Irrigation Leader

VOLUME 13 ISSUE 5

MAY 2022

NEW ZEALAND EDITION

Mayor Neil Brown: Navigating Irrigated Agriculture in New Zealand's Ashburton District

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Do you have a story idea for an upcoming issue? Contact our editor-in-chief, Kris Polly, at kris.polly@waterstrategies.com.

Irrigation Leader

NEW ZEALAND EDITION

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Irrigation Leader is published 10 times a year with combined issues for July/August and November/December by

WATER STRATEGIES LLC
an American company established in 2009.

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ADVERTISING:
Irrigation Leader accepts half-page and full-page ads. For more information on rates and placement, please contact Kris Polly at (703) 517-3962 or kris.polly@waterstrategies.com.

CIRCULATION:
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COVER PHOTO:
Neil Brown, Mayor, Ashburton District.
Photo courtesy of Ashburton District.

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Planning for the Future of Ashburton

By Kris Polly

Ashburton District's rich soil and abundant water make it an agricultural powerhouse, but those resources must be carefully husbanded to ensure economic success and environmental protection. In this month's cover story, district Mayor Neil Brown discusses Ashburton's farming prowess as well as the challenges posed by regulation, climate change, and nitrate leaching.

We also learn about several new developments in horticulture. First, we speak with Mathias Levarek, the CEO of Agrotonomy, which manufactures aeroponic tower farms that drizzle plant roots with nutrients and water. Next, we speak with Dr. Trentee Bush, Jill Heemstra, and Richard M. Wright of Northeast Community College about its Horticulture and Golf Course Management program, which includes significant in-field learning opportunities. Then, we talk to John Scholten, a product specialist at LiveRoof, about its green roofs, which absorb and store storm water, provide desirable green spaces, and can even grow vegetables.

Chris Roth, the president of Reinke Manufacturing, tells us about some of the company's recent technical advances, from the installation of a laser tower for metalworking to the ReinCoat galvanizing process.

John Berge, the new executive director of the Farm Service Agency (FSA) for Nebraska, is a Nebraska native and the former general manager of the North Platte Natural Resources District. We speak with him about current trends in Nebraska agriculture and how the FSA can help farmers.

Rubicon Water, which creates water management solutions based around automated canal gates, is increasing its presence in Latin America. Jorge Ramírez Contreras, Rubicon's marketing coordinator for Latin America, tells us about how the company is expanding from Chile to Argentina and Costa Rica.

Shon Rae, the former assistant manager of the Central Oregon Irrigation District, now works in operations at Oregon Spirit Distillers, which uses pure local water and irrigated crops as important inputs.

Important progress is being made in unconventional horticultural settings, increasing our food supply and strengthening food security. We are glad to bring you the stories of some of the innovators in this field this month. IL

Kris Polly is the editor-in-chief of Irrigation Leader *magazine and the president of Water Strategies LLC, a government relations firm he began in February 2009 for the purpose of representing and guiding water, power, and agricultural entities in their dealings with Congress, the Bureau of Reclamation, and other federal government agencies. He may be contacted at kris.polly@waterstrategies.com.*

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-Melanie Brooks, CEO, MHV Water, New Zealand

Mayor Neil Brown: Navigating Irrigated Agriculture in New Zealand's Ashburton District

The Rangitata Diversion Race.

With its rich soil and abundant water, New Zealand's Ashburton District has a thriving economy based on dairy farming and crop production. The 67-kilometer (42-mile) Rangitata Diversion Race is an irrigation and power generation scheme that diverts water from the Rangitata River to irrigate the district's farmlands. In this interview, dairy farmer and district Mayor Neil Brown talks about local farmers' contributions as well as their challenges, such as how to prevent nitrates from leaching into the aquifer.

Irrigation Leader: Please tell us about your background and how you came to be in your current position.

Mayor Brown: I've lived in Ashburton District all my life. I went to Lincoln University and achieved diplomas in agriculture and farm management. I started off as an employee on a dairy farm and worked my up through the share milking system in New Zealand to eventually become the owner of my own dairy farms. In 2004, I decided to start giving back to the community and the district that had been so good to me. When the elections came around that year, I made the decision to put my name forward for election, and that became the start of my political career. I was elected to the council and remained a councillor until 2016, when I became the deputy mayor. In 2019, I was elected mayor.

Irrigation Leader: How has your experience being an irrigating farmer informed your role as mayor?

Mayor Brown: It makes me aware of the responsibility of using irrigation sustainably. Water is a valuable resource. While we have a plentiful supply in Canterbury Region, we are mindful of responsible usage. We certainly don't want to waste it by irrigating unnecessarily, and to avoid that, we use technology such as water and soil moisture meters, rainfall data, and weather forecasting. This information assists us to know when and how much to irrigate. Excess irrigation causes nitrogen to leach into our underground aquifers; we are trying to reduce that.

Irrigation Leader: Please tell us about Ashburton District.

Mayor Brown: We have a population of 35,000. Half the population lives in the Ashburton town, and the other half lives in rural areas. Agriculture is the main industry, and dairy and dairy support make up half of that. We also have many arable farmers who grow crops such as beetroot, carrots, and radishes for their seed. We also have a major food-processing factory in this district, which processes the carrot, corn, pea, and potato crops. Alongside the arable industry, we have a meat-manufacturing plant that processes lamb and beef. There is also a feedlot that fattens approximately 50,000 cattle a year. All of these products are then exported.

The businesses of the Ashburton township and its outlying rural townships rely on farmers to purchase supplies from them. Tourism is also part of our economy,

PHOTOS COURTESY OF ASHBURTON DISTRICT.

albeit minor; we have one of the main skiing locations in New Zealand, Mt. Hutt, on our back doorstep.

Irrigation Leader: Please tell us about the district's irrigation systems.

Mayor Brown: We have a lot of center-pivot irrigators in the district, so we have several irrigation companies that maintain the pivot irrigators, pumps, mainlines, and other infrastructure. Servicing this infrastructure is a major source of employment in the district.

We have a big irrigation canal, the Rangitata Diversion Race, that takes water from the Rangitata River. The purpose of this canal is to deliver a maximum of 34 cubic meters (1,200 cubic feet) per second of water from the Rangitata River to the three irrigation schemes located along the canal. These schemes then deliver the water to the farmers to irrigate an area of approximately 100,000 hectares. This delivery occurs through both open ditches and piped systems. The fall of the Canterbury Plains creates enough pressure to run the water in pipes without needing pumps. During the wintertime or when irrigation is not needed, the water is sent through to the Rakaia River, where it is used to generate electricity. The Rangitata Diversion Race was built in the 1940s during the Great Depression, and it was one of the best things that our forefathers did. It is the cornerstone of Ashburton District irrigation.

Irrigation Leader: What are the main irrigated crops?

Mayor Brown: Barley, clover, oats, pasture, peas, wheat, and processed and small seed crops. I am sure that with climate change, other crops that we don't grow yet will be tried. We have 300–450 millimeters (12–18 inches) of soil that is sitting on top of hundreds of meters of shingle. It is so versatile that it lends itself to growing almost anything. In most areas, it is free draining, which makes it good for cultivation and stock but detrimental for the leaching of nutrients.

Irrigation Leader: What are the main concerns relating to water in Ashburton?

Mayor Brown: Its long-term availability. Who knows what a government will do to change the availability and allocation of water? The water is reasonably reliable at the moment, and irrigation allows us to meet reasonably consistent production targets every year. The only thing that could possibly affect us is a natural disaster, such as a wind, snow, or flood event.

Climate change is always in the back of our minds. Climate-change scientists are telling us that there will be a greater likelihood of higher rainfall events in the high country, higher flows in our rivers, and a drier climate. If climate change reduces the flow of water in the rivers, that would affect the reliability of our irrigation. We may have to mitigate that by building water storage. We currently have a project underway to store 53 million cubic meters (42,968 acre feet) of water supplied from the Rangitata Diversion Race. This water will be stored when it is not needed for irrigation. This storage pond is permitted, and if

Center-pivot irrigation in Ashburton District.

there is a willingness to build it, it will probably happen in the next 5 years or so. It's an expensive project, but it may be needed to mitigate climate change.

Irrigation Leader: Who would build and own that storage structure?

Cattle graze along the Rangitata Diversion Race.

Mayor Brown: It will probably be the irrigation companies. It's in the feasibility stage now, and irrigation companies are discussing who would like to build it and who will pay for it. The storage capacity might end up being less than 53 million cubic meters, depending on what the demand for the storage is and who has the ability to pay for it. It could even be funded by private investors.

Irrigation Leader: What sort of obligations are local farmers under to ensure that their operations are sustainable and environmentally friendly?

Mayor Brown: We've got a national policy statement for freshwater management that sets a nitrate-nitrogen level of 2.4 milligrams per liter of water (2.4 parts per million). If you farm, you must have a Farm Environment Plan (FEP) with a nutrient budget attached. A computer program called Overseer calculates how many nutrients you leach from your property. The FEP has been around for approximately 5 years, and farmers are still coming to terms with it. The minister of the environment says that the farmers have a generation—which is suggested to be up to 40 years—to reach the 2.4 milligrams/liter level. This is going to be hard to achieve, but farmers are making progress. It will require research and development, but hopefully in the years to come, scientific methods will be developed to eliminate nutrient leaching down to the acceptable level. As an example, managed aquifer recharge is one of the methods being used to achieve this goal.

Irrigation Leader: Is there a good understanding between farmers and urban dwellers in Ashburton District?

Mayor Brown: In Ashburton District, there generally is. Most of the people in Ashburton District are connected with farmers, because their income comes directly or indirectly from farming. Nationally, urban dwellers don't have a great understanding of what farmers are doing. Media reports point the finger at farmers and say they are polluters and that the waterways are polluted because of farming, particularly dairy farming. But farmers do a lot of work to prevent pollution, including riparian planting and the fencing of streams and waterways to keep stock out of these areas, and generally these efforts are not acknowledged. Farmers have held a few protests lately to show their displeasure to the government. One of the slogans of the protests is, "No farmers, no food." Some city people think their food comes from the supermarket, not from the farmer.

During the COVID-19 pandemic, huge amounts of money have been spent on wage subsidies all over the country. But farmers have carried on working right through the pandemic. The export earnings they produce will help pay back the debt that the government is accumulating. Some 95 percent of the produce that comes out of New Zealand is exported. Agricultural exports earn $80–$100 billion, which is a reasonable percentage of our gross domestic product.

Irrigation Leader: Is there anything you would like to add?

