** Hidalgo County Extension Agent, Brad Cowan, takes a soil sample in a producer's field.

typically kicked off in October and ran through the end of January. Through the campaign, Extension provided information on proper soil sampling, timing and interpretation of results. Extension, in cooperation with NRCS and TSSWCB, conducted soil sampling for producers when requested and provided a free-of-charge analysis (Figure 7).

The cost for the soil sampling was covered by a USDA-Cooperative State Research, Education, and Extension Service (CSREES) sponsored project,

the Rio Grande Basin Initiative (RGBI). However in 2008, RGBI funds for the soil sampling campaign were cut and in an effort to continue this valuable service to the producers, Extension used funds directed under this project to cover the costs of soil samples for October 2008 thru January 2009.

Prior to 2008, the soil testing campaign generated 2,974 samples representing 119,400 acres. The 2008-09 campaign added an additional 337 samples. Projected fertilizer savings based on soil tests were an estimated 3.3 million pounds of nitrogen and 3.8 million pounds of phosphorus compared to rates planned before testing. These reductions in nutrient loading represent a reduced threat for potential impacts to surface water and groundwater resources. In addition, results indicate that producers could potentially save from \$7.50 to \$27.20/acre by using soil test results, depending on their crop and management history. The total economic impact from the project was estimated at \$1.9 million based on average per pound costs for nitrogen and phosphorus.

The economic savings and reduction in nutrients applied to the fields was obviously news worthy and award worthy. A news article, *Texas AgriLife Program Saves Growers Millions while Protecting Water*, (Appendix G) developed through this project and highlighting the impacts of the soil testing campaign, was released October 3, 2008, to *AgNews* and subsequently received statewide attention. This same story was tracked in ten different news venues from October through December 2008. Table 2 provides a detailed list of the media and date of the release. The nutrient management program and soil testing campaign also received numerous awards including a Texas Environmental Excellence Award from the Governor’s Office and TCEQ, which celebrates the efforts of citizens, communities, businesses and organizations to preserve and protect the Texas environment.

**Table 2.** Date and name for each media mention of the article, *Texas AgriLife Program Saves Growers Millions while Protecting Water*

<b>Date</b>	<b>Media</b>
October 3, 2008	AgNews
October 3, 2008	PR Newswire Policy & Public Interest
October 6, 2008	Media NewsWire
October 7, 2008	Extension
October 10, 2008	Crop Life
October 10, 2008	High Plains Midwest Journal
October 11, 2008	Valley Morning Star
October 28, 2008	Southwest FarmPress
October 2008	Hutchison County Highlights
November 2, 2008	PR Newswire Policy & Public Interest
November 8, 2008	Fresh Plaza
December 6, 2008	North Texas e-News

## Conclusions

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Education of Best Management Practices in the Arroyo Colorado Watershed was and continues to be a success. Partnerships formed between Extension, TSSWCB and NRCS as a result of this project have resulted in sharing of information and resources as all three agencies work with agricultural producers in the watershed.

Educational events reached more than 3,500 producers in the watershed and worked to expand their knowledge of new technologies for more efficient and safe production, best management practices for water quality protection and cost share program participation.

This project supported the implementation of water quality management plans (WQMP) through technical assistance and education programs and to date, 131 WQMPs have been developed. Extension will continue to work with TSSWCB in its effort to implement WQMPs and provide follow-up assistance.

The soil testing campaign is a gem in the effort to reduce agricultural nonpoint source pollution. The measurable data resulting from this aspect of the program and noted within this report is key to quantifying program impacts on water quality.

Overall, the agricultural community is making substantial progress in meeting the goals outlined in the Arroyo Colorado WPP that were set by the Agricultural Issues Workgroup. Projects such as this one are the reason for these accomplishments and why agriculture will continue to make headway in improving water quality in the Arroyo Colorado.



**Figure 8.** Texas AgriLife Extension Personnel Brad Cowan (Hidalgo County), Enrique Perez (Cameron County), Ruben Saldana (District 12) and Omar Cavazos (formerly in Willacy County) receive an Extension District Award in Excellence for the soil testing campaign and nutrient management education program.

## Appendices

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Appendix A: Administrative activities related to the Education of Best Management Practices in the Arroyo Colorado Watershed

Appendix B: Crop production programs

Appendix C: Nutrient management and soil testing programs

Appendix D: Promotion of cost-share and WQMPs programs

Appendix E: Sample flyers and agendas from select education programs

Appendix F: Other educational programs related to the effort, but not directly applicable to the project

Appendix G: Texas AgriLife Program Saves Growers Millions while Protecting Water

## Appendix A

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### **Administrative activities related to the Education of Best Management Practices in the Arroyo Colorado Watershed**

#### **Task 1.1**

- TWRI and Extension met in Weslaco on October 5, 2005 to discuss project tasks, reporting requirements, eligible uses of funding, and match.
- TWRI and Extension met in Weslaco on January 20, 2006 to discuss project tasks, Extension educational program efforts, and reporting requirements for the project.
- TWRI met with project participants in Weslaco on November 14, 2006 to discuss project activities including hiring an Extension Assistant to provide the three County Agents assistance with education activities related to the project. A position description was drafted.
- Project participants met on July 24, 2007 in conjunction with the Agricultural Issues Workgroup Meeting. The hiring of the project technician (Extension Assistant) was the primary topic of discussion as the county extension agents have had a hard time locating an individual for the job.
- Communication via email continued during the search for an Extension Assistant as local County Extension personnel struggled to locate a candidate.
- Extension hired an Extension Assistant, Geraldo Tapia, to assist with outreach and education programs.
- The Watershed Coordinator met with Extension, the Regional Program Director and the District Extension Administrator in February 2008 to discuss targeting educational efforts towards specific agricultural producers to make the greatest potential impact on water quality.
- TWRI met with Extension on March 4, 2008 to discuss project activities related to the Arroyo Colorado.
- Project personnel met in August 2008, prior to the Agricultural Issues Workgroup Meeting, to discuss project status and activities.
- TWRI worked with TSSWCB to amend the scope of work and budget to allow for the funding of the soil testing campaign during the last quarters of the project.
- TWRI worked to purchase a portable GPS unit to mark/monitor where soil samples are collected.
- Project personnel met on December 17, 2008 via TTVN to discuss final activities of the project and the necessary steps to begin drafting the project final report.

#### **Task 1.2**

- A discussion of the project strategies / programs, as well as a copy of the project workplan, was included in the draft Watershed Protection Plan.
- Extension provided a discussion of the project status to the Agricultural Issues Workgroup on October 5, 2005.
- Extension provided a discussion of the project status to the Agricultural Issues Workgroup on February 22, 2006.

