Interview with Peter Moller

Technology for sustainability:

Helping farmers save water with innovation, listening & creativity

By Tanya Sharma

Water scarcity is a major problem in the world right now. An estimated four billion people live in areas that suffer from severe water scarcity for at least one month per year.[1] This increasing threat of water scarcity has been exacerbated by anthropogenic factors and climate change. The United Nations world water development report in 2021 concluded that the world would face a 40% global water deficit by 2030 under a business-as-usual scenario. Water withdrawals for irrigation are the primary driver of groundwater depletion worldwide.[2]

We often believe that technology and development have led to reckless depletion of natural resources as exhibited by the popular maxim "Human technology owes ecology an apology." But recently, technological advancements have helped fortify our efforts for sustainable water use in agricultural settings. One such person who has served as the pioneer in this field is Peter Moller.

Peter Moller is the Business Development manager at Rubicon Water, a pioneering company with a vision to make water available to the world and ensure food security. It specializes in delivering advanced technology to managers of gravity-fed irrigation networks and irrigation farmers, enabling them to manage their water resources with unprecedented levels of efficiency and control. Peter's expertise as a qualified Agronomist with 30 years of experience in this industry and as a founder of two agriculture-based start-ups has served as the cornerstone of his ability to launch, commercialize and market the development of agricultural technology for irrigated agriculture, food processors, irrigation dealerships and multinational irrigation manufacturers across North America, Latin America, Middle East, South Africa, Australia and Southern Europe. Peter holds Bachelor of Applied Sciences in Agriculture from Western Sydney University and an MBA from University of South Australia. In addition, he holds professional certification in Innovation and Entrepreneurship from Stanford University, USA.

Peter's first stint was at an Australian company focusing on providing irrigation equipment and infrastructure systems (sales, design and project delivery) specifically designing drip irrigation systems. He later transitioned from design and sales to technical services in an Agriculture Chemical company (Ag-Chem) where his work involved developing sensor-based systems to monitor crop health. "When the Wall Street recession hit in the late 1980s, my company had a directional change and most of the employees were laid off, including myself. With a young family to take care of, I was left with no choice but to create order out of the chaos. It makes you think deeply. I channeled that uncertainty into creating a service that could help farmers add value to their business and influence irrigation behaviors. I reached out to my previous clients and offered a sustainable way to manage their agricultural production systems, sensing an apparent gap in the industry at that time. Along with some of my former colleagues, brimming with zeal, this marked the beginning of my entrepreneurial journey and led to setting up my first start-up, Agrilink Water Management in 1990."

Agrilink was an irrigation consultancy firm that introduced Ag-Tech with the aim of improving yield, efficiency and profitability for farm managers and growers. Peter was always at the forefront in adopting technology and scanning the horizon for the value it could offer to his clients. "Our company utilized continuous Wireless Sensor Networks (WSN) technologies with an aim of strategic water management using soil moisture probes and data analytics. We would manually take the data and upload it on the data loader which later became automated following the introduction of Radio based systems. This was still at a time when there was no internet of things and cloud computing. This distributed data collection by Agrilink was first of its kind in the 1990s."

His work in Australia garnered a lot of global traction. "One of the biggest clients was a supplier of potatoes for McDonalds. Potato crop is very sensitive to stress that can lead to 15-20% reduction in yield, tuber size and worst of all, sugar accumulation. We ensured high quality produce of potatoes to the suppliers by optimizing abiotic parameters in the fields. At that same time, "Simpla", a very large US food processing company entered the Australian market by acquiring an Australian food brand. They got acquainted with our work and offered me to move to Idaho, USA in the epicenter of USA's agricultural marketing strategies. This was an exciting opportunity as everything in the agricultural sector was on a larger scale". Peter has worked with a vast variety of clients growing diverse crops ranging from wine, almonds to citrus growers of Florida. "Our initial investigation into water content required by the crops came from our commitment to deliver high quality products and to increase the yield. We observed that the quantity of water supplied to the crop was a major determinant in this regard."