Mayor Brown: I think the national and regional governments need to be more understanding of the farmers. They are doing a lot environmentally that does not appear to be recognized. The policymakers need to talk to the farmers at the grassroots level and hear what they have to say. Farmers need to farm and not get bogged down in bureaucracy.

Irrigation Leader: What is your vision for the future of Ashburton District?

Mayor Brown: To allow the district to flourish and provide an inviting place to work, live, and play for the betterment of all its residents. IL

Neil Brown is the mayor of Ashburton District. He can be contacted at info@adc.govt.nz.

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Mathias Levarek: Agrotonomy's Aeroponic Vertical Farming Solutions

Mathias Levarek with produce grown in Agrotonomy towers.

Agrotonomy markets and builds vertical farming towers for clients around the world. Its simple technology drizzles a water-nutrient mixture over the roots of 20–50 plants per tower, allowing them to absorb exactly as much as they need. The towers can be deployed in commercial greenhouses, on rooftops, and outside. In this interview, Agrotonomy CEO Mathias Levarek tells Irrigation Leader *about the benefits of Agrotonomy's solution.*

Irrigation Leader: Please tell us about your background and how you came to be in your current position.

Mathias Levarek: Before getting involved in the vertical farming industry, I was involved in organic farming as well as information technology (IT). My work in IT financed much of my farming operations at that time. About 10 years ago, I exited the organic farming world and was looking for a solution for urban farming; I was living in Amsterdam at that point, having just moved from Hawaii. In my search, I came across tower garden technology, which at the time was mainly on the commercial side and hadn't made its way into the residential market. Over the next few years, I became involved in hydroponic farming. Hydroponic vegetables look beautiful and can be calibrated to grow throughout the year, but are uniform in taste and texture, which is a downside.

When I returned to the farming world, I came across aeroponic tower technology. Initially, I was somewhat skeptical because aeroponics is in the hydroponic family. My main interest was the fact that the nutrient density was substantially higher in aeroponics, which led me to adopt it in my own home. Since my family eats mainly plant-based foods at home, the higher nutrient density

PHOTOS COURTESY OF AGROTONOMY.

that this technology could provide was enticing. I asked several inventors in the United States to take a chance on me and let me work alongside them, but I was initially unsuccessful. Then, I visited a tower farm in Sedona, Arizona, and met with the inventor. I was blown away. The tower farming solution saved 95 percent of the water and 90 percent of the space required by other methods, and the main perk, which I saw right away, was that it was the only agricultural technology that could deliver professional results without the owner having any professional experience. It's simple and easy for me to set up for people around the world. Most of my clients don't come from the farming industry, but they want to learn more about sustainable farming with a lower carbon footprint. We have tower farm projects all over the world, including in the Middle East, Southeast Asia, the Maasai Mara in Kenya, and Equatorial Guinea, to name a few. This technology makes that possible; conventional farming would not be an option in many of these cases.

Irrigation Leader: Please tell us about your company, Agrotonomy.

Mathias Levarek: Before becoming registered in Arizona, we were based in Spain and known under a different name, Ibiza Farms. Wanting to expand, we rebranded as Agrotonomy. Our company is small, with around 8 people, including agronomists, farmers, and people who do project development. We also have partnerships with different farms, so our extended team has around 30 people.

Irrigation Leader: Would you please describe how your technology works?

Mathias Levarek: It is an automated tower with its own irrigation system and nutrient dosing system, which supplies the right amount of nutrients and water to the plants on an as-needed basis. The system can be calibrated to the feeding needs of different plants. The towers are made of plastic but can withstand extreme temperatures. They are modular in size and can be up to 10 feet tall. The inside of the tower is hollow, and depending on the height, you can plant anywhere from 20 to 50 plants in each tower. The feeding mechanism is automated and turns on for 3 minutes and then off for 12 minutes. It drizzles a water-nutrient mixture from the top of the tower, providing the plants with the right amount of water and nutrients. The mixture goes up the tower and drips back down to the bottom reservoir, which contains 20–25 gallons. It is effortless to operate and manage.

Oxygen is the key for nutrient delivery at the root level. In regular hydroponics, the roots are immersed in a substrate and covered with water, whereas in aeroponics, the roots are hanging in the air and always have 100 percent availability of oxygen. This changes everything about nutrient absorption.

Strawberries are harvested from an Agrotonomy tower.

The plants can absorb the amount of nutrients they need. Another incredible facet of this technology is that unlike hydroponics, which requires different nutrient formulas for rooting, vegetating, budding, and flowering, aeroponics uses one formula that adjusts based on what the plant needs. The device is also LEED approved.

Irrigation Leader: Are these towers almost always placed within greenhouses, or do people keep them outside?

Mathias Levarek: We have people using them in every scenario. We have them in commercial, climate-controlled greenhouses; indoors with artificial lights; on rooftops; and outside. Some of our towers have been used outside for 10 years.

Irrigation Leader: It sounds like your technology has been adopted in many areas around the world. Do you see any untapped markets where you think your product could help?

Agrotonomy towers in a greenhouse setting.

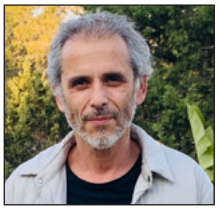
Mathias Levarek: Yes, there are some markets in which I would like to see our product in the future. For example, it would be great to implement this technology in places like retirement homes so that older folks can work with plants. Our technology doesn't require any chemicals, it's clean, and it doesn't require much energy on the part of the operator. I think it would bring joy to the elderly, allowing them to connect with plants from seedlings to the full, mature plant as if they were in a real garden. I also feel that the towers should be in more schools around the country. Around 1,000 schools in the United States alone already have farming towers, but there can always be more. Lots of kids don't know how food grows, and I also think that these towers can inspire children to invent the technology of tomorrow.

Irrigation Leader: What can you tell us about the energy demand of running these towers?

Mathias Levarek: The energy demand is low: Each tower requires about 55 watts and runs for about 12 minutes per hour, or around 5 hours per day. That amounts to around 270 watts—that is less than what is used by an office aquarium that runs 24 hours a day. Many of our systems, including our operation in Arizona, are 100 percent reliant upon solar energy, and most of our projects in Africa are fully off the grid.

Irrigation Leader: What is your vision for the future?

Mathias Levarek: Business is expanding quickly in the agricultural manufacturing world, since many people fear for the future. I don't really like seeing an increase in business based on fear, but that fear is making people a little more conscious about the subject of food security and is ultimately giving them more autonomy to do something about it. My hope is that efforts related to matters of food security are sustained past the pandemic. The vision I have for myself is to continue doing my work, one project at a time, around the world. IL



Mathias Levarek is the CEO of Agrotonomy. For more on Agrotonomy, visit agrotonomy.com.

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Advancing Horticulture Careers at Northeast Community College

Richard Wright teaches students about irrigation equipment in the field.

Sure, students in Northeast Community College's Horticulture and Golf Course Management program learn about soil science in the classroom. But they also get out in the field and get their hands in the dirt. The result? A pipeline of young people who are prepared to take jobs in fields such as landscaping and golf course maintenance. Irrigation Leader *spoke with a horticulture and agriculture instructor, Dr. Trentee Bush, a horticulture adjunct instructor, Richard M. Wright, and the ag program director, Jill Heemstra, about the program's curriculum and goals.*

Irrigation Leader: Please tell us about your backgrounds and how you came to be involved with this program.

Trentee Bush: I grew up on a family ranch north of Whitman, Nebraska. I have a bachelor's degree in landscape design and a master's in public horticulture administration, both from the University of Nebraska, and a PhD in educational administration. For 9 years, I taught at the Nebraska College of Technical Agriculture in Curtis. For the last 3 years, I've been here at Northeast Community College in Norfolk, teaching in the horticulture and agriculture departments.

Richard M. Wright: I'm from Omaha, Nebraska. I went to work for some friends doing turf irrigation about 46 years ago. I went out on my own about 44 years ago and have done everything in turf irrigation, from drip to golf courses. I still work at my own business, the Sprinkler Company, and I am an adjunct faculty member at Northeast.

Jill Heemstra: I got my bachelor's and master's degrees in animal science at South Dakota State University, then came to Nebraska and worked as an extension agent. At first, I was in a traditional county-based role, focusing on farm management with an emphasis on small farms. Then, I moved into a grant-funded position, which was a less-traditional extension role. I did a lot of program and curriculum development and worked on manure management, water quality, and nutrient management issues. I did that for about 20 years, and about a month ago, I started here at Northeast Community College as the director of the agricultural program.

Irrigation Leader: Would you tell us about Northeast Community College and the Horticulture and Golf Course Management program?

PHOTOS COURTESY OF NORTHEAST COMMUNITY COLLEGE.

Trentee Bush: Northeast Community College services 20 counties in northeastern Nebraska. We have several satellite campuses. We have about 3,000 full-time students. Most of them come from this region, but we also have students from out of state. Northeast Community College has partnerships with many colleges and universities in Nebraska. We work with Wayne State College and the University of Nebraska on a variety of things. We also have partnerships outside the state, including with Northwest Missouri State University and South Dakota State University.

The Horticulture and Golf Course Management program offers a 2-year associate of science degree in general horticulture. The horticulture program has gone through several revisions since it was established in 1986. In the last 2–3 years, we've tried to make it a more general program. Our intention is to give students a broad background so that they can work in any area of horticulture. Horticulture students rarely go on to a 4-year program because there are so many job opportunities for people with a 2-year degree. Most of them would rather work.

Irrigation Leader: What are some typical employment opportunities for your students?

Trentee Bush: In the past few years, many of our students have found work as superintendents or assistants at golf courses. Others work for arborists or landscape companies, and some own their own businesses. We have some at lawn-chemical-application companies. Most of our students end up staying in our 20-county northeastern Nebraska area, because that's where they are from.

Jill Heemstra: More than 90 percent of the students who study in Northeast's agriculture and horticulture programs get jobs in areas related to their program of study.

Irrigation Leader: What are some of the things they learn in the 2-year program?

Trentee Bush: Our program has three classes on turf as well as classes on irrigation, nurseries and greenhouses, plant identification, landscape design, and landscape management. Students also learn basic horticulture science and soil science as well as writing, math, and interpersonal skills.

In addition to our traditional horticulture program, a year ago we started a program called *urban agriculture*. The COVID-19 pandemic showed us that many people do not know how to grow their own food. We wanted to capitalize on that and also get back to the basics. As part of this program, we have a 10-acre demonstration urban farm. We will have an outdoor classroom and work with beehives and raised beds. Mr. Wright will help us create a low-flow irrigation system to teach growers how to water carefully. We hope to eventually grow some grapes and orchard trees and maybe some hops. We

Richard Wright teaches students about irrigation equipment in the classroom.

want it to be an edible landscape with lots of perennials in it. We are still in phase 1, but we have big dreams!