- TWRI provided comments to the draft Watershed Protection Plan for the Arroyo Colorado Watershed. The final copy of the Arroyo Colorado Watershed Protection Plan was released to the public on January 30, 2007 at the *Pachanga for the Arroyo Colorado* function.
- TWRI Project Manager and Extension provided an update of the project activities to the Agricultural Issues Workgroup meeting on July 24, 2007.
- TWRI developed the Arroyo Colorado Watershed Protection Plan Web site in August 2007 and included details, reports and contact information for the project, Education of Best Management Practices in the Arroyo Colorado Watershed.
- TWRI presented an update on the Arroyo Education Project to the Arroyo Colorado Watershed Partnership Steering Committee meeting on October 24, 2007. The update included the submission of the Pesticide education grant submitted to the Coastal Management Program.
- TWRI and Extension participated in the Arroyo Colorado Agricultural Issues Workgroup and Steering Committee meetings on January 24, 2008 and presented an update on the Arroyo Education Project at the meeting. This update included the submission of a proposal titled, “Integrated Farm Management Education Program,” submitted to the EPA Region 6 Strategic Ag Initiative Program.
- TWRI provided a summary of education activities to the Steering Committee at the meeting on April 24, 2008.
- A special Ag Workgroup Session was held in preparation for the next Agricultural Issues Workgroup Meeting in July.
- Extension provided a program update to the Agricultural Issues Workgroup Meeting on August 20, 2008.
- TWRI requested a 6 month no-cost extension and it was approved. The new project end date was February 28, 2009.
- Extension provided a program update to the Arroyo Colorado Watershed Partnership Steering Committee meeting on October 23, 2008.
- Extension provided a program update to the Agricultural Issues Workgroup and the Arroyo Colorado Watershed Partnership Steering Committee on January 26, 2009.
- Extension personnel provided an ag education program update to the Arroyo Colorado Watershed Partnership Steering Committee meeting on April 27, 2009.

### **Task 1.3**

- TWRI submitted fourteen quarterly reports over this project from January 2006 through April 2009. Each quarterly report, which documents all educational programs and activities throughout the project including number of attendees, is posted on the Arroyo Colorado Web site at [http://www.arroyocolorado.org/EducationBMP\\_Reports.php](http://www.arroyocolorado.org/EducationBMP_Reports.php).

### **Task 1.4**

- TWRI submitted a draft final project report to TSSWCB for review on June 15, 2009.

## Appendix B

### Crop Production Programs

Date	Event	Counties* Involved	Description	Attendance
11/9/2005	Pesticide Safety Training		Topics included: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units	
11/21/2005	Sugar Growers Meeting	CH	Provided crop production and nutrient management information, as well as promoted participation in the soil testing campaign	70
12/8/2005	The Rio Farms Crops Meeting	CH	Provided crop production and nutrient management information, as well as promoted participation in the soil testing campaign	80
12/13/2005	The Southwest Grain Meeting	H	Provided crop production and nutrient management information, as well as promoted participation in the soil testing campaign	20
1/19/2006	Cotton Pre-Plant Seminar	CHW	Provided educational information on crop physiology, cotton varieties, nutrient management, integrated pest management (IPM), and irrigation management	125
1/25/2006 2/22/2006 2/24/2006	CEU Workshops	CHW	To train people in the safe use of crop protection chemicals including: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units	151
2/14/2006	Texas Country Cleanup	CHW	Opportunity to recycle empty pesticide containers, used oil, oil filters, and batteries	40
3/24/2006	Rio Grande Valley Cotton Advisory Committee Meeting		Provided information on cotton residue management	
4/10/2006 5/18/2006	Rio Grande Valley Boll Weevil Program Advisory Committee Meeting	CHSW	Provided a discussion of proper residue management to lead cotton growers	
5/3/2006 5/6/2006	Pesticide Safety Training	CH	Topics included: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, and calibration	
5/10/2006	CropMan Model Training	C	Learn about Best Management Practices for row crops	7
5/10/2006	CropMan Model Training	C	Learn about Farm Evaluation and nutrient and water management	4
6/2/2006	Grain Sorghum Field Day	CHW	Learn about new varieties available, management practices, insect control needs, and other related topics	75
6/6/2006	Sugarcane Field Day	CHW	Planting techniques and proper herbicide and insecticide use	

Date	Event	Counties* Involved	Description	Attendance
7/12/2006	Cotton Field Day	CHW	Producers were provided information on cotton harvest aids, whitefly, fertility management, water quality regulations, boll weevil eradication, crop physiology, cotton varieties, irrigation, and new developments	93
8/2/2006	Pesticide Safety Training	CH	Included principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species, Worker Protection, record keeping, personal protection, application equipment, and calibration	10
9/20/2006	Sugarcane Field Day	CHW	On field operations, genetic breeding for variety improvement, economics of varieties, nutrition, trash management, water use, irrigation sensors to measure irrigation, genetic improvement through biotechnology, and the soil testing campaign	63
10/17/2006	Valley Cotton Meeting	CHW	Cotton producers received timely information to assist them in being more profitable; a boll weevil eradication program update; and information on beet armyworm insecticides, whitefly management and cotton varieties	140
10/27/2006		C	Participated in farm visits to evaluate progress of a new crop, sesame, and gather information on producing itp	3
10/31/2006	Rio Farms Crops Meeting	CHW	Topics at the meeting included: cotton, corn, sorghum and soybean varieties; nutrient, insect and disease management; new crops such as southern peas, wheat and sesame; proper cotton stalk destruction; and information on the soil testing campaign	108
11/8/2006	Nutrient Management Field Day	CHW	Learned about cotton, corn and sorghum row crops. The program also addressed minimum tillage; residue management; fertilization; soil sampling; GPS soil sampling; pesticide rules and regulations; stalk destruction; FSA agricultural loans; the soil testing campaign; and NRCS and TSSWCB cost-share programs	also reported in subtask 2.2
11/11/2006	Pesticide Safety Training	CH	The topics at the training included information on: principles of integrated pest management; non-chemical alternatives; pest features; ground and surface water protection; laws and regulations; pesticide labels; endangered species protection; Worker Protection Standards; record keeping; personal protection; application equipment; calibration and continuing education units	12
1/19/2007	Cotton Pre-Plant Seminar	CHW	Provide timely educational information to cotton producers topics included crop physiology, irrigation, managing plant nutrition, cotton varieties, cotton & grain insect forecast, cotton market outlook, biofuel production in the Valley, boll weevil eradication, and new developments from industry	102
2/8/2007	Pesticide Safety Training	CH	The training taught principles of IPM, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units	12
1/30/2007 2/20/2007	Pesticide Application License	CH	County agents provided continuing education to pesticide license holders including BMP's associated with safe use of pesticides and protection of environment including water resources	137
5/2/2007	Pesticide Safety Training	CH	Topics included: principles of integrated pest management, non chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units.	12
6/5/2007	Grain Sorghum Field Day	CH	Sorghum varieties, sorghum insects, sorghum plant physiology, sorghum outlook	68
6/14/2007	Rio Farms Sorghum/Corn / Soybean Field Day	CH	Varieties, Ratooning Sorghum, Disease Update, Soybean production, Pesticide Rules and Regulations	125
7/19/2007	Cotton Field Day	CHW	Information provided to cotton producers. Topics included: cotton harvest aids, cotton varieties, pesticide continuing education, new developments	90

