



INNOVATIONS IN IRRIGATION

In Upper Egypt, low-cost irrigation technologies can make all the difference



Much of the water in earthen canals — like the one seen here in the Qena governorate — is lost to seepage before it reaches the crops.

Irrigation in Egypt

Irrigation first began in Egypt around 6000 BCE and makes up over 86 percent of water withdrawals today¹. Agriculture is such an essential part of Egypt's GDP that the Government of Egypt made improving irrigation efficiency an economic priority. While Egyptian farmers have made great strides in modernizing their irrigation practices and increasing their water use efficiency, governorates in Upper

.....
"THERE IS A WILLINGNESS TO ADOPT NEW TECHNOLOGIES THAT CREATES OPPORTUNITIES FOR INTRODUCING SUSTAINABLE IRRIGATION IMPROVEMENTS."

¹ FAO. 2016. AQUASTAT Main Database, Food and Agriculture Organization of the United Nations (FAO).

² El Gafy, I., Ramadan, N. & Hassan, D. (2014) Economic irrigation water productivity maps for Egyptian governorates,

Egypt lag in water efficiency and crop productivity due to the higher evapotranspiration rates (more water needed per feddan, which is little over one acre), higher costs of irrigation equipment, and fewer local service providers to inform farmers and sell them more efficient irrigation equipment².

Understanding the Problem

Winrock began working with CNFA in 2015 under the USAID Feed the Future Egypt Food Security and Agribusiness Support (FAS) project to understand the challenges to improving irrigation in Upper Egypt and promote water efficient irrigation technologies. Winrock's team visited over 30 farms across eight governorates in Upper Egypt to learn more about their current irrigation systems and challenges. The team found leaky, old equipment, poorly designed and low-pressure pipe schemes, and few water filtration units. "Many of the observed practices and technologies employed by farmers were largely dependent on the financial means of the farmer, their water source, and the crop and soil type," says Dr. Tim Pfeiffer, one of the irrigation experts Winrock engaged under FAS. "But there is a willingness to adopt new technologies and an increased private-sector presence that creates opportunities for introducing sustainable irrigation improvements."

Designing a Solution

After discussing irrigation needs with farmers at the demonstration plots, Winrock's team of irrigation experts designed various potential upgrades that would improve the efficiency of each farm's system. Specifically they looked at innovations that were locally available and low-cost enough that other interested farms could invest in similar technology.

Official publication of the European water association (EWA), ISSN 1994-8549





One such technology is a floppy sprinkler, which mimics rainfall by cutting the stream of water into uniform, medium sized droplets and dispersing them into the air in a wide circumference. This prevents mist formation, which can increase the risk of crop disease, and increases application efficiency. It also cools the crops, which can increase crop yield by up to 16 percent³.

Improving Irrigation

FAS identified the Al-Modather Company for Agricultural Development to promote irrigation technology through a demo plot at their site, leveraging their connection with smallholder farmers as a provider of agricultural production inputs (seeds, seedlings, fertilizers, pesticides, and small sprayers) in Aswan. After Winrock's irrigation experts toured the site and discussed Al-Modather's irrigation needs, engineers Mohamed Malek and Tim Pfeiffer designed a floppy sprinkler system to cover a 3-feddan plot and installed a canal liner to reduce the amount of water lost to seepage with FAS staff.

"We are still waiting on the results," says Modather Ahmed Mohamed Khodary, Director of the Al-Modather Company for Agricultural Development, "but we expect up to a 30-percent increased yield of alfalfa next month." These upgrades have not gone unnoticed. As customers have visited the center for other agricultural inputs, they've expressed a great deal of interest in the floppy sprinklers. Given their affordability and the increased demand, Al-Modather has become a distribution point for floppy sprinklers for Green Eagle Tech Company.



The owner of the Abnaa El Sharif farm center in Assiut gives a demonstration of his new floppy irrigation system.

Al-Modather is just one of eight sites where Winrock and CNFA upgraded irrigation schemes to improve water use efficiency and crop yield across six governorates. Coupled with Winrock's research into water use efficiency for key crops in Upper Egypt and CNFA's agriculture value chain approach to improving horticulture productivity and strengthening access to markets, these irrigation technologies offer low-cost, high-impact opportunities to sustainably improve irrigation across Upper Egypt.

www.feedthefuture.gov

³ Li, Yan & Guan, Kaiyu & Peng, Bin & Franz, T. & Wardlow, Brian & Pan, Ming. (2020). Quantifying irrigation cooling benefits to

maize yield in the US Midwest. *Global Change Biology*. 26. 10.1111/gcb.15002.

