# OUTCOMES

*from the Rio Grande Basin Initiative*

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# Smart IDEA Prevents Flooding

## Assistance team installs control systems to avoid residential devastation

*By Caitlin Churchill*

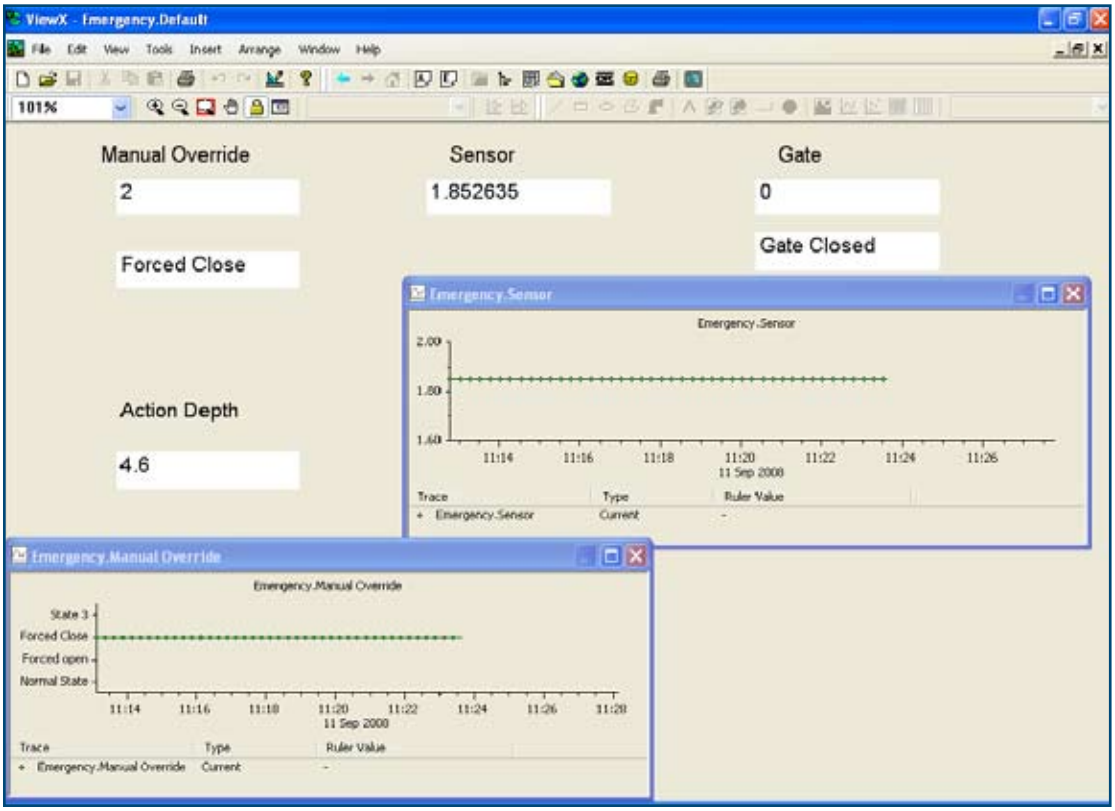
The Irrigation District Engineering and Assistance Program (IDEA) responded to a Hidalgo County Irrigation District No. 6 (HCID6) request to help prevent flooding along Walker Lake by installing remote and automatic control systems on the emergency gate of the Rio Grande.

IDEA developed the Mission 6 project when the lake, one of the district's main water management systems, began experiencing excessive water levels due to heavy rain.

"During a heavy rain in 2006, the district received reports around three in the morning that high reservoir levels were threatening residential areas," said Askarali Karimov, Extension associate at Texas AgriLife Research and Extension Center at Weslaco. "The road to the emergency gate site was dangerous and practically impassable to travel by vehicle, so the district personnel had to walk a mile through the rain on a dark muddy road to open the gate and release the excess water."