<b>Date</b>	<b>Event</b>	<b>Counties* Involved</b>	<b>Description</b>	<b>Attendance</b>
8/29/2007	Pesticide Safety Training	CH	Topics included: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units.	10
9/26/2007	RGV Boll Weevil Program Advisory Committee Meeting	CHSW	Boll weevil eradication program, cotton stalk destruction program, cotton residue management	12
10/25/2007	Valley Cotton, Sorghum and Corn Grower Meeting	CHW	Maximizing cotton production, weed management in sorghum, sorghum and corn production, LRGV cotton and sorghum variety trials, new chemistries and overview of insects in corn and sorghum, cotton and sorghum market outlook, soil testing	65
11/8/2007	Rio Farms Grower Meeting	CHW	Cotton, sorghum, corn, soybean, wheat, southern pea and sesame production, irrigation scheduling with watermark sensors, soil testing	76
11/29/2007	Pesticide Safety Training	CH	Principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units.	1
11/6/2007	Soybean Seminar	CHW	Overview of spring soybean production, water management, nutrition management, tour fall crop, insect management, weed management, disease management, marketing soybeans, CEU's, soil testing	75
1/17/2008	CEU Workshop	CH	Provide continuing education to pesticide license holders including BMP's associated with safe use of pesticides and protection of environment including water resources	101
1/23/2008	Cotton Pre-Plant Seminar	CHW	Conducted to provide timely educational information to cotton producers. Topics included: cotton varieties, cotton market outlook, boll weevil eradication, weed resistance in cotton, FSA reminders, Master Marketer Program, new developments from industry	60
2/6/2008	Pesticide Safety Training	CH	Topics included: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units.	5
2/13/2008	CEU Workshop	CH	Provide continuing education to pesticide license holders including BMP's associated with safe use of pesticides and protection of environment including water resources	66
5/7/2008	Pesticide Safety Training	CH	Topics included: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and CEUs.	8
6/18/2008	Rio Farms Sorghum Field Day	CH	Variety trial, sweet sorghum research, sorghum market outlook, sorghum checkoff, FSA update	106
6/24/2008	Waste Pesticide Collection Planning	CH	Site selection for waste pesticide collection day to be held in the Fall	4
7/29/2008	Corn, Soybean, Cotton Field Day	CHW	Soybean varieties, soybean insects, soybean diseases, soybean production systems, corn update, cotton update, FSA update	78
8/13/2008	Pesticide Safety Training	CH	Topics included: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and CEUs.	9

Date	Event	Counties* Involved	Description	Attendance
8/26/2008	Vector Control Training	CHW	General pesticide safety, biology & ecology of mosquitoes, diseases vectored by mosquitoes, surveillance and sampling, demonstration of traps, principals of mosquito control	40
9/12/2008	Sugarcane Board	CHW	Waste Pesticide Collection Day	20
9/25/2008	Sugarcane Field Day	CHW	Sugarcane varieties, development of sugarcane GMO's, crop rotation, Co-Op update, pesticide laws and regulations, Waste Pesticide Collection Day, Nutrient Management Field Day and soil testing campaign	82
9/26/2008	Cotton & Grain Producers Association Meeting	CHW	Waste Pesticide Collection Day, Nutrient Management Field Day and soil testing campaign	15
10/15/2008	Conservation Tillage/ Nutrient Management Field Day	CHW	Pest management with Conservation Tillage, Herbaceous wind barriers, grower panel of farming with conservation tillage, nutrient management and soil testing timing and application pesticide rules and regulations, company representatives perspective, kickoff of soil testing campaign	Also reported in subtask 2.2
10/21/2008	Waste Pesticide Collection	CH	Collection and proper disposal of unwanted pesticides. Also collected batteries, oil, oil filters and plastic pesticide containers for recycling	40
11/5/2008	Pesticide Safety Training	CH	Topics included: the principles of integrated pest management, non-chemical alternatives, pest features, ground and surface water protection, laws and regulations, pesticide labels, endangered species protection, Worker Protection Standards, record keeping, personal protection, application equipment, calibration and continuing education units.	9
11/18/2008	Rio Farms Crop Production Meeting	CHW	Cotton, grain sorghum, corn, soybean, production, use the science of soil testing to target crop fertility requirements, 2009 production economics in the Rio Grande Valley, 2009 market forecast for feed grains, FSA report, drift minimization	50
12/9/2008	Mexican Growers Tour	C, Mexico	Corn production, soybean production, surge flow irrigation, soil moisture monitoring, crop nutrition and soil testing	18
12/11/2008	Soybean Seminar	CHW	Soybean herbicides and varieties, disease update on soybean production, integration of double crop scenario, soybean varieties, soybean budget, soil test campaign	35
<b>Total number of producers that attended education events</b>				<b>2532</b>

\*C=Cameron H=Hidalgo S=Starr W=Willacy

## Appendix C

### Nutrient management and soil testing programs

Date	Event	Counties* Involved	Description	Attendance
10/11/2005	Nutrient Management Workshop	CHW	Provided nutrient management education	75
Oct 2005 thru Jan 2006	Soil Testing Campaign	CHW	To promote proper use of fertilizers. This free soil testing campaign is provided to producers to encourage the testing of soil and application of the testing results on their farms. This is a substantial economic benefit to and best management practice for producers participating in campaign	
4/27/2006	Arroyo Colorado Planning Meeting	CHW	Discuss possible nutrient management training for agricultural producers	
10/25/2006	Nutrient Management Workshop	CHW	Obtain information on soil testing, sorghum & corn fertility, fertility in the cotton patch, soil fertility in a reduced tillage system, sulfur fertilization and the start of the soil testing campaign. Information on the EQIP program and its role in nutrient management assistance and water quality management plans were provided	59
11/8/2006	Nutrient Management Field Day	CHW	Learned about cotton, corn and sorghum row crops. The program also addressed minimum tillage; residue management; fertilization; soil sampling; GPS soil sampling; pesticide rules and regulations; stalk destruction; FSA agricultural loans; the soil testing campaign; and NRCS and TSSWCB cost-share programs	63
11/21/2006	Hidalgo Leadership Advisory Board Meeting	H	Received information on the nutrient management program for 2007	22
Oct 2006 thru Jan 2007	Soil Testing Campaign	CHSW	To promote proper use of fertilizers. This free soil testing campaign is provided to producers to encourage the testing of soil and application of the testing results on their farms. This is a substantial economic benefit to and best management practice for producers participating in campaign	
3/7/2007	Nutrient Management Program		The results of the Nutrient Management Program were presented to the Leadership Advisory Board	18
3/27/2007	The Water Management Result Demonstration	C	Various water conservation measures were evaluated.	4
9/20/2007	Sugarcane Field Day	CHW	Soil testing campaign	63
Oct 2007 thru Jan 2008	Soil Testing Campaign	CHWS	Soil testing campaign conducted to provide ag producers scientific data of nutrient levels present in soil and recommendations on fertilizer levels needed to produce a sustainable crop. Total number of soil samples received through the campaign (includes only those that go through the Extension Office – does not include samples that go thru NRCS) was as follows: Cameron County – 44 participants - 201 samples; Hidalgo County – 289 samples received; Willacy County – 18 participants – 172 samples received.	

