

Ag Water Conservation in the Rio Grande Valley
By Wayne Halbert, General Manager - Harlingen Irrigation District
www.hidcc1.org

This morning I want to share with you the work we are doing in the Rio Grande Valley, to promote water conservation with our farming community. First I will give you some background and then try to show you where we hope to go.

Irrigation in the Lower Rio Grande Valley began about 1900. Much of the base infrastructure that we currently use was constructed a hundred years ago. Many of the smaller canals and laterals have been concrete lined or put underground into pipelines but much of the main delivery system still uses the original open dirt canals.

Typical irrigation practices through the years has been furrow flood for row crops and borders and flood for pastures and orchards. Various types of modern day conservation practices such as drip, micro-jet, and sprinkler systems have been implemented on specialty crops but the bulk of irrigation has continued to be applied by the older methods.

Changes in management of these practices have been made through the years such as moving from open ditches and open cuts to siphon tubes and then to gated pipe and more recently to poly pipe. Though these changes resulted in conservation of water the movement was more a practical issue than saving water. We still use the borders and flood methods for pastures and most orchards.

From the mid 1990's to about 2003 the region suffered severe water shortages. Though drought conditions were blamed for the shortages, the real issue was Mexico's change in water demands that dried up much of the traditional source of replenishment to Amistad and Falcon Reservoirs. All of this resulted in short allocations of water resources to the farmers.

The farmers on strict allocations had to pay exorbitant prices for water from neighbors. They had to deal with metering devices that were in fact more of a guess than anything else. They had to plant crops by water demand rather than by market demand. Many chose to leave a portion of their land fallow just to insure they had sufficient water for the most productive of crops. Districts were financially stressed as water is their only commodity and they were being forced to be water conservation conscious.

Most of the Valley districts had long range plans to rehabilitate their facilities as funds were available. Water shortages dictated an acceleration of these efforts. Federal legislation was passed that provided some matching funds and through an agreement between the US and Mexico, North American Development Bank funds became available. Many districts took advantage of these sources and began to expedite major projects. The Harlingen Irrigation District was able to match funds from these sources and actually spend approximately \$4.5 million on conservation projects.

Shortly thereafter Senator Robert Duncan, concerned with agriculture and water conservation issues across the state, sponsored legislation that ultimately allowed the Texas Water Development Board to sponsor agricultural demonstration initiatives. Two projects were awarded by TWDB, one to Texas Tech on the High Plains and one to Harlingen Irrigation District in the Rio Grande Valley.

The Valley project consists of work from various participants. Texas A&M Kingsville, Texas A&M Extension and Harlingen Irrigation District are running various demonstration sites with farmers on actual production farm operations. Delta Lake Irrigation District is running some variable speed and manual metering projects. Texas Cooperative Extension's Farm Assist Program is analyzing the financial aspects of the demonstration projects and working with the individual farmers to determine the financial viability of the various conservation practices. Axiom-Blair Engineering was providing the technical expertise in our metering projects and meter calibration facility as well as developing the software to accomplish our goals. The districts are working with TSS&WCB and USDA-NRCS to encourage farmers to take advantage of the various cost-share programs. All of this is sponsored by the Texas Water Development Board.

As a part of our water conservation project the Harlingen Irrigation District had installed multiple meters to allow for the measurement and management of our water throughout the district. We have used various types of meters to fit the applications. We have insertion mag meters, traditional micrometer prop meters, full mag meters and Siemens transit time meters. All of these are tied to a telemetry system that reports back to the District and is available to the farmers from our website on a real time basis. This program has allowed us to integrate the use of these meters in our demonstration program to help give the farmer additional tools to manage his irrigation.

The demonstration projects have involved several different methods of irrigation

with over 15 different farmers and 20 to 30 sites on real world farming operations. These sites are spread across the Rio Grande Valley to get a broad spectrum of crops, conditions and farm practices. There are some 28 irrigation districts and multiple independent diverters in the Valley that provide water for 600,000 plus acres of irrigation. Our demonstration sites are designed to provide the farming community the information about the available technology and data that will encourage them to look at conservation alternatives to the traditional irrigation practices. They are full blown demonstrations on multi-year and annual crops. We do not dictate to the farmer how to do his irrigation. We give him the tools and any expertise we may be able to generate and ask him to set aside a portion of his operation to utilize the various tools we provide. We ask him to keep accurate records of his irrigation activities. We work with the district to quantify the water used by each method.