Jill Heemstra: We also hope that, in this space, we can engage with people beyond our traditional students. We are interested in engaging the community by serving adult learners and by having daycares and teachers bring their classes to the space. We may even build a community garden.

Irrigation Leader: What do you teach your students about irrigation?

Richard M. Wright: Right now, our students are completing a residential irrigation plan, and we'll walk through several different components. We've talked about different sprinkler heads, mainly with regard to their capabilities and limitations. I'm impressed to see the students dive right into the project. This spring, we'll give students an opportunity to do some hands-on work with the college's irrigation system, and we'll get them to the golf course. They will also do some outside work installing and repairing pipe, including polyethylene and high-density polyethylene, or HDPE, pipe. That way, they'll know what they're looking at when they go out to do repairs on these systems.

Irrigation Leader: Do the students also study pumps, such as the ones used on golf courses?

Richard M. Wright: Absolutely. That's one of my fortes: everything it takes to get water on and off the ground. One of my big pushes now is variable-frequency drives. If we can use variable-frequency drives to apply only the water we need, we end up with smarter applications at all sites.

Irrigation Leader: In the municipal water world, we're seeing a trend toward using more natural systems for capturing and treating runoff. Does your program focus on that at all?

Trentee Bush: We do know that some water issues are starting to affect both the rural and the urban environments, and we're seeing some challenges related to storm water quality and quantity. We talk about storm water management in our landscape management class. It is usually a new term for the students at that point. They really haven't thought about where their residential water ends up. I think that is certainly an area in which we recognize that both our agriculture and horticulture departments need to grow, because we see a lot of people farming close to cities. They may even be on an urban water system.

Richard M. Wright: We've been fortunate in this state to have abundant water, but the supply is not endless. We're in the early stages of education on water reclamation and helping people understand that we can't just use a million gallons when it only takes one. We need to start talking more about conservation and recapturing our usage.

Jill Heemstra: In agriculture, we've seen a push toward the use of low-flow sprinkler heads and water sensors. It's interesting to see the conserve-and-reuse approach being promoted in urban and residential areas as well. There's been a shift in mindset over the 20 years during which I've been in Nebraska.

Irrigation Leader: How much is tuition at Northeast, and how many credit hours are required for the 2-year degree?

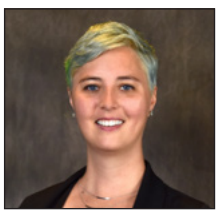
Trentee Bush: The in-state tuition is currently $105 per credit-hour, and the out-of-state tuition is $147 per credit-hour. The associate of applied science degree requires about 65 credit hours, and that will be shifting closer to 60 in the next year or so. It's a great program, but we only have 2 years to teach the students in it everything they need to know.

Irrigation Leader: Do your students do internships?

Trentee Bush: Students do an internship in the summer between their first and second years. They can work anywhere they want, but we encourage them to branch out beyond their own communities. They can go anywhere in the world to get an idea of how water usage differs between places. We recommend that students who are interested in golf course management work go outside the Midwest, because water availability and requirements are so different everywhere else.

Richard M. Wright: Yes—even the grasses are different. A big challenge for somebody from Nebraska who goes to the West Coast or Florida is that they've never seen zoysia. They don't know what that type of grass is. It's important to get them acclimated to other environments.

Jill Heemstra: Dr. Bush engages with industry leaders to make sure that we're being responsive to industry needs and that our students have the skills they need to fill jobs. We find out what the emergent issues are and build instruction on them into our programs. Northeast is also very student centered, and it works hard to ensure that the program is focused on their interests, their future, and what they can do with what they learn here. IL



Dr. Trentee Bush is a horticulture and agriculture instructor at Northeast Community College. Jill Heemstra is the director of agriculture. Richard M. Wright is an adjunct irrigation instructor. To find out more about the program, contact Dr. Bush at trentee@northeast.edu.

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John Scholten of LiveRoof: Designing Green Roofs for Water Retention and Rooftop Horticulture

The green roof at the Frederik Meijer Gardens and Sculpture Park was a joint effort among the owners, the architects, and LiveRoof.

They absorb storm water and transform heat traps into flourishing rooftop gardens. They create desirable green spaces in urban buildings where people live and work. What's not to like about green roofs? Irrigation Leader *spoke with John Scholten of LiveRoof about what it takes to design a green roof that thrives.*

Irrigation Leader: Please tell us about your background and how you came to be in your current position.

John Scholten: I got my degree in horticulture and then worked in a research facility for a large flower-seed company in California. I did a lot of traveling and promoting products for the company. When I started my own family, I stepped back from all that traveling and started to look at other opportunities. I moved back to Michigan, where I was born and raised. Fifteen years ago, LiveRoof started here, and I was one of the company's first employees.

Irrigation Leader: Please introduce LiveRoof.

John Scholten: The parent company of LiveRoof is Hortech, a perennial plant nursery that services independent garden centers and landscapers in the Midwest. Our introduction to green roofs came about 20 years ago, when Ford Motor Company put a green roof on its River Rouge truck plant. It purchased plants from us and consulted with us on plant selection. After that, we started increasing our plant selections for green roofs and supplying plugs for built-in-place green roofs. Then, a landscape contractor in Chicago that was installing green roofs asked our owner, David McKenzie, if there was a better way of creating green roofs. Mr. McKenzie spent a day with the contractor to see how it was doing built-in-place and other tray systems. On his drive back, he figured out in his head how LiveRoof would work.

Once a green roof is established, it's easy to take care of; it's the establishment that's the hard part. The roof environment is too harsh to grow plants in the summertime. A black membrane roof can have temperatures of 130 degrees, and once plants get above 90 degrees, they start to shut down. We needed to grow the green roof at a nursery and then bring it to the roof when the plants were fully established. That was the idea behind LiveRoof. We worked on some patents for our module design, which is different from other module systems on the market.

Irrigation Leader: Why are more builders and architects getting interested in green roofs? Is the appeal mostly aesthetic, or is it to retain water?

PHOTOS COURTESY OF LIVEROOF.

A vegetable garden on the roof of a transit station.

John Scholten: All the above. Green roofs offer great benefits for both commercial and residential properties. Some cities with major storm water issues have set up their building codes to promote green roofs to help them manage storm water. Some places require builders to contain all the water that originally fell on that piece of property. Green roofs are valuable tools for achieving that goal. Over the years, some poor green roofs were installed on buildings in response to mandates, but cities have wised up to that. They're doing inspections to make sure that the green roofs are maintained and are doing what they're supposed to do. Green roofs can serve other purposes, too. One residential client with a flat-roofed house didn't like to hear the rain, so we put in a green roof. It made the house much quieter, and it also stayed cooler in the summer.

Irrigation Leader: Would you describe the modules and how they work?

John Scholten: Until we entered the market 15 years ago, most module trays were not being developed by horticulturists, but by people in the roofing industry. Since storm water management is one of the aims of green roofs, roofers were trying to figure out how they could store more water. Some of the early trays had drain holes located a half-inch from the bottom of the modules so that water would be stored in the bottom, which did more damage than good because the plants were frequently overwatered. It doesn't make a lot of sense from a horticulture standpoint to store water in the soil, because you're going to open yourself to diseases and other problems. Our tray is designed so that all the drainage is at the bottom of the module. Our module system has what we call *positive drainage*. Any water that does not get soaked up by the plants and the soil exits the system and goes to the roof drains, just like it would normally.

Irrigation Leader: What kind of plants can be grown on green roofs?

John Scholten: When we first started out, we were growing predominantly sedums in our standard tray, which is a 4¼-inch-deep system. A 4-inch system is standard in the industry. As architects have gotten more comfortable with green roofs, they have wanted more grasses, perennials, and other plants that require deeper soil, so we introduced a 6-inch module, and we now also have an 8-inch module. The natural progression from that was to ask whether we could grow vegetables on a roof. About 8 years ago, we had a commercial client that wanted to have a vegetable garden as a part of its larger sedum LiveRoof, so that was our first trial. The soil that we normally use in a green roof is highly inorganic—ideally, for a green roof you want 90 percent inorganic soil or more—but to provide adequate nutrition to a vegetable garden, you need organic soil. The problem is that as organic soil decomposes, it settles and compacts, which impedes drainage. Our solution was to take an engineered green-roof soil and mix it at about a 50-50 ratio with a more conventional potting soil that contains peat and other compost.

Irrigation Leader: If the organic soil compacts gradually, do you need to top up the soil periodically?

John Scholten: You may have to add some different products over the long term. We recommend doing a soil analysis, which will tell you the porosity of the soil and whether you need to add anything. We've worked with the 50-50 mix of soils for multiple years, and it works well. Since leaves and other organic materials remain, you may have to mix in more of the inorganic engineered soil to keep it close to the 50-50 ratio that is suitable for growing vegetables.

Irrigation Leader: What kind of vegetables can be grown in green roofs?

John Scholten: Beans, herbs, lettuce, peppers, spinach, and tomatoes do well. Taller vegetables, such as corn, would not work as well because of the small amount of soil. Even with tomatoes, it's wise to choose smaller varieties, because you're only dealing with 6–8 inches of soil, which may not be sufficient for a plant that's 3–5 feet tall. Beans and row vegetables are prime candidates for rooftops. We always tell people to grow the things that are more difficult to find in stores, so that they are using this valuable space to grow vegetables that they really want.

Irrigation Leader: What kinds of irrigation systems might your clients use for vegetable gardens on the roof?

John Scholten: Simple fan systems work well. They are available at most stores. It is best to hook up a simple hose timer to water the roof on a regular basis.

Irrigation Leader: Would you tell us about a successful project that your company has been involved with?

John Scholten: One project I can tell you about that incorporated vegetables was for the Interurban Transit Partnership in Grand Rapids, Michigan, which had green roofs and a walking track for exercise above its bus garages. To promote healthy lifestyles, it incorporated a vegetable garden. The vegetable garden didn't get used enough, so the organization eventually discontinued it, but that shows how easy it is to incorporate vegetables in a green roof.

The other one I'm familiar with is at a corporate center in Chicago. The owner was really into vegetables. As far as I know, he still grows vegetables in his green roof every year. He loves the types of tomatoes and peppers that may be harder to source throughout the year.

