

UNL Extension Works with Afghan Farmers to Improve Techniques and Efficiencies

By

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Greetings from Afghanistan. My name is Vaughn Hammond, Extension Educator with University of Nebraska-Lincoln Extension on assignment in Afghanistan working with local agriculture producers.



Agriculture in Afghanistan is very similar to agriculture in the U.S. in the very early 1900's. Issues that dictate what Afghan farmers grow are similar to those facing American agriculture producers. Some of these include market, price, transportation and WATER. Water is the overriding factor that determines if the Afghan farmer has a chance of success.

Afghanistan has a rich culture dating back thousands of years and agriculture has played a central role in their history. It has a predominately dry continental climate. Negligible precipitation occurs during the growing season in the majority of the country's cultivatable land. Most of the annual precipitation occurs at the higher elevations of the Hindu Kush mountain

range. Afghan producers have been irrigating for centuries and do it much the same way they did hundreds of years ago. They have learned how to harvest seasonal moisture primarily from the mountains and divert, collect, store and move it throughout their arid land. This is accomplished successfully, but inefficiently through ancient, manual, labor-intensive methods.

Currently Afghanistan uses two types of irrigation systems which they call the informal and formal systems. Informal systems are developed and managed by communities, with no government assistance. Community resources dictate their success. Farmers using informal systems are allocated specific amounts of water, which are allocated to each farmer in proportion to sweat-equity the farmer puts forth in maintaining the system and to cash paid by the farmer.

Surface water accounts for 30 percent of irrigation water and supplies 86 percent of the irrigated land. The infrastructure used includes diversion structures called surbans; main, secondary and tertiary canals that are predominantly unlined and made of earth, conveyance structures such as culverts, siphons and aqueducts and then access points. Small earthen retention dams are also used to capture runoff from the mountains.

Groundwater systems tap into shallow groundwater sources through springs, karez, and wells. Springs are an important water source for rural communities and their survival. An estimated

5,600 spring-fed irrigation systems provide water to approximately 188,000 hectares. The spring-fed systems are generally lower volume systems and are often supplemented by other water sources. Water allocation is again based on sweat equity and cash payment.

The karez extracts groundwater through a series of sub-surface tunnels and canals to gravity-feed water to communities for distribution. These underground tunnels and canals can stretch several kilometers and some are hundreds of years old. It is estimated that there are 7,000 karez responsible for irrigating 170,000 hectares of land. These are operated and maintained by individual communities and are long-term sources of good, quality water.

Wells are the final water source in the informal system. Information is sketchy due to the war and loss of many records. The last good records date to the 1960's. At that time, less than 1 percent of the water came from wells. Traditionally wells are shallow and hand dug. Most wells of this nature are only capable of irrigating approximately three hectares. Recently, with help from coalition forces, more wells are being dug with modern equipment, but the numbers are relatively small compared to other methods of sourcing water. New wells are deeper and capable of watering a much greater area.

Formal irrigation systems exist with assistance of the central Afghan government. These are large irrigation systems financed, maintained and regulated through the government. Afghanistan currently has 10 such systems; all supplied by water sourced from major waterways and storage dams. They are running well below capacity and are in very poor condition due to the current state of the government.

Both informal and formal systems share some common characteristics. The transfer of water from the source to the farmer is done most commonly through a series of open canals of varying size down to a simple one-foot deep ditch. Local farmers typically farm areas known as jeribs. A true jerib is equivalent to about 0.49 acres. In reality, few jeribs are that size. The average Afghan farmer cultivates three to five jeribs. Each is surrounded by a 12 to 18 inch soil dike. Open canals bring water to the jeribs. At that point, the farmer will dig an access to his jerib, flooding it with water. When adequate water has been applied, the farmer will backfill the access point to stop the flow of water. When beds are utilized, water is directed into furrows between the beds. In orchard plantings, the water is channeled to each individual tree for irrigation.

The concept of using buried pipe to move water from the source to fields is almost unthinkable primarily due to cost, but also because of tradition and culture. Farmers know and understand the irrigation methods that have been used for hundreds of years. They believe the old methods have served them well, and believe they remain the best option. The average farmer has been successfully growing crops this way for generations, and it is part of the farming culture to spend the day with shovel in hand diverting water throughout the jerib to the different crops that need irrigating.

We are trying to demonstrate how use of buried pipe for water transfer to jeribs will increase efficiency. Educated Afghans understand and welcome this new approach and can see the advantages while others see no need for the added expense. Our hope is to demonstrate that water transferred through pipes will cut down on the time and amount of water used to irrigate crops.

We are also trying to introduce drip irrigation to fruit and vegetable producers. Farmers have a hard time understanding that a dripping emitter is actually capable of supplying adequate water for crops. The delivery system plays a role because most often there is little or no water pressure involved. Water has to be transferred to an elevated holding tank to achieve enough pressure to drip-irrigate a larger area. Once again, cost and tradition are major barriers in converting from the old ways.

At Home in Nebraska....

I'm Jenny Rees, a UNL Extension Educator currently serving as UNL's agricultural point-of-contact for Nebraska National Guard Agribusiness Development Team 2 (ADT2) to help them with reach-back. "Reach back" is conducted primarily by email and/or Facebook where soldiers send questions, provide pictures, or explain issues they are experiencing. Because UNL Extension is well connected and has a wide breadth of research-based resources, I send the information from the soldiers to Extension Specialists or Educators best qualified to help. They, in turn, respond to our soldiers. We have an excellent group of faculty dedicated to this effort and, thus far, we've been able to provide information back to our soldiers in 24 hours or less! Additional partners include the USDA's Natural Resources Conservation Service (NRCS) and the National Agroforestry Service.



The 58 Nebraska National Guard soldiers serving on ADT2 all have some agricultural experience and volunteered for this mission. Soldiers are training qualified local Afghans to be Extension Educators; to take knowledge to the rural people and improve their lives and sustainability. They are also developing research and demonstration farms, teaching classes in poultry and beekeeping production, working with local universities, and conducting watershed, irrigation, and wheat distribution projects. Thirty years of war resulted in a huge loss of agricultural knowledge and has set the country back 100 years compared to where production agriculture in Nebraska is today. If we can teach the Afghan people how to sustainably grow their own food to feed and provide for their families, then hopefully they won't have to rely on the poppy and drug markets which feed terrorism.

The 12 soldiers of the "ag team" responsible for training the Afghan people had the opportunity to get to know UNL Faculty through pre-deployment training conducted in the areas of wheat/specialty crops/irrigation/old equipment, livestock and veterinary practices,

fruits/vegetables/greenhouses, water quality, food preservation, and beekeeping. Extension Educator Gary Zoubek and I coordinated training involving over 25 UNL Extension Specialists and Educators at Scottsbluff, Lincoln, Nebraska City, and the ARDC near Mead. Our UNL team is currently training ADT3 and has been able to improve our training as we received more information regarding conditions in Afghanistan and training suggestions from ADT2. We also have developed a clearinghouse of all training materials, resources, and photos for the Nebraska ADT teams at <http://cropwatch.unl.edu/militaryresources>.

Our ADT2 soldiers along with UNL Extension Educator Vaughn Hammond are making great strides toward helping the Afghan people. I'm so proud of them and thankful for their service! Here's wishing all of them a safe and productive remainder of their deployment!