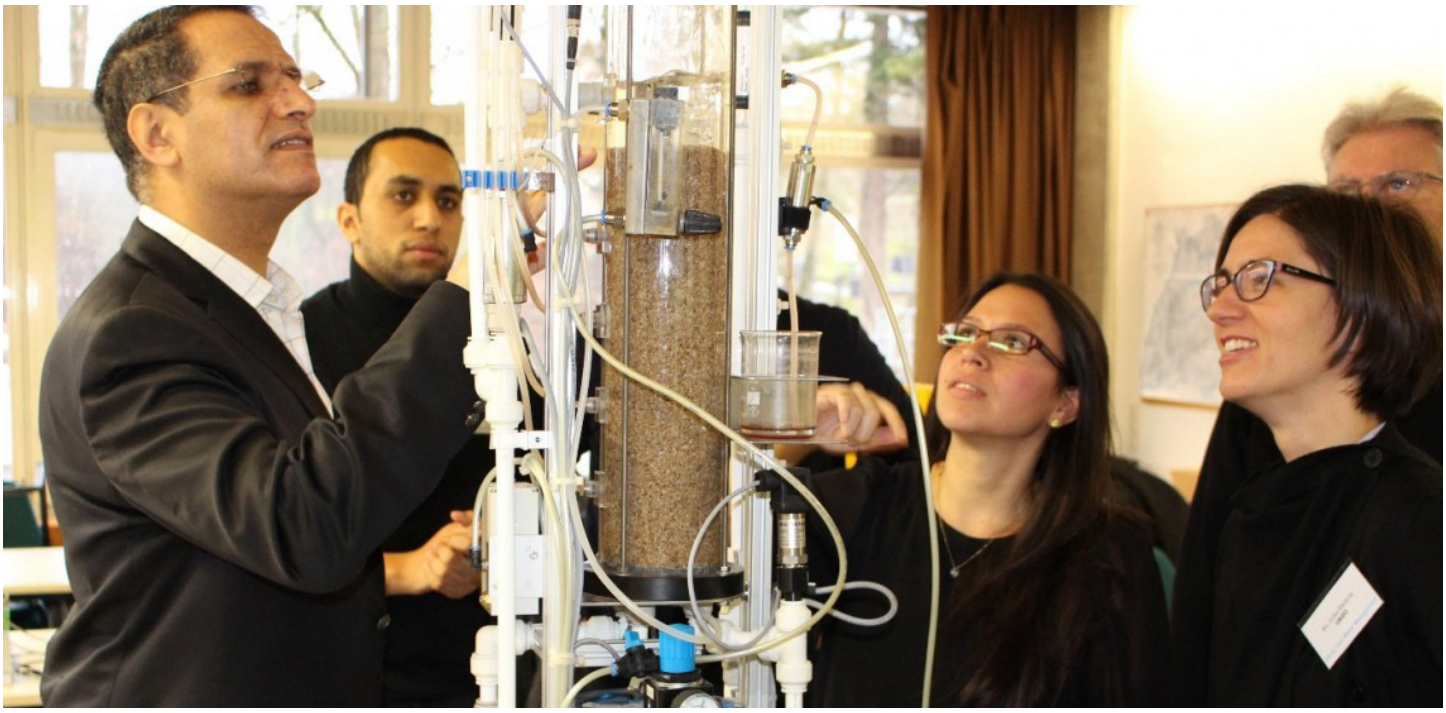

During a visit to Germany, officials from Morocco's water sector learn about best practices for sustainable water management. Photo credit: U.N. Industrial Development Organization (UNIDO)

How Morocco Is Training Country's Next Generation of Water Managers

September 16, 2018

Morocco is staring into an uncertain water future. With a median population age of only 27, Morocco is a youthful nation in transition, contending with the interwoven challenges of urbanization, rapid population growth, industrialization, and climate change. These trends have collectively increased pressure on the country's most vulnerable natural resource, water, with demand and competition for freshwater mounting with each passing year.