When even more intense raining occurred, the dirt road leading to the emergency gate became entirely inaccessible. If impossible for personnel to manually open the Rio Grande emergency gate, rains ultimately would have flooded homes and residential areas along Walker Lake.

To combat these hazards, the IDEA team installed remote and automatic control systems at the emergency gate near the main pump station of the Rio Grande. This allows the district manager to immediately respond to water level readings and open flood gates from a safe distance.




*Emergency Gate control and real time data display with graphs at the office master station.*

HCID6 further requested the IDEA team to install two additional remote and automatic control systems on Walker and District lakes. Programming is complete and HCID6 is now purchasing hardware for the sites. Once the project is finished, the district manager, Cornelio Morales, can control the entire lake system from his office computer.

"The control system will ensure that our radial gates open and close when needed, thus avoiding mistakes


*Left: Emergency Gate and Remote Terminal Unit (RTU) site. Right: The components of the Remote Terminal Unit.*

that could be costly," Morales said. "This system will ensure peace of mind and security to the district and neighbor communities."

Texas AgriLife Extension Specialist Dr. Guy Fipps said the Mission 6 project is the first fully automatic successful gate control system in the Lower Rio Grande Valley, saying it's, "a starting point for the district… which will improve efficient and timely water delivery and conveyance system management."

IDEA began in the 1990s and is now the most extensive university-based program of its kind in the United States. The IDEA program includes educational services and technical assistance for irrigation districts, as well as applied research in GIS-based management systems and rapid assessment methods for prioritized rehabilitation projects based on water saving potential.

To learn more about IDEA and its many projects, programs and educational opportunities, visit http://idea.tamu.edu.

*Photos courtesy of Eric Leigh*

# Comparing Citrus Irrigation

## Three-year alternative irrigation system averages versus traditional flood

*By Heriberto "Eddie" Esquivel*

Under the direction of Dr. Shad Nelson, assistant professor at Texas A&M University–Kingsville, Eddie Esquivel has been working since March 2005 to establish citrus irrigation demonstration sites throughout the Rio Grande Valley. Nelson and Esquivel work closely with the Texas AgriLife Extension Service and Dr. Juan Enciso, Extension specialist, and Xavier Peries, Extension technician, sharing resources and gathering data on sites established by Enciso.

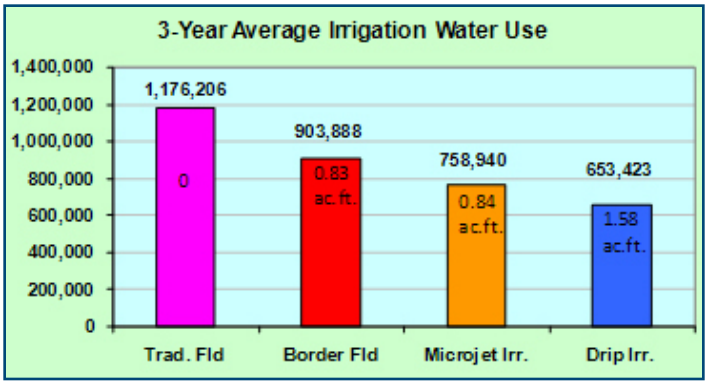
Data collected for the past three years includes: rainfall at each site, soil moisture levels and yields. Using one crop, such as Rio Red grapefruit, a perennial luxury crop for the Lower Rio Grande Valley (LRGV) can be compared between different growers throughout the LRGV.

Differences in soil type, rainfall events and available water can vary from county to county, site to site. These differences will dictate water usage for commercial citrus growers. Typically irrigation of citrus is done with wide area flooding, adding approximately 0.6 acre-feet of water per irrigation event. Traditional flood events are calculated using this method unless there are metering devices that accurately measured water flow.

"By comparing individual sites using alternative irrigation methods, our goal is to illustrate potential water savings over traditional flood irrigation techniques," Nelson said. "Irrigation methods used are bordered flood, microjet spray and drip irrigation."