We have provided thousands of successful LiveRoofs across North America. Many are sedum roofs, but each year, we do more roofs with ornamental grasses and perennials. One of them, a joint effort among the architects, owners, and LiveRoof, was the Frederik Meijer Gardens and Sculpture Park. We worked together to develop different plant mixes in the design so that it would have blooming plants all season long.

Irrigation Leader: What characteristics do you look for in determining whether a roof is suitable for a LiveRoof system?

John Scholten: The first thing we need to know about an existing roof is its loading capacity, as you don't want to overload a roof. For a 6-inch system that can grow vegetables, you're going to need an additional 50 pounds per square foot dead load available to avoid any problems. Typically, our systems are installed on a flat roof, or what we call a low-slope roof, to allow for adequate drainage. For roofs that are used as amenity spaces, you would need an additional 100 pounds per square foot live load.

Irrigation Leader: Would you tell us about your RoofBlue RETAIN system?

John Scholten: As I mentioned, one of the reasons green roofs are popular is their ability to absorb storm water. Since storing storm water in the soil isn't right from a horticultural standpoint, we developed the RETAIN system module to help with storage, but we also wanted to have the water available for the plants to use, so that's why there is a wick in the module. The RETAIN module stores excess storm water below the vegetated module, away from the soil, and later wicks it up into the plants' root system. When paired with the LiveRoof Standard System, the RETAIN system can increase storm water retention by 42 percent compared to the vegetated module alone. We're doing testing this summer to figure out the extra benefits in terms of lowered irrigation that would be realized when plants are actively growing in the middle of the summer. We are trying to figure out how much water we're going to save by using the RETAIN module for less-frequent irrigation cycles. We know it holds a lot more storm water over the entire year, but we also want to know the advantages in terms of lowered irrigation needs.

Irrigation Leader: What is your vision for the future?

John Scholten: I think this pandemic has shown that people thrive when they're in natural spaces. People want to live and work in buildings that offer outdoor spaces, especially in urban areas. When we incorporate plants into those outside spaces, people are happier, healthier, and more productive. I think we're going to see many more green roofs in the future. IL

John Scholten is a product specialist at LiveRoof. He can be contacted at john@liveroof.com.

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DIG DEEP

President Chris Roth of Reinke Irrigation on Tradition and Innovation

Reinke's new laser in action.

A tower leg component, cut by laser.

From the world's first reversible electric-drive center pivot to the newest electronic swing arm used to improve precision irrigation on corners, Nebraska-based Reinke Manufacturing has been an irrigation innovator since 1954. In this interview, Reinke President Chris Roth tells Irrigation Leader *about the company's proud history and its innovative new irrigation solutions.*

Irrigation Leader: Please tell us about your background and how you came to be in your current position.

Chris Roth: I was born and raised in Callaway, Nebraska, on the southern edge of the Sandhills. I come from a farming background. I got a degree in accounting at the University of Nebraska–Lincoln and went on to work at the Nebraska business unit of KPMG for 5 years. Reinke was one of my clients, so I got to know the company, the management, the manufacturing people, and the area. Deshler, where Reinke is based, is a small community, and it felt a lot like Callaway, where my wife and I grew up. I joined Reinke in 1996, and we moved to Deshler and have been here ever since. As president of the company, my role is to keep the organization moving forward strategically and effectively while making sure that we are competitive in the irrigation space.

Irrigation Leader: Please tell us about Reinke as a company.

Chris Roth: Established in 1954, Reinke has focused on quality, service, and innovation to make the lives of growers easier in more than 40 countries around the world. As the largest privately held maker of center-pivot and lateral-move irrigation systems, we've developed products to increase productivity for growers while providing labor savings and improved sustainability to help them conserve resources so they can grow more with less. Reinke has a network of dealers dedicated to helping our customers with their irrigation needs—dealers who are committed to working on everything from custom design and installation to making sure the irrigation systems they sell perform as expected, year after year. We understand how important qualified service technicians are to growers. Our dealers commit to having their employees participate in Reinke's extensive technical service training programs, allowing us to consistently build upon the level of service capabilities they provide.

Irrigation Leader: How has Reinke improved its products in recent years?

Chris Roth: A few years ago, we released our patent-pending electronic swing arm corner, which has won multiple awards. The product was designed to make irrigation more uniform and efficient, increasing yields while conserving water. A series of algorithms that work with GPS allows the swinging corner to know exactly where it is. To prevent under- or overwatering, valves turn on or off to make sure that water is applied uniformly.

Irrigation Leader: Would you tell us about your new laser units?

Chris Roth: The first pivots were made in two rooms in the original Reinke manufacturing building in 1967. Now, literally 10 feet away, we've got beautiful, brand-new lasers that are helping us serve the next generation of farmers.

Most manufacturers are having issues trying to get steel into their facilities. We recently installed two large laser units with a tower that automatically feeds material into our lasers. It is programmed to know the size and the thickness of the steel that we need to manufacture at that point. This allows for much quicker setup and processing. If you're tight on inventory, you can do what you need and then move on to the next part that you need. Since it reduces setup time so much, we can make something out of 3/8-inch material and

PHOTOS COURTESY OF REINKE.

then, within minutes, be working with ½-inch material, if that's what the product is.

The laser cutting process leaves no sharp edges, so you can run your bare hand across the end product. We don't have to do any smoothing—it's ready to go straight out. The entire process is very precise.

We also invested in a nitrogen generator. Lasers need nitrogen to make their cuts, and this generator allows us to use naturally occurring nitrogen, so we are creating our own gas rather than being dependent on a supplier to bring us commercial gas. The device filters the air next to the laser, removes the nitrogen, and compresses it. Afterward, the nitrogen is released back into the air. It's an environmentally conscious process.

Irrigation Leader: Would you tell us about your ReinCoat galvanizing process and how it differs from normal galvanizing dipping?

Chris Roth: Sometimes, folks think galvanizing is a very industrial process, and it is. But in our buildings, we have a negative vacuum that we use as our pretreatment area. That is where all the acid used to prepare the product to be galvanized is located. We pull air from the atmosphere and push it across the pretreatment and acid tanks, both of which are inside a building. We then run the air through an air filtration system so that when it leaves the facility, it's as clean as when it came in. We are careful about our manufacturing process from an environmental sustainability standpoint.

The other thing that sets us apart from a process standpoint is that we have thick concrete that is lined with an environmental barrier so that in the case of a catastrophic tank failure, we can capture and clean the contents and prevent them from getting into the soil or the water table.

Irrigation Leader: Is that design standard, or is that something Reinke came up with?

Chris Roth: We made an extra investment into the building that we use for the pretreatment acid area just to make sure that we were being smart and environmentally conscious about what we're putting into the water, soil, and air.

Irrigation Leader: Tell us about the people who work at Reinke.

Chris Roth: We're proud of our people. We have multiple multigenerational families working for us—spouses, fathers, mothers, sons, and daughters. We have people who have worked here for their entire careers. I think that is because we treat people with respect. They believe in our mission. We're working to solve large, global issues, like trying to feed billions of people while using less water.

Irrigation Leader: What should every irrigating farmer know about Reinke?

Chris Roth: We're constantly trying to think of ways to make life easier for farmers. We believe we make the world's finest irrigation systems. Our systems look a little different than the others, and that is by design. We manufacture stronger, lighter-weight machines with high-strength steel to reduce tracking in the field. When you're putting water out on the field, it gets a little bit muddy. We want to reduce the weight of the equipment so it performs well even in the toughest environments and to reduce rutting and soil compaction. Heavier equipment also puts a strain on the motors and gears, so making the equipment lighter helps it last longer. Another patent-pending product that we came out with a couple of years ago is a sleeve that sits inside the irrigation system bearing. Once our maintenance-free bearing is installed, you don't have to lubricate it anymore. Those are a few of the innovations that we've come up with just in the past few years to make life easier for farmers.

Irrigation Leader: Would you discuss recent supply chain issues and what you are doing to get pivots out in the fields faster?

Chris Roth: Besides the addition of the laser units, which will increase production in our Deshler facility, we've also expanded our distribution channels. In the United States, we have distribution centers in Georgia, Idaho, and Texas in addition to our Nebraska and Kansas manufacturing facilities. One of the primary reasons for that is to keep inventory closer to our farmers. If a customer in Georgia has a breakdown and we've got a product sitting in Georgia, they will get the product much faster than if we had to ship it from far away, especially with current trucking issues. Around the world, we've also built distribution centers in Argentina, Australia, China, Mexico, Romania, and South Africa.

Irrigation Leader: Is there anything you'd like to add?

Chris Roth: We're very active in our community. We're teaching students at the Nebraska College of Technical Agriculture how to service irrigation systems so they can go back and service small, rural communities. We have employees teaching welding at the local high school and coding for computer numerical control equipment at the junior high. We're also active with organizations like the Future Business Leaders of America, the Future Farmers of America, and 4-H. We want to make sure that we're giving back to the kids as best we can. IL

Chris Roth is president of Reinke Irrigation. He can be contacted at irrigation@reinke.com.

Investing in Farm Futures: John Berge of the Nebraska Farm Service Agency

John Berge, right, listens as Arapahoe-area producer Drew ten Bensel, left, explains the value of no-till methods and the negative impact of a recent wildfire on crop farming operations in south-central Nebraska. Standing at center-left is Nebraska FSA Furnas County Executive Director Dillon Breinig, and at center-right is Nebraska FSA Price Support Programs Chief Pat Lechner.

The U.S. Department of Agriculture (USDA) Farm Service Agency (FSA) provides price support, disaster support, conservation, and farm loan programs to agricultural producers in all 50 states and Puerto Rico. To learn more about the agency's current programs and its focus for the future, Irrigation Leader *spoke with a leader who brings decades of policy and hands-on agricultural experience to the table: the new FSA executive director for Nebraska, John Berge.*

Irrigation Leader: Please tell us about your background and how you came to be in your current position.

John Berge: I'm from western Nebraska and have lived here most of my life. I worked on agricultural issues for United States Senators Jim Exon, Bob Kerrey, and Ben Nelson here in Nebraska. Then, at the end of the Clinton administration, I spent some time at the FSA. I worked as the White House liaison to the USDA in the Obama administration and was later appointed acting assistant secretary of agriculture for congressional relations. I served as the FSA's deputy administrator for field operations before I moved back to Nebraska. Before I accepted the position of FSA state executive director for Nebraska, I spent about 9 years as the general manager of the North Platte Natural Resources District in Scottsbluff.