We have demonstration sites on drip versus flood irrigation on multi-year and annual crops.

The project provides surge valves to demonstrate the water usage on surge versus conventional flood. The District also built an automated gate that would automatically change water settings by programmed data input allowing the farmer to irrigate more land before having to make physical changes.

Demonstrations with various sprinkler technologies are being monitored from center pivot, linear movement, and traveling gun delivery.

We are operating demonstration sites on irrigation of citrus by flood, border flood, drip and micro-jet

Our work is not research. Texas Tech, Texas A&M and many other agricultural research institutes have done decades of research. We are taking the research to the field and giving the farmers the available tools, technologies and encouragement to try to demonstrate the viability of the various methods of water conservation in the real world. We document all of their inputs as well as their yields. We provide assistance through the Texas A&M Farm Assist Program to evaluate each demonstration site within the operations of the farm to determine to what extent these practices are economically feasible and at what point the value of water and conservation becomes a prominent factor in their planning.

One of the chief road blocks to moving farmers to water conservation practices is the cost of conservation and relative inexpensive cost of our water in the Rio

Grande Valley. It hasn't always been this way and our farmers know that it will not be long before higher costs and less available water will be with us again. During the last water shortage one of the chief problems was the inability of districts to adequately measure the water usage of each farmer. As a part of this project the Harlingen Irrigation District has built a meter calibration facility, the only one of its kind in Texas.

Though this facility will be used to calibrate various types of metering devices, it is also very beneficial in demonstrating the methods of water measurement and water delivery systems to irrigation district personnel across the state. We are holding workshops that demonstrate procedures for determining the validity of meter readings and the various methods and types of metering available. The workshops utilize a constructed open channel to simulate open canal management and procedures to enhance these operations to provide optimum water to the farmer. The District has built into the system an automated as well as manual capability to show the advantages and possibilities of automation to water conservation and efficient management of the resource. We hope this facility will help districts move towards good meter practices and help farmers become comfortable with the metering process.

Many would hope to hear us say that already we have moved our farmers to use the most modern and water saving procedures available and that we have saved X % of water by this movement. The reality is that we have shown that for the large acreage crops, such as cotton, grain sorghum, corn and sugarcane, the traditional thinking conservation practices, such as drip or sprinkler irrigation, are not economically possible. What has been an interesting learning experience for many of our farmers is that good management practices, no matter which practice they use, will save water and often make positive economic differences in their crops. We have been able to show up to 50% savings of water even in flood operations with good management and utilization of the proper data for irrigation. We have been able to show savings without loss of revenue as far as crop production. In some cases the good management practices have shown actual increases in production. The key to success requires a special effort from both the farmer and the irrigation district to provide sufficient water to implement good practices. Now before we go any further I don't want anyone saying that I said we can save 50% of our water. We have shown that in some conditions. We have also shown no significant savings under some conditions. What I want to leave with you is the importance of giving the producer all the tools he needs to make good decisions.

We want to give him access to meter devices that are credible and make the producer comfortable that he is getting what he is paying for and that he is applying the proper amount of water for the needs of the crop.

All districts can not easily give the producer real time data but we believe to reach optimum water efficiency the producer must know what he is doing today not several months down the road. In the Harlingen District the farmers have full access to real time water delivery data throughout the District and to their individual farm. Both the District and the producer know if enough water is being delivered and how much is being applied.

On our demonstration sites we have made available soil moisture data, as well as actual rainfall information as tools to help the farmer make good decisions in his water use. Again we are not here to tell the producer how to farm or even how to irrigate. We are demonstrating on his farm, the tools and technologies available so that he can make good choices.

We are excited about the next few years of carrying on these demonstration projects. We feel confident as we have continuation on the same farm for multiple years we will develop credible data that will encourage the agricultural community to make major water conservation improvements. Thank you for this opportunity. We encourage anyone to visit our website and get detailed information on the many aspects of this work. We will be happy to answer any questions now or by email about this work.