Rio Grande Basin Initiative

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Texas A&M University System
Agriculture Program
•
New Mexico State University
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Polypipe Conserves Water

Tests in Mexico demonstrate up to 50 percent water savings

by
Danielle Supercinski

Texas Agricultural Experiment Station and Texas Cooperative Extension scientists and engineers, through the Rio Grande Basin Initiative, are helping farmers in Mexico test polypipe to conserve water, and thereby provide an expanded water source to help meet future water demands, maintain flows to the river system, and retain better levels in Falcon and Amistad Reservoirs to enhance wildlife and natural resources in the area.

"Polypipe is like a garden hose 15 inches in diameter made out of 10 ply pieces of plastic," said Gordon Hill, former General Manager for Bayview Irrigation District. "You make holes where your turnout is – where you want to water the plants. There are no losses and the water pours out right onto the plant."

Three polypipe test blocks have been installed in Tamaulipas, Mexico by Hill, Winzen Film & Fiber Inc., and Mexican farmers. Research personnel Drs. Juan Enciso and Guy Fipps will collect and certify the data to determine effectiveness and water savings. Tony Hinojosa from Texas A&M Kingsville and four student interns from Monterey Tech are also involved with this project.

Field days and demonstrations were held to teach Mexican farmers how to properly install polypipe so it irrigates their crops efficiently.

"If we can reduce demands on the supply by 50 percent and apply it to their water supply, along with rainfall and a stable economy, it will significantly benefit the area."

Three test blocks were installed April 1, April 6, and April 11, respectively, while another field beside them is using conventional irrigation methods common to the area.

The three metered, irrigated fields are using polypipe and will be compared to the conventional irrigation field. The fields will be watered and tested for six months. After the testing period, the data will be compiled to determine how much water was saved.

"To determine the savings due to the use of polypipe we are conducting these three tests, then we will multiply (the data) by 700,000, which is the number of irrigated acreage in the area, to predict how much water polypipe potentially could save," Hill said.

"Using polypipe is the easiest way to conserve water for the least amount of money, and it gets the biggest bang for the buck."

Currently the overall irrigated acreage in the Rio Grande Valley of Mexico is twice as much as the irrigated acreage along the Lower Rio Grande in Texas, he said.

Two 50 acre blocks are being measured for volume of water lost off the field. Open ditch irrigation, volume, crop yields and other data are also being collected.

"Twenty to 25 percent of water was saved from seepage in the Bayview Irrigation District by using polypipe, and Mexico could save up to 50 percent,"

BEFORE:
Typical dirt-lined canals and ditches are leaky, and water is wasted as it "slips through the cracks."

AFTER:
Polypipe prevents canal leakage losses by keeping the water contained in this garden hose-like pipe.

Hill said. "So presume we save 50 percent. That means Mexico will have an additional 700,000 to 800,000 acre-feet of water each year. If we can reduce demands on the supply by 50 percent and apply it to their water supply, along with rainfall and a stable economy, it will significantly benefit the area."

"It keeps the river charged constantly because water is available and there is still enough to water crops. It has enhanced the ecosystem and the environment in the area."

Tom Wilson, representative for Winzen Film & Fiber Inc. in Sulphur Springs, Texas, donated seven rolls of polypipe for these tests. The Lower Rio Grande Authority, which consists of all Irrigation Districts in the Valley, donated the money to purchase six meters. The meters were then given to Texas Cooperative Extension to meter and evaluate the research and certify this project. This work is also supported by the U.S. State Department, Senator Kay Bailey Hutchinson, Senator John Cornyn and Governor Perry's office. Hill said they all see the big picture and understand how the project affects all of us, and they are interested in what it will do for both Texas and Tamaulipas.

The Comisión Nacional del Agua (CNA), Mexico's governmental research agency, is interested in the data and has been involved step-by-step along the way. Costa Ricans and United Nations personnel are also interested in the data.

"The CNA wants to take (the data) and make a Mexican government policy to subsidize use of polypipe," Hill said. "Now they are subsidizing use of gated pipe, but it is expensive, isn't used much, and a lot of water pressure builds up in it. Polypipe can be used by all farms for irrigation. Using polypipe is the easiest way to conserve water for the least amount of money, and it gets the biggest bang for the buck."

Use of polypipe causes a chain reaction of events to take place that leads to conserving water and farmers' money in the Tamaulipas area.

"With university assistance with this technology through the Texas Agricultural Experiment Station and Texas Cooperative Extension, we use less water, so there is more water left in Falcon and Amistad Reservoirs, and therefore, more water available for other uses," Hill said. "It helps keep the river charged constantly because water is available and there is still enough to water crops. It also has enhanced the ecosystem and environment in the area."