My career has been predominantly focused on agricultural policy, but that doesn't tell the whole story. My passion for this work goes back to growing up on a corn and wheat farm in western Nebraska. Our family fell victim to the farm crisis in the early 1980s, and in 1984, we lost a farm that had been in our family for seven generations. One of the defining moments of my life was walking with my dad around the farm that we were about to sell as he pointed out what we were keeping and what we were selling. That's why I chose this profession—to help others avoid this type of experience.

Irrigation Leader: Please introduce the FSA and its mission.

John Berge: The predominant mission of the FSA is to provide price support, disaster support, conservation, and farm loan opportunities for agricultural producers across the country. Here in Nebraska, we have 71 county offices and 412 employees, all of whom work together to administer programs that help our farmers and ranchers build, sustain, and grow their agricultural operations. For example, we implement disaster programs such as the Livestock Forage Program, farm loan programs, and the Conservation Reserve Program (CRP). The FSA employs around 10,000 people across the country and has a presence in all 50 states and the territory of Puerto Rico. Most of our employees either

PHOTOS COURTESY OF THE NEBRASKA FSA

John Berge, right, walks through a corn stubble field with Arapahoe-area producer Drew ten Bensel. The dark area in the distance is the burn scar of a recent wildfire, which burned roughly 35,000 acres. All the corn stubble that was in that area was burned off in the wildfire, exposing bare ground that has been under no-till cover for years.

grew up on farms or in rural communities or run their own farming operations, so they have an immediate and visceral tie to the programs that we administer.

Irrigation Leader: What are the main responsibilities of the Nebraska FSA?

John Berge: Our work falls into a few different categories. On the loan-program side, we provide direct ownership and direct operating loans to customers and work with local lenders to provide guarantees for the ownership and operating loans they make to customers. We have a large loan portfolio: about $1.8 billion in terms of financing operations in Nebraska. We also have a significant Beginning Farmer and Rancher Program, which helps young people get into the business of agriculture. We also work to support operations owned by veterans and the socially disadvantaged through our loan programs. We also administer Farm Bill programs like the CRP and price-support programs that aid producers financially when their margins get a little too tight. Disaster-assistance programs are also a big part of our workload when Mother Nature doesn't cooperate.

All of this grew over the past 70–80 years out of the USDA's interest in ensuring a cheap and abundant food supply in the United States. Not a lot has changed in terms of what the FSA does. The Farm Bill is authorized and funded every 5 years or so, and when that happens, we adjust what we administer. We used to only work on foodstuffs and create subsidies for what was grown to feed livestock or people. Then, we expanded to support fiber, cotton, and other materials used in textile manufacturing. Later, we expanded into fuel, and today, we support renewable fuels as well.

Irrigation Leader: What are the top issues you respond to today?

John Berge: We have a lot more disasters today than in the past, so we're dealing more frequently with regular and ad hoc disaster programs. For example, in Nebraska, we're currently in what the National Weather Service calls a D2, or severe, drought in a majority of the state, and that's likely to turn into a D3, or extreme, drought. The drought classifications trigger a forage program to help offset the needs of livestock producers. We had several floods 3 or 4 years ago that devastated productive land. We have a program called the Emergency Conservation Program that provides mitigation money after flood damage for things like rebuilding topsoil or building conservation structures, such as terraces.

Because we're seeing all these extreme weather disasters, we're looking more globally at ways we might be able to play a role in addressing climate change. What drew me back into government service was the notion that working lands can be a part of the climate solution. Farmers really are the best stewards of the land if given the right opportunities. With a voluntary, incentive-based approach to conservation, we might be able to help address nitrates in groundwater, water quantity problems after extended periods of drought, tillage practices, cover cropping, and perhaps even carbon capture over the long term. It's exciting that working lands can be a part of the climate solution. This is a big initiative of this administration. It will be interesting to see how Congress and the administration can figure out how we can continue to be part of that solution.

I'd also like to highlight the aging workforce in farming and agriculture, and how important recruiting and retaining a workforce in this line of work is. I think that people in positions like mine need to focus on ways we can draw people who have left these rural communities back to them so that they can serve the industry that has served them well.

Irrigation Leader: To what degree do you work directly with irrigation districts themselves?

John Berge: We have 8 million acres of irrigated land in Nebraska. Our programs directly affect virtually every agricultural producer, so it stands to reason that virtually every irrigated producer is a participant to some extent in our programs. Our programs are responsible for about $1.7 million worth of net farm income. Part of that income is used for input costs, which includes some of the operation and maintenance fees people are paying to their irrigation districts, so by supporting our agriculture industry, we are indirectly working with and supporting our irrigation districts.

Irrigation Leader: How does your background in agriculture and your management of a natural resources district inform your current work?

John Berge: Part of the joy of managing a natural resources district is that you're directly in contact with farmers on a routine basis. Working directly with the people you're serving, understanding their goals and ambitions for their properties, and trying to fit those into a solution is good training for working on a broader scope of issues through the FSA. Experience in agricultural policy and knowledge of what has worked and what hasn't historically are also important. I also frequently use what I learned growing up on a farm in my work today.

Irrigation Leader: How will climate change affect your work in Nebraska?

John Berge: I think we're already seeing it in this extended drought. In the east, around Lincoln and Omaha, you can expect 30–40 inches of precipitation a year. In the area of western Nebraska where I am from, you would be lucky if you got 8–10 inches. Nebraska is heavily reliant on irrigation, particularly in the western part of the state, just because of the lack of rainfall. Much of that irrigation is dependent on the federal surface water districts that were built in the early 1900s, which rely on snowpack from the Rocky Mountains in northern Colorado and southern Wyoming. That snowpack has diminished a great deal over time. The last time I checked, a few weeks ago, it was 85 percent of normal in the North Platte basin, which feeds many of the projects that bring water to the Nebraska Panhandle. On top of the lack of snowfall is the beetle kill that has occurred in those forests. That is also likely a direct result of climate change, because warmer temperatures allow the beetles to live longer in the year and at higher altitudes. With fewer trees, the snow melts more quickly and can't be captured in reservoirs for later use in irrigation. From a water quantity perspective, climate change has clearly affected the western part of the state.

We've had severe flooding on both the Niobrara and Missouri Rivers in northern and eastern Nebraska because of calamitous rainfall. These are 100-year events that are happening every 2 or 3 years. Dams are breaking, roads are being washed away, and farmland and topsoil along the rivers are being washed away. Those are big effects, and they're directly related to climate change. Events like those require the FSA to spend a lot more money and federal resources on disaster programs such as the Emergency Conservation Program.

Irrigation Leader: What is your vision for the future?

John Berge: We have a great opportunity to be leaders in the production agriculture space, especially in addressing some of these long-term issues. If we can make investments in disaster and conservation programs in a way that builds resiliency and helps mitigate the effects of climate change, we will be positioning agriculture for the future. I think that there is a real opportunity to use working lands to address some of these problems in a voluntary, incentive-based way. Rural America is good at creating a safe and plentiful food system while addressing the importance of renewable fuels and climate resilience. IL

John Berge is the state executive director for Nebraska at the Farm Service Agency. He can be contacted at john.berge@usda.gov.

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WORTHINGTON
Waterway Barriers

Rubicon Water Expands Its Water Management Technology From Chile to Other Latin American Countries

By Jorge Ramírez Contreras

Rodrigo Romero Jara, the manager of the North Biobío Canal Association in Chile, operates a Rubicon gate.

"The technical level we have reached is formidable. The automated management of water resources is no longer optional—it is required—and thanks to our partnership with Rubicon Water, we are at the forefront of progress in this area." These are the words of Fernando Rueda, the president of the Ñuble River Joint Board of Control, a water users' organization located in the south-central area of Chile that began to implement Rubicon technology in 2017 and continues to add water solutions developed by the business today.

Rubicon specializes in the creation of technology to improve the management of water in open-canal irrigation networks. The company's solutions consist of automated control gates with components that include integrated flow meters, operating software, and photovoltaic energy, all of which interact with advanced remote control engineering.

The company, originally from Australia, is active in a variety of countries, including Australia, Chile, China, India, Italy, Kazakhstan, New Zealand, Spain, and the United States. Its main clients are large irrigation districts and water management organizations. Its entry into Latin America began a decade ago, and its main office is located in Santiago, Chile. From there, it has started to expand throughout Latin America, and today, it also has offices in Costa Rica and Argentina.

Rubicon Latin America has 40 staff members, including engineers; specialists in electronics, telecommunications, and control systems; and field technicians who continually advise its clients.

Álvaro Luna Maureira, the general manager of Rubicon Water Latin America, says that "the modernization of irrigation canals using Rubicon technology improves the efficiency of the management of water resources, increasing productivity in a sustainable manner. Our company designs, manufactures, and installs solutions that accord with the needs of each client, using components and technology created especially for their goals and tested in a large

PHOTOS COURTESY OF RUBICON WATER

Rubicon gates installed at one of Ledesma's sugar operations in Argentina.

During the 1990s, the Australian government used Rubicon's autonomous canal control technology to deal with the country's water crisis. One of the best-known cases was that of the Murray-Darling basin, where authorities decided that irrigation modernization was needed and achieved unprecedented levels of efficiency and productivity. Including its projects in Chile and across the region, the Latin American branch of Rubicon installs more than 250 gates a year and has more than 35 clients across Latin America.

number of countries. In Chile, the main water users' organizations have put their trust in us, and clients in other Latin American countries are starting to do so as well."

The development and implementation of Rubicon technology is taking place in the context of a severe drought across Chile, which is affecting agriculture and food production. According to numerous studies, 76 percent of the country's area is affected by the drought, and more than 100 aquifers are suffering from low recharge levels compared to demand. By 2025, Chile is predicted to be among the 30 countries in the world with the highest water-related risks.

Thus, it is necessary to pay extremely close attention to water resource management. Rodrigo Romero Jara, the manager of the North Biobío Canal Association, adds that "Rubicon allows for the operation of canals, whether by flow or by volume, letting us open and close different delivery structures using a computer or phone, and allows us to manage our water and adapt ourselves to these times. That is the trend in management, particularly in these times of water shortage, when water needs to be used in the best way possible."

Anticipating these problems and with the aim of increasing the productivity of agriculture on a global scale, Rubicon developed a unique technology for the automation of gravity irrigation systems during the 1990s in Australia as part of a public-academic-private partnership. The company's water management solutions are developed using cutting-edge technologies that are designed in conjunction with the University of Melbourne. Its products are rigorously tested in Rubicon's dedicated hydraulics flow laboratory, one of the largest in the Southern Hemisphere.