<b>Date</b>	<b>Event</b>	<b>Counties* Involved</b>	<b>Description</b>	<b>Attendance</b>
10/9/2007	Nutrient Management Workshop	CHW	Soil testing, sorghum & corn fertility, EQIP program and It's potential for nutrient management assistance, water quality management plans, fertility in the cotton patch, soil fertility in a reduced tillage system, sulfur fertilization, kickoff of soil testing campaign	91
11/19/2007	Sugar Growers Annual Meeting	CHW	Soil testing campaign	65
9/16/2008	Texas Ag Industries	CHW	Nutrient loading	20
9/26/2008	Cotton & Grain Producers Association Meeting	CHW	Waste Pesticide Collection Day, Nutrient Management Field Day and soil testing campaign	15
Oct 2008 thru Jan 2009	Soil Testing Campaign	CHWS	Soil testing campaign conducted to provide ag producers scientific data of nutrient levels present in soil and recommendations on fertilizer levels needed to produce a sustainable crop. Total number of soil samples received through the campaign (includes only those that go through the Extension Office – does not include samples that go thru NRCS) was as follows: Cameron County – 67 samples; Hidalgo County – 167 samples; Willacy County – 98 samples; Starr County - 5 samples	
10/15/2008	Conservation Tillage/ Nutrient Management Field Day	CHW	Pest management with Conservation Tillage, Herbaceous wind barriers, grower panel of farming with conservation tillage, nutrient management and soil testing timing and application pesticide rules and regulations, company representatives perspective, kickoff of soil testing campaign	74
11/24/2008	Sugar Growers Annual Meeting	CHW	Promoted soil testing campaign	60
<b>Total number of producers that attended education events</b>				<b>629</b>

\*C=Cameron H=Hidalgo S=Starr W=Willacy

## Appendix D

### Promotion of cost-share and WQMPs programs

Date	Event	Counties* Involved	Description	Attendance
10/11/2005	Nutrient Management Workshop		EQIP Program and WQMP Program were both discussed	Also reported under subtask 2.2
1/19/2006	Cotton Pre-Plant Seminar		The EQIP Program will also be a topic of discussion	Also reported under subtask 2.1
11/10/2005	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI provided an overview of the Agricultural Component of the Arroyo Colorado Watershed Plan and discussed the activities of the Agricultural Work Group.	31
2/7/06 2/8/06	EQIP Meetings	H	To inform producers on how to apply for EQIP Program funds and provide producers information on nutrient management planning	60
2/9/2006	EQIP Meetings	C	How to apply for EQIP Program funds and providing them information on nutrient management planning	25
Jau 2006 - Feb 2006		W	Information was provided to producers on the EQIP application process through an EQIP Information Newsletter	
1/19/2006	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI provided an overview of the Agricultural Education program	31
5/25/2006	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI provided an overview and update of activities occurring as part of the Ag BMP Education Program	30
8/22/2006 9/6/2006	EQIP Meetings	CH	Discuss EQIP Program provisions, EQIP Program application process, and nutrient management plans	28
8/30/2006	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI and Extension provided an update of Ag BMP Education Program activities	20
	Willacy COOP Country Cleanup		Producers disposed of approximately 300 containers used pesticide and 55 gallons of used motor oil	

Date	Event	Counties* Involved	Description	Attendance
10/17/2006	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI and Extension provided an update of Ag BMP Education Program activities	36
11/29/2006 11/30/2006	Educational program	CH	Provided details of the EQIP program and encourage them to apply. Information on the soil testing campaign was also provided at the meeting.	25
12/1/2006	Ag Demonstration Initiative Project	C	To provide information on EQIP, its application process and nutrient management plans. Also in conjunction with this meeting, a water conservation program was held at the Harlingen Irrigation Pumping Center.	53
2/23/2006	Irrigation Management Workshop	CH	Information on field-water and soil-moisture measurement, irrigation scheduling, and TDA laws and regulations was provided	
7/24/2007	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI and Extension provided an update of Ag BMP Education Program activities	26
10/9/2007	Nutrient Management Workshop	CHW	Soil testing, sorghum & corn fertility, EQIP program and It's potential for nutrient management assistance, water quality management plans, fertility in the cotton patch	Also reported under subtask 2.2
1/24/2008	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI provided an update of Ag BMP Education Program activities	21
4/24/2008	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI and Extension provided an update of Ag BMP Education Program activities	30
8/21/2008	Arroyo Colorado Watershed Partnership Steering Committee	CHW	TWRI and Extension provided an update of Ag BMP Education Program activities	15
10/23/2008	EQIP Workgroup Meeting	C	Provisions of EQIP Program	10
10/29/2008	Rio Grande Valley Irrigation Conference	CHW	Trade show, educational posters, current water supply situation-forecast for the 2009 crop, EQIP program, improved irrigation technologies (selection, benefits and costs), maximizing the efficiency of furrow irrigation, measuring soil moisture metering and using ET for crop management, agronomic considerations in irrigation management, fertigation, recycling irrigation plastics, evaluation of canal lining projects, (telemetry, remote control and automation)	110
10/30/2008	EQIP Workgroup Meeting	H	Provisions of EQIP program	20
<b>Total number of producers that attended education events</b>				<b>479</b>

\*C=Cameron H=Hidalgo S=Starr W=Willacy

## **Appendix E**

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### **Sample flyers and agendas from select education programs**

# Crop Nutrient Management Workshop

Topics sure to save you money, grow a quality crop and be environmentally friendly

Tuesday, October 11, 2005

9:00 a.m.

A&M Research & Extension Center- Weslaco

Lunch provided

3 hours of TDA and CCA CEU's to be offered

## **Putting it All Together to Maximize Yield: Fertility, Irrigation, and Crop Management**

Charles Stichler, Extension Agronomist, Uvalde

## **Results of Last Year's Soil Testing Campaign and the Value of Soil Testing**

Dr. Mark McFarland, Extension Soil Fertility Specialist, College Station

### **Concurrent Sessions**

Citrus	Dr. Julian Sauls, Extension Horticulturist, Weslaco
Vegetables	Dr. Larry Stein, Extension Horticulturist, Uvalde
Sugarcane	Dr. Robert Wiedenfeld, Professor, TAES, Weslaco
Cotton	Charles Stichler, Extension Agronomist, Uvalde
Corn/Sorghum	Dr. Mark McFarland, Extension Soil Fertility Specialist, College Station

## **EQIP Program: Eligible Practices, Cost Share Rates, Application Deadlines**

Arturo Ybarra, District Conservationist, Natural Resources Conservation Service  
Edinburg

## **Ag Issues on the Arroyo Colorado**

Andy Garza, Regional Manager, Texas State Soil & Water Conservation Board  
Harlingen

## **Kickoff of Soil Testing Campaign for the Valley**

County Extension Agents- Dr. Enrique Perez, Omar Montemayor, Omar Cavazos, Brad  
Cowan

**Door Prizes-** over 100 door prizes valued at \$50 to be given away!

Persons with special needs are requested to call 800-638-8239 in advance so these may be addressed  
Agriculture and Natural Resources " Family and Consumer Sciences " 4-H and Youth Development " Community Development  
Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.  
The Texas A&M University System, U.S. Department of Agriculture and the County Commissioners Courts of Texas Cooperating  
A member of the Texas A&M University System and its statewide Agriculture Program

# **COTTON PRE-PLANT SEMINAR**

## **and**

### **Annual Membership Meeting of the Cotton and Grain Producers of the Lower Rio Grande Valley**

Thursday, January 19, 2006

Best Western Palm Aire, Expressway 83 and FM 1015, Weslaco

8:00 - 8:30 Registration (free of charge) Door Prizes

Program begins at 8:30 a.m., concludes around 3:30 p.m.