The overall global picture is that this technology is helping the environment throughout the Rio Grande Basin by maintaining higher water levels in both reservoirs, creating steady flows, maintaining adequate supplies for irrigators, increasing the quality of life with water savings and crop differences, and

*See **Polypipe** page 5*

NMSU Turf Research

Tray system serves up big water savings

by
Norman Martin

New Mexico State University scientists studying turf irrigation have discovered how a series of 5-by-5 foot trays buried a foot below ground can cut water use in half. The work sheds new light on a puzzle that has long intrigued New Mexicans: How can desert dwellers have a lush lawn or golf course?

An international research group headed by Bernhard Leinauer, an NMSU turfgrass specialist, has found that a subirrigation technique, Evaporative Control Systems, used the least amount of water while providing the highest quality turf. The two-year study examined three water application methods here on the arid southern New Mexico campus.

Bernhard Leinauer, New Mexico State University turfgrass specialist, examines a subirrigation tray. Experimental studies suggest that the 5-by-5 foot trays buried a foot below ground can cut turf water use in half.

"Over a year's time, this system used 50 percent less water than our traditional sprinkler system."

"Hands down, it was the winner," Leinauer said. "Over a year's time, this system used 50 percent less water than our traditional sprinkler system. On top of that, during the hottest part of the summer, it used about 80 percent less water."

Two years ago Leinauer and his colleagues built what they call a rolling green, a 41,000-square-foot series of subsurface drip and sprinkler irrigated plots. One of the turf trial's critical elements is its alternating series of south-facing 5 percent slopes followed by flat areas.

"We're trying to match real-world conditions such as you would find on a golf course or in your own yard."

The project is funded by NMSU's Experiment Station, The U.S. Golf Association, Toro Co., and the Rio Grande Basin Initiative.

"The information from these sloping areas is very important because not all turf areas are flat," Leinauer said. "We're trying to match real-world conditions such as you would find on a golf course or in your own yard."

Creeping bentgrass, used on many of the state's golf greens, was selected for the experiment because it is one of the most intensively maintained grasses in New Mexico. From a bird's eye view, Leinauer's rolling green looks like a huge, manicured or well-maintained golf green. But underneath the green

This golf course plot shows the three major irrigation treatments: Sprinkler (far back), tray system (middle) and drip (front). If you look closely, the Evaporative Control System plot is the greenest.

carpet is a complex array of irrigation systems, including traditional pop-up sprinklers, subsurface drip irrigation and subirrigation.

Sprinklers, which apply water to the surface, are commonly used in many parts of the state. In subsurface drip irrigation, water is applied directly to plant roots through a grid of black plastic liners or drip tape buried more than a foot deep.

Subirrigation uses a combination of flood irrigation and 5-by-5 foot drain tiles or trays. The three-inch-deep tiles are buried a foot below the surface, and water is injected through a patented distribution system at very low pressure into the trays. The water then wicks to the surface from the base of the trays. Installation is about double the cost of a conventional sprinkler system.

Evaporative Control Systems, invented by Jonas Sipaila in Reno, Nev., are specifically targeted for newly constructed golf and housing developments. "This isn't something that can be easily retrofitted," Leinauer said. "You really have to start from scratch."

Because of the cost and scope of installing subirrigation, Leinauer doesn't foresee its application over entire golf courses. But the method could be applied to high-profile areas like greens and specific fairways.

Leinauer admitted that subirrigation is "a little far out there, but part of our job is to look at where we can be." With the population continuing to grow in the Southwest, water conservation will remain a high priority for the foreseeable future, he said.

Scientists know that more than 90 percent of the water used by grass goes to transpirational cooling. In other words, the water evaporates from the leaves to keep the plant cool.

Leinauer's rolling green experiment is scheduled to run at least another 10 years to determine the long-term viability of irrigation systems. "Root intrusion and plugging are always a concern," he said. "The performance of the systems needs to be monitored."

Polypipe

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impacting the economy on both sides of the River, he said.

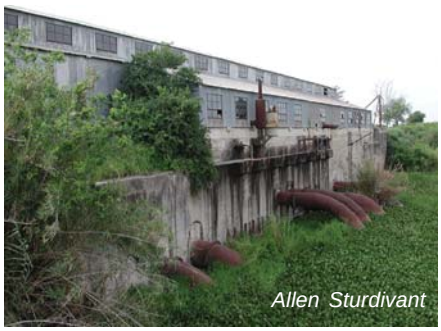
"I think we're going to do well," Hill said. "The only way I was able to do all of this is with the approval of the Bayview Irrigation District Board of Directors and through what the Texas Agricultural Experiment Station and Texas Cooperative Extension does as part of the Rio Grande Basin Initiative project to help provide the information, find where the water losses are occurring, and where water savings can be made. We could not have done this without the funding and technical support from the university through the Rio Grande Basin Initiative."