The country has enjoyed some notable successes in recent years to extend water supply coverage. In 2000, just more than half of Moroccans had access to an improved water supply in the immediate vicinity of where they lived. By 2015, that figure had risen to more than 68 percent, but still, nearly one-third of Moroccans remain without reliable water access, and only one-fifth of the country's collected

wastewater is treated. The country's current population of 35 million is on track to reach 40 million within the next 30 years. Continuous demand for irrigation water from a thirsty agricultural sector further adds to the country's water stresses despite Morocco's battles with recurring droughts.

So how is Morocco planning on addressing the considerable water-related challenges that lie ahead?

Enter the H2O Maghreb initiative. Launched in 2017, this two-year activity partners U.S. Agency for International Development (USAID) and the U.N. Industrial Development Organization (UNIDO) with Moroccan government bodies—the Ministry of National Education, Vocational Training, Higher Education, and Scientific Research; the Ministry of Equipment, Transport, Logistics, and Water; and the National Office for Water and Electricity (ONEE)—and two business partners, Festo Didactic and EON Reality.

H2O Maghreb aims to harness the power of science, private sector innovation, and state-of-the-art technology to build the country's capacity for sustainable water and wastewater management in both the public and private sectors, and train Morocco's next generation of water managers—with a special focus on improving the employability of young people in the water sector and providing further professional development to those already involved. As the project ramps up in Morocco, H2O Maghreb is also considering expansion into other parts of Morocco and beyond, with eyes on bringing its water management training module to other arid and semi-arid countries across the Maghreb, North Africa, and the Middle East.

"To Moroccans, water is wealth," says Salma Kadiri, a project management specialist with USAID/Morocco. "As the population grows and the economy develops, there are increasing amounts of stress on Morocco's limited water resources. Ensuring future prosperity for all starts with addressing the main challenges of sustainable water management today. By leveraging technological advances from around the world, H2O Maghreb aims to support Morocco's sustainable development by bringing modern practices to the water and wastewater sectors."

Turning the Virtual into Reality

At the heart of H2O Maghreb's mission lies innovation. The project emphasizes novel approaches to learning as it seeks to train an emerging generation of water technicians. Given the tech-savviness of Moroccan society, where roughly half the nation's population uses a smartphone according to a recent survey, it may come as little surprise that H2O Maghreb's program designers are implementing a curriculum that is cutting-edge and reliant on the next frontier of immersive technology—virtual reality (VR).

H2O Maghreb's business partner EON Reality is enriching the project's teaching curriculum with VR applications that enhance students' technical training with trainees using VR equipment to gain "hands-on" experience with a virtual water treatment facility, while also simulating how to manage and respond effectively to real-life emergencies that may occur at water and wastewater plants.

"One of the major advantages of VR is that students can be trained on dangerous situations or situations difficult to reproduce such as lightning strike, flooding, or chemical accidents within the safe environment of VR," says Ulrike Bletterie, H2O Maghreb project manager, on the technology's ability to help prepare students for the unexpected. "Furthermore, VR allows [us] to reproduce the exact same training conditions for all students, which is especially helpful for examination and standard training," such as safety and security and treatment plant inspections.

The VR-based training develops students' technical skill sets while promoting best practices for sustainable water management gleaned from both the public and private sectors. In doing so, the curriculum takes a holistic, systematic view toward water and wastewater management, so that up-and-coming water managers gain an appreciation of and familiarity with the complexities and trade-offs needed when municipalities, industry, and agriculture are competing for the same finite water supply.

While VR represents a new avenue for engaging aspiring water managers, H2O Maghreb's programmatic emphasis on cutting-edge technology as a training tool does not end there. Thanks to the work of project business partner Festo Didactic, e-learning opportunities are made available to trainees and classes utilize a water management training system known as the Environmental Discovery System (EDS), which provides students with a thorough understanding of the hydrologic cycle and traces water's journey step-by-step "from the source to the wastewater treatment plant," says Bletterie. "This gives the students the opportunity to try out the different functions in the water cycle and directly see the interaction between these functions and how to influence them."

The goal, project staff say, is to create a flexible approach to teaching that increases the chance that students will be responsive to at least one of the methods. "Each person has a different way of learning," says Bletterie. "All these elements together with classical classroom training contribute to a solid and practical training approach that provides participants in the program with skills required for real-life working environment." Furthermore, nowadays as employers in the sector seek staff that is appropriately skilled and flexible, training future recruits on a broad scale of topics using a variety of methods is a strategy aimed at maximizing their chances on the job market.