4 hours of TDA CEU's and CCA CEU's being applied for

#### Program Topics

- **Cotton Physiology: Irrigation and Fertility to Maximize Production**  
Charles Stichler, Extension Agronomist, Uvalde
- **Economics of Cotton Variety Selection**  
Dr. Luis Ribera, Extension Economist, Weslaco
- **Cotton IPM Program for 2006**  
Manda Cattaneo, Extension Cotton IPM Entomologist, Weslaco
- **Cotton Varieties: Big Changes This Coming Season**  
Charles Stichler, Extension Agronomist, Uvalde

#### *Lunch Sponsored by our Allied Industry Partners*

Luncheon: Annual Membership Meeting of the  
Cotton and Grain Producers of the Lower Rio Grande Valley  
Glenn Wilde, President  
Dr. Webb Wallace, Executive Director

- **Cotton Market Situation and Outlook**  
Dr. John Robinson, Extension Economist, College Station
- **EQIP Program Reminders**  
Arturo Ybarra, NRCS District Conservationist, Edinburg
- **Boll Weevil Eradication Program in the RGV: The First Full Season**  
Charles Allen, Program Director, Texas Boll Weevil Eradication Foundation, Abilene  
Lindy Patton, Executive Director, Texas Boll Weevil Eradication Foundation, Abilene
- **New Developments from Industry**  
Industry Representatives

For more information contact: Brad Cowan, County Extension Agent-Ag, Hidalgo Co., 383-1026; Dr. Enrique Perez, County Extension Agent-Ag, Cameron Co., 361-8236; Omar Cavazos, County Extension Agent-Ag, Willacy Co., 689-2412.

Persons with special needs are requested to call 800-638-8239 in advance so these may be addressed  
Agriculture and Natural Resources " Family and Consumer Sciences " 4-H and Youth Development " Community Development

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**Presentation by**  
*NATURAL RESOURCES CONSERVATION SERVICE*  
**On**  
**2007 State Concern for Water Quantity**  
**in Lower Rio Grande Valley Irrigation Area**  
Cameron • Hidalgo • Maverick • Starr • Willacy Counties

***Meeting Dates***

Wednesday, November 29, 2006  
11:30 - 1:30  
Rio Red Room  
TAMU-K Citrus Center  
Weslaco

***LUNCH PROVIDED BY SPONSORS***

Friday, December 1, 2006  
11:30 - 1:30

Harlingen Irrigation District Pumpouse  
9 miles South of Expressway 83 on Rangerville Rd to  
dead-end at Bus. 281, jog to West and then South on  
Trevino Road for 1/2 mile.  
Call HID at 956-423-7015 for directions

Thursday, November 30, 2006  
11:30 - 1:30  
TexaSweat Building  
901 Business Park Drive  
Mission

**RSVP to Martha Trejo, Texas Citrus Mutual, (956) 584-1772**

***EQIP Sign-up Deadline is December 15***

**Why should you attend?**

1. All applicants for last three years have been funded
2. Discussion among growers with *Dwight Head, NRCS Engineer, Corpus Christi* to clarify finer points of this relatively new program
3. Valley needs to take advantage of one of few programs for cost share for water conservation. There is plenty of water behind dams now, but we will almost certainly have water shortages in future.
4. Funding for this program may not be as plentiful in future.

***Hosted By:***





Texas Cooperative  
**EXTENSION**

The Texas A&M University System

## **Crop Nutrient Management Workshop**

Topics sure to save you money, grow a quality crop and be environmentally friendly

Tuesday, October 9, 2007

9:00 a.m.

A&M Research & Extension Center, Hoblitzelle Auditorium- Weslaco

Lunch provided

3 hours of TDA and 3 hours of CCA CEU's to be offered

### **Fertilizer Market Outlook, The Science of Soil Testing**

Dr. Mark McFarland

Extension Soil Fertility Specialist, College Station

### **EQIP Program and It's Potential for Nutrient Management Assistance**

Arturo Ibarra

District Conservationist, Natural Resources Conservation Service, Edinburg

### **Water Quality Management Plans- How they Benefit Growers**

Andy Garza

Regional Manager, Texas State Soil & Water Conservation Board, Harlingen

### **Corn and Grain Sorghum Fertility**

Dr. Dan Fromme

Extension Agronomist- Uvalde

### **Ag Projects in the Arroyo Colorado Watershed**

Kevin Wagner

Project Manager, Texas Water Resources Institute, College Station

### **Pasture Fertilization**

Brad Cowan

County Extension Agent- Agriculture, Hidalgo County

### **Kickoff of Soil Testing Campaign for the Valley**

Dr. Enrique Perez

County Extension Agent- Agriculture, Cameron County

Geraldo Tapia, Ag Technician, Hidalgo, Willacy & Cameron Counties

### **Door Prizes**

Persons with special needs are requested to call 800-638-8239 in advance so these may be addressed

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Agriculture and Natural Resources · Family and Consumer Sciences · 4-H and Youth Development · Community Development  
Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.  
The Texas A&M University System, U.S. Department of Agriculture and the County Commissioners Courts of Texas Cooperating  
A member of the Texas A&M University System and its statewide Agriculture Program

# Soybean/Corn/Cotton Field Day

Tuesday, July 22, 2008

Rio Farms, Monte Alto

10:00 a.m.

Lunch Provided

3 hours of TDA and CCA CEU's to be offered

Welcome

Dale Murden, General Manager, Rio Farms

Tour Research Plots

Specialists

Soybean Varieties

James Grichar, Research Scientist, Beeville

Soybean Insects

Mo Way, Research Entomologist, Beaumont

Roy Parker, Extension Entomologist, Corpus Christi

Soybean Diseases

Tom Isakeit, Extension Plant Pathologist, College Station

Soybean Production System

Dan Fromme, Extension Agronomist, Corpus Christi

Corn Update & Variety Discussion

Specialists & Company Professionals

Cotton Update & Variety Discussion

Specialists & Company Professionals

Fall Cropping Options: Corn, Soybeans, Grain Sorghum, Southernpeas, Black Beans

Andy Scott, Director of Research, Rio Farms

Brad Cowan, County Extension Agent-Agriculture, Hidalgo County

FSA Update

Tacho Cavazos, County Executive Director, Farm Service Agency, Raymondville

Franco Trevino, County Executive Director, Farm Service Agency, Edinburg

This educational program is sponsored by :



**RIO FARMS, INC.**  
RESEARCH AND DEMONSTRATION  
"SINCE 1941"



Persons with special needs are requested to call in advance so these may be addressed

For more information contact: Andy Scott, Director of Research at Rio Farms, 262-1387 or Brad Cowan, County Extension Agent-Agriculture, at the Hidalgo County Extension Office, 383-1026 or 800-638-8239, b-cowan@tamu.edu

# Texas Ag Industries Association Rio Grande Valley Regional Meeting

Tuesday, September 16, 2008

Echo Hotel, 1903 South Closner Blvd (956)383-3823  
Edinburg, Texas

## Program

7:30 - 8:15 AM

### Registration and Display Visitation

8:15 - 8:30 AM

### Welcome

- TAI A Chairman- Jerry Bellar, Wilbur Ellis Co. Earth

- TAI A Rio Grande Valley Regional Meeting Committee Chairman- Benny Martinez, Dow AgroScience, Kingsville