Rubicon Solutions in Argentina and Costa Rica

Over the last few months, Rubicon has entered the Latin American market with greater force. In July 2021, it installed 18 automated gates commissioned by the sugar business Ledesma, a leader in its field in the Argentine market. Ledesma developed a 5-year plan to increase its productivity and competitiveness and realized the fundamental importance of being more efficient in the use of water in its 40,000 hectares (98,842 acres) of sugarcane fields and 700 kilometers (435 miles) of canals. In response, the company launched its project with Rubicon, starting with a first stage at its largest property.

At the same time, Rubicon designed its first installations in Costa Rica as part of a pilot project for the country's National Service for Groundwater, Irrigation, and Drainage. The solution helps manage a diversion canal in the Río Cañas area.

Rubicon's first projects in Latin America were carried out in Chile more than a decade ago, and since then, the company has undergone a remarkable expansion that has led the main water users' organizations in the country to put their trust in the company's solutions. A number of Chile's joint boards of control and canal associations, including those of Huasco, Elqui, Bellavista, Aconcagua, Rinconada, Choapa, Melozal, Ñuble, and North Biobío, already use automated gates for the measurement, remote control, and delivery of water to irrigators.

The president of the Ñuble River Joint Board of Control adds that "thanks to the automatic gates, the efficiency of water distribution is optimal and real-time, in addition to which we have been able to minimize our reaction time after unexpected events." IL

Jorge Ramírez Contreras is Rubicon's marketing coordinator for Latin America. He can be reached at jorge.ramirez@rubiconwater.com.

PHOTOS COURTESY OF

What Is Title Transfer?

Ever since the modern Kennewick Irrigation District (KID) went online with deliveries beginning in 1957, most of the irrigation facilities (canals, laterals, and Amon pump station) have been owned by the federal government, specifically the United States Bureau of Reclamation. Due to the fact that constructing the system was a large and expensive endeavor for its time (almost 5 million dollars), and the need for the system was due in part to removal of local irrigated farmlands from production to make way for the federal Hanford project, federal involvement was sought by the local community and finally authorized by Congress in 1948.

This partnership with the federal government was necessary to construct the infrastructure needed to bring irrigation water from Kiona to Hover, irrigating farms and residential neighborhoods along the way. However, as areas of Benton County, including parts of West Richland, south Richland, and Kennewick have grown over the years, development pressures have required easements to be moved or abandoned in some cases, and it is not an easy or quick process for the federal government to process these requests in a timely fashion.

The good news is that there is a solution. Title transfer is the process of transferring ownership of federally-owned irrigation facilities over to the local communities that they serve. The process, as expected, can be long

arduous, but legislation passed by Congress and signed into law in 2019 has greatly streamlined the requirements for relatively simple transfers. KID is a beneficiary of this new legislation and has actively been working to receive ownership of the "transferred works," or that portion of the system that KID has already operated and maintained from the beginning. This is the system of canals and laterals from the head gate of the Main Canal all the way to the system terminus at the Hover Waste-way.

The benefits of title transfer to the community are substantial. KID has the staff and capacity to process landowner requests in a timely fashion. The district has staff dedicated to environmental reviews required under state law. Title transfer will give the district flexibility needed to engage the broader community on best use of our infrastructure, including the potential for linear parks and walking paths. Also notable is that the cost to the district for title transfer has been minimal; the district has already collected enough funds to repay our portion of the construction costs, and nothing more is owed to make the federal government whole. Funds have been spent by the district on cultural and environmental studies and related mitigation to ensure no harm to the environment or cultural resources will occur.

At long last, on January 18th, 2022, the district completed the process that took over four years. The district would like to extend **special thanks** to Representative Dan Newhouse for his support of this effort, the Confederated Tribes of the Umatilla Indian Reservation, and the Yakama Nation for their willingness to work with us to make this project a success. The district also would like to thank Reclamation for their commitment to the project. Without these partnerships, title transfer would not be possible.

A community wide event is planned for this summer to celebrate this historic event.

kid.org
Facebook | @KennewickIrrigationDistrict
Instagram | kennewick.irrigation.district
LinkedIn | linkedin.com/company/kennewick-irrigation-district

Oregon Spirit Distillers: Making Spirits Bright

Oregon Spirit Distillers' straight American Bourbon whiskey.

Why did Shon Rae make a career change from an irrigation district to a whiskey maker? Because, as they say, "Whiskey is for drinking, and water is for fighting." While the former assistant manager of the Central Oregon Irrigation District (COID) now works in operations at Oregon Spirit Distillers, water still plays a key role in her work as an ingredient and input.

Irrigation Leader: Please tell us about your background in water and how you came to be in your current position.

Shon Rae: I was the assistant manager of COID, where I primarily managed internal operations. Water in the Deschutes basin is shared among eight irrigation districts, municipal needs, and the river ecosystem. Most of the irrigation infrastructure is over 100 years old, and we are still using the ancient technology of gravity and weirs to deliver our precious water resource. As climate changes and water becomes scarcer, the need for modernization has become paramount. Modernization is extremely expensive, and there are differing views on how it should happen. All these elements feed a very contentious industry. I left because, as they say, "Whiskey is for drinking, and water is for fighting." COID is an amazing irrigation district with a knowledgeable staff that is personally invested in doing the right thing for the basin as a whole. There are many things we can't control when it comes to water, and it breeds contention. When the opportunity to take an operations position at the distillery came up, I decided that I was ready for something a bit more positive.

Irrigation Leader: Please introduce Oregon Spirit Distillers.

Shon Rae: Oregon Spirit Distillers, founded in 2009, was born out of owner Brad Irwin's passion for distilling and his interest in different styles of whiskey and what makes each of them different. Today, our distillers are motivated by the same thing. We are located in Bend, Oregon, where local craft businesses are booming. We take our craft seriously and aim to bring you the best spirits of their kind.

With one of the largest whiskey-barrel inventories in the state of Oregon, we are known for our award-winning whiskey, which is made from local and regionally sourced grain and pure Cascadian water. As we continue to grow outside the state of Oregon, we are committed to Oregon agriculture and the Oregon spirit.

Oregon Spirit Distillers stands for integrity in all that we do. From hands-on production methods to onsite distillation and aging and beautiful packaging, we stand behind our family of craft spirits 100 percent.

Since the company started, we have used over 3 million pounds of locally grown agriculture to make more than 3,500 barrels of American whiskey, a value-added agricultural product. That translates to almost 175,000 cases of whiskey alone. In addition, we've seen nearly equal success with our dry gin, absinthe, and vodka. Our distribution footprint has grown to 29 states as of this year. It makes us proud to share Oregon-made products with the rest of the country.

Irrigation Leader: Why is water quality important in making whiskey?

Shon Rae: Part of making whiskey is adding water to a mixture made of grain that is called a mash. The mash is boiled, fermented, and run through a still. Obviously, water is a part of the entire process. After the water is separated from the alcohol and the alcohol is distilled, the alcohol sits in a barrel for a minimum of 4 years. Then, it must be proofed down by adding water. Adding poor-quality water would affect the taste of the of the spirit. Central Oregon has exceptional water—it's clean and clear, and we drink it straight from the tap. That happens to make our whiskey pretty darn good. In addition, all our grains are sourced from

PHOTOS COURTESY OF OREGON SPIRIT DISTILLERS

Oregon Spirit Distillers sources all its rye, wheat, and corn from Bishop Farms.

Oregon, and it takes water to grow them. We've also just purchased a little farm that has COID water rights where we will raise botanicals like wormwood and fruits to add into our spirits. Wormwood is an herb with a distinctive aroma and flavor that we use in our absinthe and gin.

Irrigation Leader: Please tell us about how the distillery uses spent grain to feed local cattle.

Shon Rae: To make whiskey, we turn whole grains into a a mash. We have a mill that grinds the grain up and then dumps it into what is called the mash tun, where we add water, heat it up, and add enzymes that cause the mash to create sugars, which are then distilled. Once that process is done, we take the water out and basically wash the leftover grain into a tub. That spent grain is then taken to local farms to use as cow feed.

Irrigation Leader: How do you conserve water during the distilling process?

Shon Rae: We recycle and reuse all the water we use to heat and cool. Some of the clean condenser water gets used to swell the barrels before filling them with whiskey. When you distill whiskey, you end up with what are called heads, hearts, and tails. The hearts are what goes into the barrel to become the whiskey you drink. The heads are a product with higher-than-comfortable quantities of acetone and methanol; it gets bottled up and used as cleaner for all our equipment. The tails are an oily, low-alcohol liquid that comes off after almost all the alcohol has been collected in the hearts. The tails are actually reworked into the next distillation.

Irrigation Leader: Tell us about your tasting room and tours.

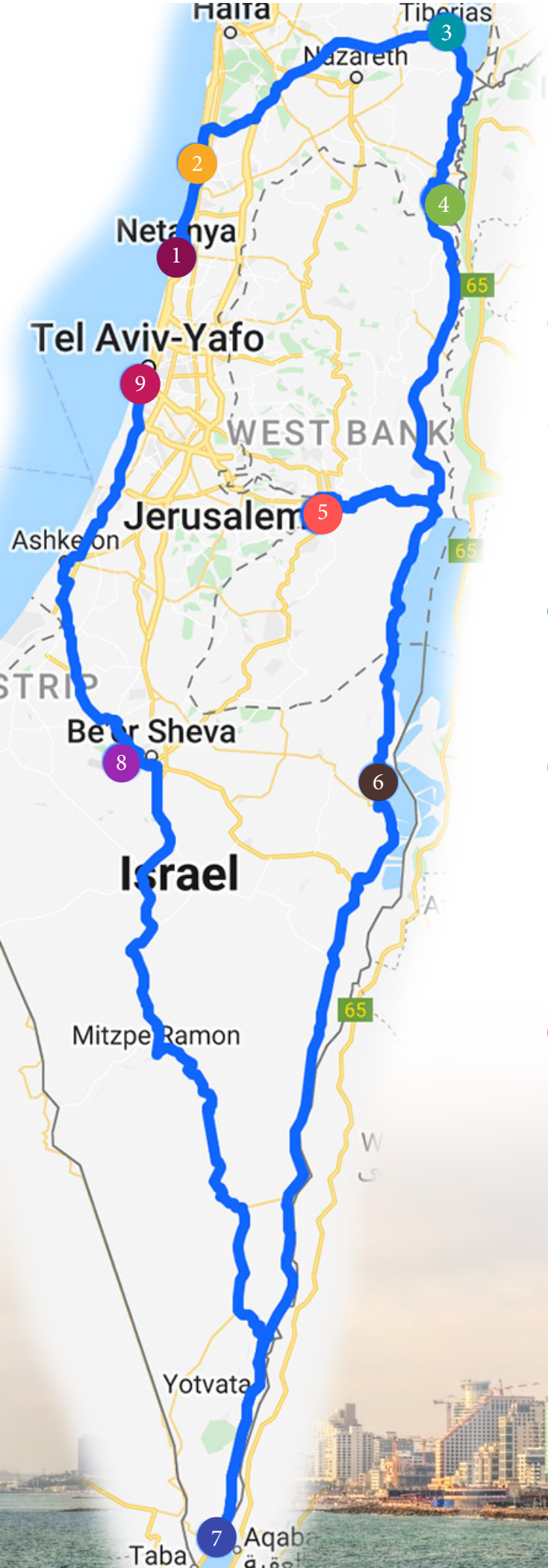
Shon Rae: We have a tasting room that is open to the public. Visitors can taste all the different spirits that we make, and we also serve cocktails and have a light food menu. Visitors can also tour the distillery.