His inclination towards Precision irrigation technology was the result of the observation of extensive wastage of precious ground water due to abeyance of targeted technology in this field. On looking at the statistics, roughly 70 percent of the world's freshwater is used for agriculture. "It was a grave cause of concern that the manual water distribution systems that are used today are 50-80 years old. These systems have delivery efficiency of 60% whereas a major chunk (40%) is lost in spills and inefficiencies.[3] Of the water that is delivered, 60% is used in surface irrigation while 40% is drip irrigation and mechanized systems giving us surface water application efficiency of about 40%." In addition to decreasing the yield, waterlogging ultimately leads to leaching of important nutrients, reduction in air exchange, reduced root growth, pathogen infestation and shallow root structure.[4] Thus, we are producing a crop that is not as nutritious and healthy as it ideally should be, if grown the right way. It has a huge impact on the food quality and overall well-being of the population.

"After spending about 10 years in the quality business, Rubicon wanted me to lead product extension to grow and expand their business to farm based application of water. There are two parts to the water supply chain: storage and distribution of water on farms. Rubicon traditionally worked on the side of water storage reservoirs. We have designed a system to transform flood irrigation to high performance surface irrigation achieving 90% application efficiency through science, technology and data aimed at doubling the water for productive use. The water saved in the reservoir could be diverted to high density urban areas or used as environmental water for maintaining water balance in aquifers for fish breeding and/or migratory birds.

Peter highlights the impact of implementing this technology in a dairy farm in Australia which grew maize based dry matter for feeding livestock for milk production. "On an average, 10 years ago he required 8.5 megaliters of water (per hectare) to produce 16 tonnes/hectare of maize ($16/8.5 \approx 2$ tonnes/megaliters of water). After applying water at high application efficiency, we used 6.8 megaliters of water and increased the yield to 27 tonnes ($27/6.8 \approx 4$ tonnes /megaliters of water). Thus, using the same seed and fertilizer, we grew twice as much with half the amount of water."

He also talks about how continuous monitoring allows the grower to be prepared well in advance. "The implementation of proximal sensors could facilitate the prediction of certain critical points when plants need to receive water upon which irrigation setpoints can be defined on a crop-specific basis. If you aren't measuring and monitoring how the crops are responding through data analytics, you won't be able to plan the right time points which can stress the crop. Something as elementary as a meter with a dashboard that can give a green, amber and a red signal to tell the grower about the state of the crop would be immensely helpful."

He mentions how farmers are the most environmentally considerate people he's worked with who must pass the legacy to the next generation. They are already overloaded and multitasking between procurement, labor, managing the biosystems and financial costs. This can help relieve some pressure off them. We need to be more efficient with what we have in wake of population growth (expected to be 9.3 billion by 2050) and limited cultivable land. Hence efficient irrigation management is of critical importance for sustainable food production.

On being asked about the future, he says that they are currently making a platform using telematics where farmers all around the world can upload their data and overlay management strategies which can be accessed

by growers across the world. Adjustments can then be made via software inputs to alter the farm equipment's performance to ensure that best results are achieved. Further, adaptive control technologies employing Machine Learning and Artificial Intelligence-based have augmented irrigation decision support systems that help growers and decision-makers in reducing the time and human resource required for analyzing complex alternative decisions.[5, 6, 7] Sharing systems and training new generations of technology backed farmers will certainly facilitate the evolution of smart irrigation methods and reduce costs.

As a quick tip for the budding entrepreneurs, he says "Get grit under your fingernails! Having mentored and worked closely with a group of start-ups in Australia, I've seen new companies burning a lot of cash till the product reaches the end user, which sometimes is not tailored to what the client needs. One thing I always tell them is to have early and continuous engagement with the client to understand the root cause of the problem and seek constant follow ups with them. You don't necessarily need a particular degree to succeed as much as you need ideation, understanding end user issues with empathy, and analysis of problems. If you can do that, they will be willing to pay for it. The challenge is to get it right!"

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