8:30 - 9:30 AM

### IPM of Invasive Species Pest in Citrus

Dr. Mamoudou Steamou, Texas A&M Citrus Center, Weslaco

9:30 - 10:30 AM

### Soil Properties Effecting Plant Nutrient Availability

Dr. Robert Wiedenfeld, Texas A&M, Weslaco

10:30 - 10:45 AM

### Break & Display Visits

10:45 - 11:35 AM

### Nutrient Load Management

Brad Cowan, Texas AgriLife Extension, Edinburg

11:35 AM - 12:20 PM

### Lunch (Included in the registration fee) - Visit Displays

12:20 - 1:20 PM

### Bio Fuel Production

Jurg Blumenthal, Texas AgriLife Extension, College Station

1:20 - 2:10 PM

### Fertilization and Composting Impacts on Citrus Production

Shad Nelson, Texas A&M, Kingsville

2:10 - 3:10 PM

### Water Quality in the Arroyo Colorado

Laura De La Garza, Water Resource Institute, Weslaco

3:10 - 3:25 PM

### Break & Display Visits

3:25 - 4:25 PM

### Aerial Application Drift Control

Pat Kornegay, Sun Valley Dusting Co, San Benito

4:25 - 5:15 PM

### Soybean Production in the RGV

Andy Scott, Rio Farms Inc., Monte Alto

## Other 2008 Regional Meetings

Lubbock-Sept. 9-Reese Conference Center

Salado-Oct. 7-Stagecoach Inn

El Campo-Oct. 14-Mikeska's BBQ

Dumas-Nov. 6-Boar's Nest Steak House

### CCA CEUs

A total of eight CEUs for Texas Certified Crop Advisers will be offered. This includes two CEUs in each of the four performance objective areas (Crop Management, Nutrient Management, Pest Management, Water Management).

### TDA CEUs

Five CEUs for Texas Department of Agriculture Pesticide Applicator's Licenses will be offered (including Laws & Regulations, and IPM), which is equivalent to the annual requirement for a commercial license.

Questions 979-968-5602 or go to [www.txag.net](http://www.txag.net)



Natural Resources Conservation Service  
13434 Leopard St. Suite A14  
Corpus Christi, Texas 78410

FOR IMMEDIATE RELEASE  
January 6, 2009

Contact: Melissa Blair, 361-241-0609  
melissa.blair@tx.usda.gov

## Conservation Tillage Field Day Scheduled for Jan. 27 in Hidalgo County

Are you interested in learning how to improve your land's fertility, reduce erosion, improve crop production, and find out about equipment that will help you spend less time spent in the field? If so, then mark your calendar to attend the Conservation Tillage Field Day on Tues., Jan. 27, 2009, at the Immaculate Conception Parish Hall in McCook. The Parish Hall is located on Farm Road 681, 30 miles northwest of McAllen, in west central Hidalgo County.

The USDA-Natural Resources Conservation Service (NRCS) and the Texas AgriLife Extension Service is sponsoring the one-day workshop that will include field demonstrations.

- |               |  |
|---------------|--|
| 8:00 – 8:30   | Registration   |
| 8:30 – 9:00   | South Texas Reduced Tillage Overview: Dr. Charles Stichler, Agronomist (Retired), Texas AgriLife Extension Service               |
| 9:00 – 9:30   | Economics of Reduced Tillage: Dr. Luis Ribera, Economist, Texas AgriLife Extension Service                                       |
| 9:30 – 10:00  | Soil Fertility Management in Reduced Tillage Systems<br>Charles Stichler, Agronomist (Retired), Texas AgriLife Extension Service |
| 10:00 – 10:15 | Break  |
| 10:15 – 10:45 | No-Till and Strip-Till Implements: Cleve Gustin, Regional Salesman, Orthman Tools  |
| 10:45 – 11:15 | Farming with Conservation Tillage: Buck Braswell, Director of Willacy SWCD/Farmer  |
| 11:15 – 11:45 | EQIP Incentives: Bruce Henderson, Zone Agronomist, NRCS, Corpus Christi  |
| 11:45 – 12:00 | Introduction of Sponsors   |
| 12:00 – 12:45 | LUNCH  |
| 12:45 – 2:00  | Field Review of Demonstration Plantings: Larry Skloss, Director of Hidalgo SWCD/Farmers  |

Lunch will be provided and three continuing education units (CEUs) will be offered to attendees.

Sponsors include Weaks Martin Implement Company, Inc., Mission; Capitol Farm Credit, Edinburg; Wilbur-Ellis Company, Edinburg; Helena Chemical Company, Donna; Pioneer Equipment Company RGV, Mission; Seiver Implement Company, Donna; Hidalgo Soil & Water Conservation District; Starr Soil & Water Conservation District; Texas/Mexico Border Coalition CBO and Rio Bravo Resource Conservation and Development (RC&D)

For more information, call Bruce Henderson at (361) 241-0609.

###

# **COTTON & GRAIN PRE-PLANT SEMINAR**

## **& Annual Membership Meeting of the Cotton and Grain Producers of the Lower Rio Grande Valley**

Tuesday, January 20, 2009

Rio Farms, Monte Alto

8:30 - 9:00 Registration (free of charge) Program begins at 9:00 a.m.

TDA CEU's and CCA CEU's being applied for



### **Program Topics**



#### **Corn, Grain Sorghum and Soybean Market Outlook**

Dr. Mark Welch, Extension Economist- Grain Marketing, College Station

#### **Cotton Market Outlook**

Dr. John Robinson, Extension Economist- Cotton, College Station

#### **Farm Bill Implementation and Trade Issues**

Craig Brown, VP Producer Affairs, National Cotton Council, Cordova, Tennessee

#### **Boll Weevil Eradication Program**

Edward Herrera, Zone Mgr. Texas Boll Weevil Eradication Foundation, Harlingen

#### **Conventional Cotton Varieties**

Dr. Webb Wallace, Consultant, Harlingen

#### **Production Issues in Grain Sorghum and Cotton**

Dr. Dan Fromme, Extension Agronomist, Corpus Christi

#### **An Informal Discussion of Alternatives to Cotton, Grain Sorghum or Corn**

Andy Scott, Director of Research, Rio Farms, Monte Alto

#### **Deep Soil Testing, A Practice to Consider in Times of Rising Fertilizer Prices**

Brad Cowan, County Extension Agent- Agriculture, Hidalgo County

*Lunch Sponsored by our Allied Industry Partners*

**Luncheon Program: Annual Membership Meeting of the  
Cotton and Grain Producers of the Lower Rio Grande Valley**  
Samuel Sparks, President • Dr. Webb Wallace, Executive Director



#### **FSA Reminders**

Franco Treviño, County Executive Director, FSA, Edinburg

#### **New Developments from Industry**

Industry Representatives

**AgriLIFE EXTENSION**

Texas A&M System

For more information contact Brad Cowan, County Extension Agent-Ag, Hidalgo Co., 383-1026

or Dr. Enrique Perez, County Extension Agent-Ag, Cameron Co., 361-8236

Persons with special needs are requested to call 800-638-8239 in advance so these may be addressed.

Educational programs of the Texas AgriLife Extension Service are open to all people without regard to race, color, sex, disability, religion, age or national origin.  
The Texas A&M University System, U.S. Department of Agriculture and the County Commissioners Courts of Texas Cooperating

# 5 CEU's

## CEU Workshop

Tuesday, February 10, 2009

Hoblitzelle Auditorium, A&M AgriLife Research & Extension Center, Weslaco

Registration at 8:00 a.m., class begins at 8:30 a.m., concludes at 3:00 p.m.

Fee: \$5.00 per hour, pre-registration is not required  
lunch will be on your own

This training is certified for 5 hours of continuing education for all private, commercial and non-commercial TDA license holders. It will meet all the CEU requirements for annual commercial and non-commercial license renewals.