Irrigation Leader: Please tell us about the distillery's plans for the future.

Shon Rae: Our goal is to continue to expand our distribution, certainly in the United States but also internationally. In order to do that, we plan to double our production capacity within the next 5 years. Since we are quickly filling every nook and cranny of our Bend, Oregon, distillery, we are building new warehouses each year and beginning to think about where we will build a new distillery. In addition, we are planting an orchard so that we can continue to use locally grown agriculture in a more diverse product line. IL

Shon Rae is the operations manager at Oregon Spirit Distillers. She can be contacted at shon@oregonspiritdistillers.com.

PHOTOS COURTESY OF



Israel Water Education and

Please save the date for the following scheduled tour, sponsored by *Irrigation Leader*, *Municipal Water Leader,* and *Hydro Leader* magazines and operated by Imagine Tours and Travel, LLC.

Itinerary

1. Arrive at Ben Gurion Airport. Following passport validation, a representative will assist with transport to Leonardo Plaza Netanya for dinner and overnight stay.

2. Travel to the Caesarea National Park to see the Roman aqueduct and water cistern, proceed to Kibbutz Magal, then visit the Netafim irrigation factory and the Meggido National Park's ancient water system. Enjoy dinner and overnight stay in Tiberias, on the shore of the Sea of Galilee.

3. Drive north to view the two main sources of the Jordan River, the Dan and Banias Rivers, then on to Mt. Bental to see the Golan Heights, the Syrian border, and Mt. Hermon. Enjoy a winery tour and tasting, then return to Tiberias for dinner and overnight stay.

4. Begin the day at the National Water Carrier, the system that supplies water to vast regions of the country, then travel to Mt. Arbel for an amazing view of the Sea of Galilee. Drive to Mt. Gilboa and Kibbutz Maale Gilboa, where the Gilboa Pumped Storage Hydroelectric Poser Project is located. Proceed to Kibbutz Sde Eliyahu for an agriculture bio tour. Drive via the Jordan Valley and the Judean Desert to Jerusalem for dinner and overnight stay.

5. Drive to the Mount of Olives for a beautiful view over the Old City of Jerusalem, then visit the City of David, including the Hezekiah Tunnel. Brave the wet side or opt for the dry as you walk to the Pool of Siloam. Drive on to Armon Hanatziv to see ancient tunnels that brings water from Solomon's Pool to the Temple. Enter the Old City to see the Western Wall, tunnels, Pool of Bethesda, and the Roman Cardo with its old wells. There will be an option to visit the Church of the Holy Sepulcher followed by dinner and overnight stay in Jerusalem.

Trade Tour Preview, Nov. 30–Dec. 10, 2022

6 Visit the Israel Museum, which houses the Shrine of the Book, the Dead Sea Scrolls, and a miniature model of Jerusalem from the First Temple period. Drive to Sataf Spring in the Judean Hills to see how the citizens of the city get a few acres to grow their own vegetables and fruits while using an ancient irrigation system that leads water between terraces. Continue on to the Beit Zait Water Reservoir and Dam, followed by dinner and overnight stay in Jerusalem.

7 Drive to the Einot Zukim Nature Reserve, which features an oasis of freshwater springs, vegetation, and animal life. Then, in the desert next to the Dead Sea, experience the Ein Gedi Nature Reserve, where kibbutz members pump water for their mineral water factory. Continue on to the world heritage site of Masada, where participants can walk the snake trail by foot or ascend via cable car to see King Herod's fortress, an ancient synagogue, a Byzantine church, and a water cistern. Proceed to Ein Bokek for dinner and overnight stay.

8 Travel through the Arava Desert Valley to the Yair Research and Development Agriculture Center and Center for Modern Desert Farming. Tour greenhouses and the agricultural inventions section, which focuses on the challenges of desert soil and climate. Continue to the ecological Kibbutz of Lotan to see how sandy soil is transformed to yield lush gardens and to hear about organic and permaculture tips that have helped the Center for Creative Ecology treat waste, raise healthy food, and save energy. Proceed to Eliat for a possible desalination facility tour, followed by dinner and overnight stay in the city.

9 Drive via the Ramon Crater to the Negev Desert Research and Development Center near Ashalim, which specializes in using salty water for agriculture. Proceed to Kibbutz Hatzerim near Beer Sheva, which is the southern branch of the Netafim Irrigation Factory. Continue to a water desalination facility in Ashkelon or Ashdod on the Mediterranean Sea. Enjoy a farewell dinner in Jaffa and then drive to Ben Gurion Airport for a night flight home.

Services Included

- meeting and assistance at Ben Gurion Airport on arrival
- transfer to/from Ben Gurion Airport
- licensed English-speaking guide for all transfers and sightseeing days
- luxury air-conditioned coach
- entrance fees for all visits and tours
- eight nights of hotel accommodation
- breakfasts and dinners at hotels and farewell dinner at local restaurant

$4,797.00 per attendee from Washington Dulles International $4,409.00 per attendee without airfare

Early bird discount of $50 for reservations made by May 15, 2022, with a $500 deposit.

All posted prices, services, and destinations are subject to the terms and conditions of a participant agreement.

Irrigation Leader, Municipal Water Leader, *and* Hydro Leader *magazines are published by Water Strategies LLC.*

Participants are strongly recommended to separately secure comprehensive traveler's insurance.

For more information, please visit
https://waterstrategies.com/israel-2022

Uri Segev: Bringing N-Drip's Advanced Microirrigation Systems to Arizona

An N-Drip system installed in Nebraska.

N-Drip wants to help solve the global water crisis by helping the world's farmers convert flood irrigation to gravity-powered microirrigation. Its system, developed by Israel's former water commissioner, Professor Uri Shani, transforms existing flood infrastructure into cost-effective, precise drip systems, without the use of filters or pumps. Irrigation Leader *spoke with N-Drip's U.S. vice president for business development, Uri Segev, about how N-Drip is helping farmers become more efficient so that they can increase yields with much less input, one field at a time.*

Irrigation Leader: Please tell us about your background and how you came to be in your current position.

Uri Segev: I'm originally from Israel. I was born and raised on a kibbutz in a small farming community and grew up among cotton and cornfields. To conserve water in Israel's desert and semiarid climate, flood irrigation had already been forbidden, so I got to see efficient drip irrigation at work. When I relocated to the United States in the mid-1990s, I changed direction from farming to real estate finance. Then, 3½ years ago, I got the opportunity to join N-Drip as vice president for business development in the United States.

Irrigation Leader: Where is N-Drip headquartered in the United States?

Uri Segev: We are in Phoenix, Arizona. We made a strategic decision a little over a year ago to move our headquarters from California to focus on the Arizona market.

Irrigation Leader: What are your current projects in Arizona?

Uri Segev: We are currently working in two areas. In Yuma, Arizona, we are converting thousands of acres of citrus fields from flood irrigation to our N-Drip system. We are also converting alfalfa fields along the Colorado River. Within the next few months, we plan to open another strategic location in Casa Grande to service the Pinal Feeding Company, one of the largest cattle feeding operations in the Southwest.

Irrigation Leader: How is N-Drip different from traditional drip irrigation?

Uri Segev: N-Drip is the first microirrigation system powered by gravity alone. It transforms existing flood

PHOTOS COURTESY OF N-DRIP

N-Drip driplines leading into a field.

infrastructure and topography into high-efficiency microirrigation without the use of filters or pumps. Depending on the type of crop and the season, the system can save 40–60 percent of the water used in flood irrigation. N-Drip works with close to zero pressure, requiring only 0.87 pounds per square inch to generate the power needed to run water throughout the fields. Since most irrigation infrastructure in Arizona is currently flood, we can simply tap into existing irrigation canals with a simple PVC pipe connection. When the water reaches the field, it enters our system, which runs with unfiltered water throughout.

Irrigation Leader: Does N-Drip use emitters, like a traditional drip system?

Uri Segev: Yes and no. The N-Drip system does incorporate an emitter to enable efficient irrigation, but unlike other drip systems, our proprietary model is based on a concept that works without the need for high-pressure energy and filters. Eliminating the conventional zigzag mechanism of a conventional dripper, we have created a multidimensional flow from the inlet to the outlet, which is highly resistant to clogging caused by brackish water and sand particles. The emitter is manufactured on our production line and is embedded directly into the dripline tape. The driplines are then installed in the field. We have patented both the emitter and the algorithm we use to plan the field design.

Irrigation Leader: Would you describe the tape and how it is installed?

Uri Segev: The installation of N-Drip is simple. Our 44-millimeter (1.73-inch) tape comes on a spool that is around 600 meters (1,968 feet) long, and our 22-millimeter (0.87-inch) comes on a 250-meter (820-foot) spool. We recommend that the tape be installed at a depth of 2 inches. The installation process is carried out by a machine called a deployer.

Irrigation Leader: What is the expected life of the tape?

Uri Segev: If we have adequate field topography and good water quality, we can maximize crop yield for multiple seasons. The product can last 3–4 years.

Irrigation Leader: Do some irrigators, such as strawberry growers in California, put down new tape and tear it out every year?

Grapefruit being grown in the Yuma, Arizona, area. N-Drip is converting thousands of acres of citrus in Yuma from flood irrigation to its microirrigation system.

PHOTO BY JEFF VANUGA, USDA NATURAL RESOURCES CONSERVATION SERVICE, PUBLIC DOMAIN.

Uri Segev: In California, farmers have developed a unique system for berry cultivation, and a lot of the growers do roll back the existing tape and reuse it later. They have the benefit of using groundwater, which is very clean, they have a very short irrigation season, and they use filters, all of which means they are able to keep the tape extremely clean. N-Drip can work with extremely dirty water and we don't use filters, so much of the time we won't know the condition of the tape until the end of the season. That's why we don't recommend reusing the tape.