The objectives of this multi-pronged approach to learning, she says, are to both accelerate the training process while also ensuring the students are retaining the macro- and micro-level details concerning sustainable water management. "By offering different training modalities such as classroom training, training in the lab [EDS], training through VR, and training in the field the students will learn quicker, memorize easier, and get better practical skills," which will in turn bolster their employability in the water and wastewater sectors of not only Morocco, but elsewhere across Africa as well. (Interested in seeing Aquatronics VR training in action? Click here.)

Boosting Employability by Breaking Down Gender and Language Barriers

Anchoring the project is an existing training center in Rabat, which will welcome this

new water knowledge hub where the curriculum will be put into action. At the center, H2O Maghreb's cutting-edge, market-driven training will equip young Moroccan water professionals with the knowledge and experience they will need to find employment within the country's water management sector. To help break down some barriers to learning, the center will offer training materials in multiple languages. "The curricula will be made available in French as well as in English, with a view to easing replication of the H2O training program," says Maximilien Pierotti, H2O Maghreb's technical coordinator, who notes "the training of trainers and beneficiaries will be conducted in French."

H2O Maghreb is also focusing on boosting the employability of women in the country's water sector, actively recruiting women for training in an effort to overcome long-standing gender barriers within the sector. In Morocco, considerably fewer women than men work, with the greatest gender disparity found in middle-income jobs. To help close this gap within the confines of the water sector, H2O Maghreb has stitched gender mainstreaming into the fabric of its programming, specifically soliciting the involvement of young women as well as young men. "The project will strive to encourage women to attend the H2O Maghreb training program," says Félix Duterte, a H2O Maghreb staffer, "in order to contribute positively to gender equality and not to perpetuate existing inequalities."

To further encourage and facilitate women's involvement in the country's water sector, instructors affiliated with H2O Maghreb will discuss gender issues as part of their training, and the activity will disseminate gender-sensitive communication materials featuring "both male and female trainees and a gender-neutral vocabulary," according to Duterte. "Gender awareness will also be raised among trainers during their training, and the project's performance management system [i.e., various data collection tools] will ensure disaggregation of information by gender," he adds.

Taking It to the Streets

While project designers are currently focused on implementation activities in Rabat, they are also taking steps to facilitate future replicability in other settings. If the H2O Maghreb trainings yield positive results in Rabat as planned, might the project's training model be applicable to other water-stressed communities?

Project designers certainly believe so. "Collecting and sharing lessons learned and best practices is an integral part of H2O Maghreb; it is expected that its training program will be replicable to a large extent in various other contexts," says Pierotti, noting that planning is already underway to offer the trainings elsewhere in the country. "The project will work closely with Moroccan Government counterparts to make sure that the training program gets fully accredited, and this will allow other Moroccan schools to deliver the H2O training program," he says.

Beyond Morocco's borders, H2O Maghreb has already been hosting community-of-practice meetings for government officials, private sector representatives, and members of academia to raise public awareness about the trainings across North Africa and the Middle East. The project plans to organize more such meetings, and also intends to place significant emphasis on involving water stakeholders from across sub-Saharan Africa. To further broaden dissemination of the water-sector

knowledge created through H2O Maghreb, the activity will be linked to the Learning and Knowledge Development Facility, a hub with virtual and face-to-face knowledge-sharing functions. "The combination of these activities will pave the way for the dissemination of relevant, practical knowledge in relation to drinking water and sanitation," says Pierotti.

"H2O Maghreb provides a state-of-the-art equipment and curriculum to deliver market-driven training programs to young Moroccans," adds Kadiri. "Through this collaboration, we hope to develop an easily transferable model that can help other countries improve their water management techniques using modern technologies."

By Russell Sticklor

• • •

Additional Resources:

- H2O Maghreb
- Learning and Knowledge Development Facility
- USAID/Morocco
- United Nations Industrial Development Organization
- Morocco National Office for Water and Electricity (ONEE)
- Morocco Ministry of National Education and Vocational Training
- Aquatronics

This article appears in Global Waters, Vol. 9, Issue 5; for past issues of the magazine, visit Global Waters' homepage on Globalwaters.org.