### Topics and Speakers

#### Laws and Regulations

Antonio Rojas, Texas Department of Agriculture, San Juan

#### Citrus Greening and Asian Citrus Psyllid

Dr. Julian Sauls, Extension Horticulturist, Weslaco

#### Integrated Pest Management Video

Biological Control Video

#### TDA Pesticide License Maintenance

Brad Cowan, County Extension Agent- Agriculture, Hidalgo County, Edinburg

#### Insect Parasitic Nematodes Video

Texas Imported Fire Ant Video

*For further information contact the Cameron County Extension Office at 361-8236 or the Hidalgo County Extension Office at 383-1026 or 800-638-8239. Proceeds from this event will be used to support Extension educational programs conducted in Hidalgo and Cameron Counties.  
Persons with special needs are requested to call in advance so these may be addressed.*

## Appendix F

### Other educational programs related to the effort, but not directly applicable to the project

Date	Event	Counties* Involved	Description	Attendance
3/9/2006		CH	A planning meeting was held to determine how Agricultural Demonstration Initiative (ADI) and Extension can work together cooperatively in the Lower Rio Grande Valley (including the Arroyo).	
3/10/2006	Cameron Master Gardeners	C	Extension provided training on turfgrass management, including nutrient management and water conservation	8
3/17/2006	Cameron Master Gardeners	C	Extension provided training on xeriscaping, including proper water and fertilizer use in the landscape	14
3/31/2006	Cameron Master Gardeners	C	Extension provided training on soils, including soil fertility, soil sample collection, soil types and other soil properties	12
4/5/2006	Cameron Master Gardener	CH	Providing Master Gardeners with information with turfgrass and nutrient management.	12
4/6/2006	Cameron Master Gardeners		A demonstration of the use of drip irrigation on vegetable gardens at the San Benito Veterans Academy	100
4/21/2006	Tour of the native plant refuge in Rio Grande City		Learned the conservation practice of using native plants in the landscape	21
4/22/2006	Rio Fest Earth Day		An educational exhibit on native plants and water conservation in the garden	200
4/28/2006	In Home Conservation		Instruction on water conservation and the use of drip irrigation in the landscape	12
5/11/2006	In Home Conservation		Taught home owners water conservation and drip irrigation methods during In-Home Water Conservation Training	6
6/21/2006	In Home Conservation		In-home water conservation result demonstrations were established	6
6/5/2006	Master Gardener Teacher Training	CH	Training on water management, water conservation, and drip irrigation	60
7/6/2006 7/7/2006 8/3/2006 9/21/2006	Turf Management Meetings	C	Training on Irrigation and Fertilizer Management for athletic fields	14
8/27/2006	Cameron County Master Gardeners	C	Established the Fall Drip Irrigation Vegetable Garden at the San Benito Veterans Academy	38
9/25/2006	Waste Chemical Collection	CHW	Participated in chemical collection	25
10/1/2006	Cameron County Volunteers	C	Volunteers worked to establish a drip irrigation system in a school vegetable garden	60
10/5/2006	Sport Athletic Field Education	C	Received instruction on the development of an irrigation and fertilizer management plan as part of the SAFE	2
11/16/2006 11/17/2006	Rain Harvesting Training	CH	Rain Harvesting Training	32
1/11/2007	Master Gardner Program	C	Focused on Rain Water Harvesting	26

Date	Event	Counties* Involved	Description	Attendance
3/8/2007 3/15/2007	Hidalgo County Master Gardeners attended programs on soil fertility and turf management	H	The soil fertility program presented principles of soil fertility and water conservation in urban landscapes and included a tour of a composting facility. The turf management program included nutrient management and water conservation practices	39
3/22/2007	Cameron County Master Gardeners attended a native plants and irrigation information session	C	Master Gardeners learned about the use of natives to conserve water and the principles of xeriscaping, drip irrigation and rain water harvesting	20
3/29/2007	Ag Assessment Project	CH	Cameron and Hidalgo County TCE personnel involved in this education program joined TAES, TCE and TAMUK personnel involved in the Arroyo Ag Assessment Project to tour a drainage ditch of the Arroyo Colorado to locate sites for monitoring agricultural BMPs and agricultural impacts on water quality	
4/5/2007	Master Gardener Program	H	Water Conservation, Irrigation techniques	23
4/9/2007	Master Gardener Program- Rain Water Harvesting	C	Rainwater harvesting system at Los Indios Learning Center-Vegetable Garden-Lessons for Youth	15
4/17/2007	Master Gardener Program- Rain Water Harvesting	C	Rain water harvesting system at Los Indios Learning Center : Vegetable Garden Lessons for Youth	21
4/24/2007	Master Gardener Program – Rain Water Harvesting	C	Rain water harvesting system at Los Indios Learning Center: Vegetable Garden-Lessons for Youth	12
4/27/2007	Master Gardener Training	C	Master Gardeners were provided training on drip irrigation installation and materials.	4
4/20/2007	Rio Fest	C	Master Gardener Educational Exhibit- Drip Irrigation, Xersicape, Native Plants	200
4/27/2007	Arbor Day	C	Master Gardeners and Texas Forest Service conducted program to school youth at Zavala Elementary	500
5/1/2007 5/8/2007	Master Gardener Rain Water Harvesting Project	C	Master Gardener taught school youth about rain water harvesting	9
5/9/2007	SAFE Program	C	Conducted evaluation of Athletic Field management as part of the Sports Athletic Field Education (SAFE) Program	2
6/4/2007	Master Gardener Teacher Training	CH	Teachers provided training on wide range of horticulture including water conservation and nutrient management	16
6/6/2007	Master Gardener Program – Soil Fertility	C	Principles of Soil Fertility and Water Conservation	36
9/18/2007	Texas Ag Industry	CHW	Presentation on the Arroyo Colorado WPP; Presentation on 319 Cost Share program and how to participate; Arroyo Colorado WPP Presentation available on Web at <a href="http://www.arroyocolorado.org/Publications.php">http://www.arroyocolorado.org/Publications.php</a>	40
11/30/2007	Food Safety Meeting	H	Food safety issues including irrigation water quality	20
1/8/2008	Training- City of San Juan Parks and Recreation	H	Native Plants, Compost and Mulch	5
1/11/2008	Grow'n Growers Class	H	Educational Program on Organics, promotion, farmer's markets	15
1/15/018	Master Gardener Composting Workday	C	Master Gardeners learned the benefits and uses of compost in a landscape. Different types of compost materials were use at the MG Arboretum	12
1/16/2008	Master Gardener Program	H	Organic products for insect control and identification and use of beneficial insects	23