Irrigation Leader: How many years can N-Drip's system last for an alfalfa crop?

Uri Segev: In most places in Arizona, the alfalfa rotation runs for 3–4 years. The crop has a long season and can be cultivated 11 times a year. N-Drip laterals can run throughout this whole crop cycle.

Irrigation Leader: What is the cost per acre of using N-Drip?

Uri Segev: The cost per acre varies. The equipment costs $800–$1,000 per acre. A cotton field would likely be at the low end, and an alfalfa field at the high end. About 50 percent of the cost is accounted for by infrastructure components, which can be used for many years.

Irrigation Leader: Is N-Drip robust enough to be driven on?

Uri Segev: Absolutely. We currently have N-Drip installed in over 150 acres of alfalfa throughout Arizona, and it continues to be operational after harvesting.

Irrigation Leader: When your product does reach the end of its life, is it recyclable?

Alfalfa growing in Arizona's Mohave Valley. N-Drip is also converting alfalfa fields along the Colorado River to its microirrigation system.

Uri Segev: The N-Drip system is 100 percent recyclable. We will come out to the field at the end of the season, retrieve the tape, and make sure that all of it goes through the proper recycling process.

Irrigation Leader: What should every Arizona irrigator know about your product?

Uri Segev: N-Drip is a hybrid system that is affordable and requires no added energy. We don't remove the existing flood infrastructure but rather install N-Drip on top of it. On occasion, we need to leach the soil, and because the flood irrigation system is still in place, we can use that for this purpose. We also want irrigators to know that N-Drip is committed to serving the grower for as long as they need support, whether it's 5 years or 10. As well as providing a full irrigation management plan to maximize crop yield with advice on when and how often irrigate, fertilize, chlorinate, and oxidize, we also educate growers on how to operate and maintain our system.

Irrigation Leader: Is there anything you'd like to add?

Uri Segev: As part of the scale-up of our operations, we are building a manufacturing facility in Arizona to serve our local clients. We hope to begin producing here in February 2023. IL

Uri Segev is N-Drip's vice president for business development in the United States. He can be contacted at (818) 692-9989.

JOB LISTINGS

Irrigation Leader

Does your organization have a job listing you would like to advertise in our pages? *Irrigation Leader* provides this service to irrigation districts, water agencies, and hydropower facilities free of charge. For more information, please email Kris Polly at kris.polly@waterstrategies.com.

GRAND VALLEY WATER USERS ASSOCIATION IRRIGATION DISTRICT MANAGER

Salary: Salary range begins at $95,000.
Location: Grand Junction, Colorado
Deadline: May 25, 2022
Summary: The Irrigation District Manager reports to an 11-member board, implements the board's directives and policies, and manages the administrative and operational functions of the Association. Requirements include knowledge of irrigation system operation and excellent skills in management, budgeting, and customer relations.
Apply: https://www.indeed.com/jobs?q=irrigation%20district%20manager&l=colorado&vjk=03a21182e7697775

Reinke

ENGINEERING AND SOFTWARE ENGINEERING MANAGER

Salary: Dependent upon qualifications
Location: Deshler, NE (Global Headquarters) or Kearney, NE
Deadline: Open until filled
Summary: Are you a self-motivated laser-focused engineering guru with leadership skills in developing and directing a spectacular group of engineers? Reinke is on the lookout for an exceptional engineering manager and needs you! Reinke is a global leader in creating the world's finest irrigation systems. Reinke is looking for extraordinary engineering management talent to join its fast-paced, high-achieving team. You will have the opportunity to develop and execute Reinke's vision of developing and maintaining America's finest water management systems used by growers worldwide and influence a talented staff of engineers
Apply: https://www.reinke.com/opportunities.html

Reinke

SOFTWARE DEVELOPMENT ENGINEER

Salary: Dependent upon qualifications
Location: Deshler, NE (Global Headquarters) or Kearney, NE
Deadline: Open until filled
Summary: Are you ready to make a big difference for growers worldwide? You would be responsible for new and sustaining product development on high-performing water management machines in this role. Your experience will directly impact application and embedded software, targeting various platforms and using a wide range of programming languages. Value-added results for growers utilizing the latest technology are paramount. This is a diverse company role that includes a variety of project assignments across several platforms, web-based applications, and interfaces in and out of database repositories.
Apply: https://www.reinke.com/opportunities.html

Reinke

Reinke Manufacturing Co., Inc.
Title: International Sales & Technical Support Assistant
Salary: Competitive and based upon qualifications
Location: Deshler, NE (Global Headquarters)
Deadline: Open until filled
Summary: Are you ready to be a part of a high-performing team and become the go-to person for representatives across the globe? In this role, you would assist with the receipt, validation, and processing of all international irrigation sales orders and a variety of dealer-facing initiatives. This opportunity directly influences and supports Reinke's international sales team to ensure that the global dealer network receives timely and accurate responses to technical and product-related questions and assists in timely, accurate, and detailed quotations.
Apply: https://www.reinke.com/opportunities.html

ANCHOR QEA

Title: Civil Structural Engineer
Salary: Dependent upon qualifications
Location: Long Beach, Irvine, or San Francisco, CA
Deadline: Open until filled
Summary: A staff engineer with 3 to 7 years of experience with emphasis on supporting the design of civil infrastructure along the waterfront and in the marine environment.
Apply: https://www.anchorqea.com/careers/careers-open-positions/

CHIEF OPERATIONS OFFICER
Salary: $91,250 - $158,746 annually
Location: Albuquerque, NM
Deadline: Until Filled
Summary: Manages projects, programs, activities, and staff involved in the operation, maintenance, control, delivery, and drainage of an open channel raw water system.
Apply: https://www.mrgcd.com/wp-content/uploads/2022/02/COOapp.pdf

COST ACCOUNTING MANAGER
Salary: Dependent upon qualifications
Location: Orem, UT or Vancouver, WA
Deadline: Until filled
Summary: Manages the day to day cost accounting function for the precast segment as well as supervising the precast cost accounting team. Prepares and directs the implementation of cost accounting methods and activities over the precast segment, and oversees cost reporting and analysis to plant and executive management. This role includes responsibilities in the areas of cost accounting, controls, expense management, policy and procedure development, and internal and external audit support.uploads/2022/02/COOapp.pdf

PROJECT MANAGER II
Salary: Dependent upon qualifications
Location: Saginaw, TX
Deadline: Until filled
Summary: Responsible for all stages of job from the initiation of the contract to job closes-out. Supports the Engineering and Operations Manager and reviews all jobs assigned to the engineering coordinators and technicians. A major part of this position is to provide proactive leadership between the internal customers and the technical staff to ensure effective manufacturing methods.
Apply: www.nwpipe.com/careersuploads/2022/02/COOapp.pdf

CORPORATE SOCIAL RESPONSIBILITY MANAGER
Salary: Dependent upon qualifications
Location: Vancouver, WA
Deadline: Until filled
Summary: The Corporate Social Responsibility Manager will help drive the Company's Social and Governance visions and will partner with other leaders in the organization as we seek to clarify our Environmental, Social, and Governance (ESG) strategy, measure output, and report results externally.
Apply: www.nwpipe.com/careers

SENIOR SCIENTIST
Salary: $59,966–$71,281 annually, based on qualifications
Location: West Palm Beach, FL
Deadline: Open until filled
Summary: The Senior Hydrogeologist is a highly experienced senior scientist position responsible for the review of consumptive water use permit applications and other strategic initiatives of the Water Use Bureau.
Apply: https://www.sfwmd.gov/careers

MICROSOFT SYSTEMS ARCHITECT
Salary: $39.81 - $59.71 per hour
Location: Fort Worth, TX
Deadline: May 31, 2022
Summary: Will work as the lead resource in a small Cloud Services team responsible for providing solutions based on the Microsoft Azure and Microsoft 365 platforms. This position will be expected to architect and manage solutions across all lifecycle stages.
Apply: https://www.trwd.com/job/microsoft-systems-architect/

TECHNICAL SALES AND BUSINESS DEVELOPMENT
Salary: Dependent upon qualifications
Location: Remote/Hybrid
Deadline: Open until filled
Summary: Presenting our product and our values accurately and enthusiastically while maintaining existing lines of business and effectively building new relationships.
Apply: https://nustreem.com/careers/

For more job listings, please visit: irrigationleadermagazine.com/job-board/.

Irrigation Leader

Upcoming Events

May 3–5 Association of California Water Agencies, Spring Conference and Exhibition, Sacramento, CA

May 9–12 American Water Resources Association, Geospatial Water Technology Conference, Austin, TX

May 10–12 National Water Resources Association, Federal Water Issues Conference, Washington, DC

June 6–7 Idaho Water Users Association, Water Law and Resource Issues Seminar, Sun Valley, ID

June 9–10 Tristate Irrigation Conference (Idaho, Oregon, Washington), Bend, OR

June 13–16 Nevada Water Resources Association, Well and Water Week, Reno, NV

June 15–17 Texas Water Conservation Association, Summer Conference, Round Rock, TX

June TBD North Dakota Water Users Association, Summer Meeting, Fargo, ND

July 4–8 I.S. Rivers, International Conference, Lyon, France

July 11–13 North Dakota Water Resource Districts Association and North Dakota Water Education Foundation, Joint Summer Water Meeting and Executive Briefing, Fargo, ND

July 20–22 Groundwater Management Districts Association, Summer Conference, Copper Mountain Resort, CO

July 21–24 National Association of Counties, Annual Conference and Expo, Adams County, CO

July 25–27 National Water Resources Association, Western Water Seminar, Fairmont, MT

July 28 North Dakota Water Resource Districts Association, Water Day at the North Dakota State Fair, Minot, ND

August 1–3 National Conference of State Legislatures, Legislative Summit, Denver, CO

August 8–11 Tristate Seminar, Las Vegas, NV

August 10–12 National Water Resources Association, Western Water Seminar/Tour, Hot Springs, MT

August 23–24 Colorado Water Congress, Summer Conference, Steamboat, CO

September 14–17 European Irrigation Association, GaLaBau Landscaping, Maintenance, and Construction Expo, Nuremberg, Germany

September 15–16 World Academy of Science Engineering and Technology, International Conference on Drip Irrigation for Agriculture, Zurich, Switzerland

September 16 Agribusiness and Water Council of Arizona, H2Open Golf Tournament, Casa Grande, AZ

September 19–20 Nevada Water Resources Association, Fall Symposium, Reno, NV

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