Modern Marvel Guarantees Water

New pumping plant saves energy and operating costs, controls water pumping

by
Jenna Smith

Old traditions are hard to break, yet a new tradition has begun in the Lower Rio Grande Valley. Cameron County, once the site of a worn, 100-year-old water pumping plant, has been given a facelift—a modern pumping facility that will more efficiently deliver water to agricultural, municipal and industrial customers serviced by Cameron County Irrigation District No. 2 (CCID#2), headquartered in San Benito and managed by Sonia Kaniger.



This 100-year-old water pumping plant in Cameron County was in need of modernizations to more efficiently conserve water.

Allen Sturdivant, Extension Associate at the Texas A&M Agricultural Research and Extension Center in Weslaco, and a team of Extension economists have analyzed the economics of water and energy savings that the modern CCID#2 will bring to South Texas. The analysis was funded as part of the Rio Grande Basin Initiative, which promotes efficient irrigation for water conservation.

Sturdivant said a computer model consistent with a program entitled Capital Budgeting was used to determine the economic efficiency of saving water with the new pumping plant. With infrastructure rehabilitation, water savings measures typically include any activity that can add to a region's water supply, such as reduced seepage and/or evaporation.

"The new pumping plant does not save water in a traditional sense," Sturdivant said. "Rather, it adds to the regional supply by allowing the diversion of additional 'no-charge' water from the Rio Grande. Otherwise, the excess flow would go into the Gulf."

"The modern facility has the flexibility to pump water at a slower rate, which lowers the volume of water being pushed through the facility."

"No-charge" refers to a temporary situation of excess water flow in the Rio Grande at "no charge" to the district's Watermaster-controlled allocation.

Using historical data and engineering calculations of the old pumping plant, the new plant will produce an annual energy savings of 791,386 kilowatt-hour (kwh), approximately $48,554, or 37,986,544 kwh over its expected 48-year life span.

Sturdivant said the energy efficiency of the new plant is due to its eight new, highly-efficient pumps, which consist of four different sizes that pump water at various rates.

"Since the new plant's existence, canals have been lined, leaky reservoirs have been repaired and pumping has been better metered."

"The modern facility has the flexibility to pump water at a slower rate, which lowers the volume of water being pushed through the facility," Sturdivant said. "Greater pumping control allows the management team to more efficiently regulate the water supply."

Bill Norris, president of NRS Consulting Engineers, oversaw the bidding and construction phases of the project.

"The new pumping plant was designed to help manage the canal rehabilitation and interconnect project," Norris said. "Since the new plant's existence, canals have been lined, leaky reservoirs

This new pumping plant is equipped with eight highly-efficient pumps, which consist of four different sizes that pump water at various rates.

have been repaired and pumping has been better metered."

Norris said Cameron County Irrigation District No. 6 has plans to build a new pumping plant as well.

The new plant is now the third largest pumping facility in the Valley and provides water to over 57,000 acres of farmland and to the cities of San Benito and Rio Hondo.

Prior to the plant's opening in February, Sturdivant and his team determined the cost of saving water from the plant to be $119.41 per acre-foot of water. Key factors used in arriving at this value included the initial construction cost, the reduced energy and operations and maintenance costs, and the expected useful life. The new plant will also save $431,195 each year in anticipated operations and maintenance costs, and $48,554 in energy costs.

"One thing is for sure—the new pumping plant guarantees its customer base a consistent and dependable water supply for years to come," Sturdivant said. "Kudos to Sonia Kaniger, Bill Norris and others for making the new plant a reality for the rapidly expanding Lower Rio Grande Valley."

Faces of RGBI

Right-hand to the RGBI project

by
B.L. Harris

Most of you have probably heard of or been in contact with Danielle Supercinski, but now you can put a face with the name. Danielle began working for the Texas Water Resources Institute this past February, specifically on the Rio Grande Basin Initiative project.

Danielle is continuing in her relatively new role as our "right hand" on the RGBI project. She is directly involved in collecting information about programs, progress, outcomes and pictures. Her goal is to maintain visibility for efforts of scientists, Extension personnel, and the cooperation and collaboration of the RGBI as a whole.

If you have any big events coming up, newsworthy information regarding your project, or anything else related to the RGBI (think **Outcomes**), Danielle is the one to contact about it.

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

Through Extension and research efforts, the Texas A&M University System Agriculture Program and the New Mexico State University College of Agriculture and Home Economics are implementing strategies for meeting present and future water demand 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.

Rio Grande Basin Initiative Outcomes
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