Date	Event	Counties* Involved	Description	Attendance
1/17/2008	Tour of organic garden	W	Organic Gardening	
1/18/2008	Organic Kitchen Garden Tour	H	Organic Pest and Disease Controls	21
1/19/2008	Sustainable Ag and Organic Gardening conference	HC	Organic Methods	137
1/19/2008	radio show	H	Benefits of Compost	
1/23/2008	Horticulture Society Annual Meeting	H	Organic Vegetable Gardening compost, organic pest and disease control, Organic prevention and Treatment of Chilli Thrips Organic Roses.	43
1/25/2008	Grow'n Growers	H	Compost Tea	12
1/26/2008	"Gardening 101 Series"	H	Organic Vegetable Gardening	41
2/1/2008	"Walk In the Park"	H	Native Trees and Mulch	37
2/2/2008	Native Tree and Shrub Planting	H	Demonstration on proper planting, use of compost and mulch, use of organic fertilizer, native plant information	39
2/6/2008	Organic Garden Tour	H	Organic Gardening	13
2/8/2008	"Walk In the Park"	H	Organic Pest Control Program	37
2/12/2008	Master Gardener Program	C	Educational Program: Landscape with Natives in the Master Gardener Arboretum.	30
2/13/2008	Grow'n Growers	H	Organic Pest Control	13
2/15/2008	Program on Compost	H	Tour of Baseball Field and Compost Study	33
2/20/2008	Mission/McAllen Garden Club	H	Organic Vegetable Gardening	15
2/21/2008	"Walk In the Park Class"	H	Native Shrubs	32
2/29/2008	"Walk In the Park" Class	H	Organic Disease Control	33
3/11/2008	Meeting	H	Organic Pecan Production Trials	27
3/12/2008	Master Gardener Class	C	Uses of Compost in the Vegetable Garden.	28
3/18/2008	Salsa Festival	H	Organic Vegetable Gardening	130
3/20/2008	Master Gardener Class	H	Use of Compost, Use of Native Trees	12
3/26/2008	Grow'n Growers	H	Organic Squash Production and Disease Control	12
3/26/2008	Evening Program	H	Organic Vegetable Production	23
3/27/2008	Master Gardener Class	H	Rain Water Collecting	13
3/31/2008	Los Largos Country Club	H	Use of Native Plants	8
3/15/2008	news article	H	Compost	
4/8/2008	Master Gardener Leadership Team	C	Develop plans of water efficient landscape	6
4/19/2008	Master Gardener Class	C	Principles of Irrigation, Water Conservation, Irrigation techniques	27
4/17/2008	Master Gardener Program	H	Turfgrass Management, including water conservation, varieties	15
4/22/2008	Master Gardener Leadership Team	C	Developed plans for composting demonstration	6

<b>Date</b>	<b>Event</b>	<b>Counties* Involved</b>	<b>Description</b>	<b>Attendance</b>
5/6/2008	Master Gardener Leadership Team	C	Developed plans for rainwater harvesting demonstration	7
5/14/2008	Master Gardener Class	C	Use of native plants	27
5/20/2008	Master Gardener Leadership Team	C	Develop plans for composting tour	6
6/16/2008	Master Gardener Class	C	Tour arboretum, ID native plants	27
6/17/2008	Master Gardeners	C	Master Gardeners present arboretum plans to county commissioners court	5
10/24/2008	Master Gardener Training	H	Soil Fertility	8
11/20/2008	Watershed Training	CHW	Overview of watershed systems (watershed hydrology, natural watershed features and functions), overview of watershed impairments (water quantity and quality, water quality law and policy, water quality monitoring), managing to improve watershed function(watershed approach, urban/ag BMP's), Community-driven watershed protection and management	50
<b>Total number of producers that attended education events</b>				<b>2633</b>

\*C=Cameron H=Hidalgo S=Starr W=Willacy

## Appendix G

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### Texas AgriLife Program Saves Growers Millions While Protecting Water

**Texas AgriLife Program Saves Growers Millions While Protecting Water  
Soil testing program is key to success**

**October 03, 2008**

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WESLACO -- A highly successful soil testing program has helped Rio Grande Valley farmers save almost \$2 million in fertilizer expenses while protecting a body of water critical to the ecology of South Texas, according to Texas AgriLife Extension Service officials.

The AgriLife Extension educational program has helped growers significantly reduce the amount of crop fertilizer that might otherwise have ended up in the watershed of the Arroyo Colorado, said Brad Cowan, an AgriLife Extension agent in Hidalgo County.

"Since its inception in 2002, this program, Nutrient Management Education in the Rio Grande Valley, has helped farmers save an estimated 3.3 million pounds of nitrogen and 3.8 million pounds of phosphorus," Cowan said.

At a time when increasing fertilizer prices have become a major concern for agricultural producers, the program has taken on a new importance.

"From 2002 to 2007, the cost of fertilizer more than doubled," Cowan said. "It has more than doubled again just in the past year, so soil testing has become a critical step in reducing costs to growers and in reducing runoff to the environment."

Through educational workshops and field days, more than 1,400 growers have received soil probes, testing forms and bags to collect soil samples. They are sent to Texas A&M University's Soil, Water and Forage Testing Laboratory in College Station for analysis.

The soil testing is partially subsidized by the Rio Grande Basin Initiative, a project administered by Texas A&M AgriLife's Texas Water Resources Institute.

The laboratory has tested and analyzed at least 3,000 soil samples representing more than 120,000 acres in Cameron, Hidalgo, Starr and Willacy counties, Cowan said.

The soil fertility results are returned to growers, along with nutrient management recommendations.



“Based on the test results, many growers have been able to reduce the amount of fertilizer they use which translates into huge cost savings,” said Dr. Enrique Perez, an AgriLife Extension agent in Cameron County.

“Depending on a grower’s crop and management history, they could save from \$7.50 to \$27.50 per acre on fertilizer costs by using the soil test results,” he said. “That puts the total economic impact from this project at an estimated \$1.9 million, based on an average cost per pound of nitrogen and phosphorus.”

In addition to helping the bottom line of growers, the reduction in fertilizer use helps protect the Arroyo Colorado, which runs 90 miles from Mission to the Lower Laguna Madre and is on the state’s list of impaired waters.

The Arroyo’s watershed covers most of Hidalgo, Cameron and Willacy counties, home to about one million people, according to a 2006 census report.

Cecilia Wagner, who manages five water quality projects in the Arroyo Colorado for the Texas Water Resources Institute, said agricultural runoff containing excess nitrogen and phosphorus from fertilizers is one of several sources of pollution to the Arroyo Colorado.

Others are wastewater treatment plants and urban storm-water runoff.

“By reducing the amount of fertilizer applied to the fields, the nutrient management program basically translates into better water quality for the watershed,” she said. “It has helped the Arroyo Colorado Watershed Partnership move toward its goal of restoring the quality of waters in the area.”

The watershed partnership is a group of some 700 area citizens and representatives of federal and state agencies, local governments and private organizations working to restore the Arroyo Colorado.

The institute administers the partnership with funding provided by the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency.

But the key to the success of the program has been the soil testing program, said Cowan.

“It has shown outstanding results,” he said. “We consistently encourage growers to conduct annual soil testing because it’s a very important best management practice in agricultural production systems.”

In addition to Cowan and Perez, others who helped put together the multi-year educational and training program include Omar Montemayor, an AgriLife Extension agent from Starr County, and AgriLife Extension specialists Dr. Mark McFarland and Dr. Tony Provin.

In early 2007, the Arroyo Colorado Watershed Partnership completed and released “A Watershed Protection Plan for the Arroyo Colorado,” Wagner said. Among its recommendations, the plan encourages voluntary reductions by wastewater treatment facilities, improved wastewater infrastructure for “colonias” and other unincorporated areas and increased public education efforts.

More information on the partnership and projects in the Arroyo is available at <http://www.arroyocolorado.org> .

The Nutrient Management Education Program is supported by a Clean Water Act grant from the Texas State Soil and Water Conservation Board and the Environmental Protection Agency.

The program is part of the Rio Grande Basin Initiative funded by the U.S. Department of Agriculture-Cooperative State Research, Education and Extension Service.