*(Above) Eddie Esquivel, Texas A&M-Kingsville, stands next to an ADI sign installed on a collaborator's property.*

*(Right) Bordered flood irrigation utilizing polypipe and attached meter is used to irrigate and monitor Rio Red grapefruit in Lower Rio Grande Valley.*




*The graph above illustrates the three-year average of irrigation water uses, which indicates the gallons of water used and potential acre-feet saved by other irrigation methods versus traditional flood systems.*

All sites from each irrigation type were compared to traditional flood's average gallons per acre during the past three growing seasons of the Rio Red grapefruit. With traditional flood at 0.6 acre-feet per irrigation event, there are six to eight events depending on rainfall. Traditional flood averaged approximately 1,176,206 gallons per acre or 3.61 acre-feet.

Micro-jet irrigation and bordered flood were close in water usage compared to drip irrigation, showing a potential savings of 1.58 acre-feet of water.

"The demonstration project is achieving good working results," Nelson said. "Until we can accurately measure traditional flood plots, we must use the well-known figure of 0.6 acre-feet per acre for each irrigation event. While water costs and availability are good, farmers will use the most cost-effective means to irrigate their citrus orchards."

This research is part of the Agricultural Demonstration Initiative funded by the Texas Water Development Board and supported by the Rio Grande Basin Initiative.

*Photos courtesy of Eddie Esquivel*

# RGBI Briefs

## Soil-testing Campaign Articles

The Rio Grande Valley soil testing program has been highly successful in saving farmers money and saving the Arroyo Colorado watershed by reducing the amount of crop fertilizer runoff. The soil testing program is a Texas AgriLife Extension Service effort supported by the Rio Grande Basin Initiative and funded by the Texas Commission on Environmental Quality and Texas State Soil and Water Conservation. This Nutrient Management Program has recently received a lot of publicity. Visit http://agnews.tamu.edu/showstory.php?id=767 to read the AgriLife Communications article featuring program results. This article has also been published by CropLife.com, Media Newswire, Southwest Farm Press, Valley Morning Star, AgriLife Extension, High Plains Midwest Ag Journal, Fresh Plaza, AgriLife Research, Hutchinson County Highlights and the Arroyo Colorado Watershed Partnership newsletter.

## Rio Grande Valley Irrigation Training Program (ITP) in Hondo

The South Texas Irrigation Conference and Trade Show is scheduled for Jan. 20, 2009 in Hondo, Texas near Uvalde. This training event is part of six programs held around the state to help farmers and others learn about efficient tools and techniques of irrigation management. Each event offers region-specific information about irrigation practices, cropping systems, policy updates and cost-share programs available to local producers.

The South Texas event will be at the Medina County Fair Hall, FM 462, in Hondo. Registration is $10 in advance and $15 at the door. For more information, visit http://itc.tamu.edu/conferences.php.

The ITP is a collaborative effort of Texas Water Resources Institute, Texas AgriLife Extension Service, Texas State Soil and Water Conservation Board, and USDA's Natural Resources Conservation Service. The Texas Water Development Board provides support funding for the project.

# Conference Success

## RGBI participants highlight 2007-2008 outcomes

*By Danielle Supercinski*

More than 100 participants attended the 2008 Annual Rio Grande Basin Initiative (RGBI) Conference held July 14-17 in Las Cruces, NM at the Farm and Ranch Heritage Museum. Project participants highlighted their accomplishments and discussed plans to continue ongoing efforts or initiate new activities through the *Efficient Irrigation for Water Conservation in the Rio Grande Basin* project.

"Even though the Rio Grande Basin is prone to frequent droughts and July always brings lizard-scorching temperatures, the RGBI group was well cared for by our New Mexico hosts and comforted by the excellence of project outcomes presented," said B.L. Harris, RGBI project director and associate director at Texas A&M AgriLife Texas Water Resources Institute.

The opening session began with welcoming comments from Dr. Allan Jones, then director at Texas A&M AgriLife Texas Water Resources Institute, and Brad Rein, national program leader at U.S. Department of Agriculture's Cooperative State Research, Education and Extension Service. Texas AgriLife Research, Texas AgriLife Extension Service and New Mexico State University Agricultural Experiment Station and Cooperative Extension Service administrators also addressed the attendees on the importance of water conservation and lauded the success of the RGBI project.

New Mexico regional water issues were discussed by Judge Jerald A. Valentine, presiding judge at the New Mexico Lower Rio Grande Basin Adjudication, and Gary Esslinger, general manager of the Elephant Butte Irrigation District (EBID). In addition, luncheon speaker Edmund "Ed" Archuleta, manager at El Paso Water Utilities, talked about El Paso's award-winning efforts in conserving water.

The remainder of the conference allowed both Texas and New Mexico RGBI task leaders and participants to present overviews of 2007-2008 accomplishments and outcomes and the impacts these projects have on the Rio Grande Basin stakeholders.

"It is very important for research scientists and Extension personnel to come together to discuss collaboration opportunities and help set priorities for these multi-state integrated research and Extension programs as well as bringing outside partners into the mix," Harris said.

Urban water conservation studies continue to help homeowners save water by using more efficient practices in their homes and landscapes. On-farm irrigation management research, demonstrations and comparisons continue providing growers with precise and efficient irrigation methods.

In addition, aquatic weed management is demonstrated to irrigation districts, and researchers are testing chemical and biological controls to manage weeds such as *hydrilla*, saltcedar and *Arundo*

*donax*. Engineers use remote sensing, regional evapotranspiration estimation models, "smart" controller irrigation, automation/telemetry, canal seepage loss testing and other methods to find areas of water loss in irrigation delivery systems and help guide rehabilitation of the infrastructure. RGBI economists develop and update economic models to analyze the cost-benefit of such improvements to irrigation infrastructure as well as the cost effectiveness of alternate water-producing methods such as desalination.

The final session highlighted the RGBI County Extension Programs in both Texas and New Mexico. Extension specialists and agents are actively involved in teaching youth and adults how to conserve water. Numerous demonstration gardens and rainwater harvesting demonstrations are established for children and the public to view and learn more about water saving practices. Specialists and agents also work together to conduct irrigation trainings and workshops to better educate growers on the best water-saving irrigation techniques available.

"The conference showed that the participants had coped well with the '07 funding issues and had been able to sustain significant efforts despite the funding hiatus," Jones said. "We're glad to see funding back on track in 2008. We expect the programs to continue their rapid progress over the next few years."

A field tour of local aquatic areas of interest followed the conference. Esslinger lead the group to EBID irrigation canal sites to demonstrate precision water management instrumentation and overall canal and water management. Craig Runyan, water quality and RGBI program coordinator at New Mexico State University (NMSU), then lead the group to the Zhul Geologic Collection and the Windmill Farm at the NMSU Alumni Center.

"RGBI has been one of the most successful projects ever conducted in Texas and New Mexico and the water savings resulting from these efforts will have far-reaching impacts throughout the Basin for many years," Harris said.

Conference presentations, notes and photos can be found on the conference Web site at [http://riogrande-conference.tamu.edu/](http://riogrande-conference.tamu.edu/).

## Increasing Irrigation Efficiency in the Rio Grande Basin through Research and Education

Through education and research efforts, Texas AgriLife Research and the Texas AgriLife Extension Service and counterparts at New Mexico State University Agricultural Experiment Station and Cooperative Extension Service are implementing strategies for meeting present and future water demands in the Rio Grande Basin. These strategies expand the efficient use of available water and create new water supplies. This federally funded initiative is administered by the Texas Water Resources Institute and the New Mexico State University Water Task Force with funds from the Cooperative State Research, Education and Extension Service.

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