

Senator Jerry Moran
Questions for the Record
Subcommittee on Consumer Protection, Product Safety, Insurance & Data Security
“Technology in Agriculture: Data-Driven Farming”
November 14, 2017

Question 1. One of the aspects of your background I found interesting is the work you've done with farmers in developing nations, specifically as it relates to irrigation. I chair the Senate Hunger Caucus and have worked for many years on the issue of reducing food insecurity in the world. I believe that agriculture development initiatives that help countries feed themselves is a key part of the long-term strategy to end global hunger. Can you elaborate on your work with farmers in developing countries, specifically as it relates to using water more efficiently, and how that work has reduced food insecurity?

I would like to take this opportunity to thank Senator Moran for asking this question and for his bipartisan leadership on the Senate Hunger Caucus. Food assistance, and other support provided by the US all over the world, leads to reduction of global food insecurity.

My expertise is in agricultural engineering with a focus on water management and irrigation. As reported by the Food and Agriculture Organization (FAO) of the United Nations and by the World Bank, approximately 70% of fresh water usage is for agriculture. Most of agricultural irrigation systems are poorly designed and poorly managed. Even the best irrigation systems, if not maintained and carefully managed, are inefficient. Most of the irrigation systems over-apply water and there is a potential to improve efficiencies through technology and education.

My major effort has been focused on Florida growers and specialty crop production in Florida. I have also been a university teacher working with the next generation of farmers, academics and irrigation specialists. I teach people how to design, manage and maintain irrigation systems. My work has been focusing on efficient systems such as microirrigation and sprinklers. These systems are usually used for higher value, specialty crops such as fruits and vegetables but can also be adapted for small farmers in developing countries.

My international work has been largely in education. I have worked for FAO in Zimbabwe designing curriculum and lab experiments for a six-months intensive course focused on planning, design, maintenance and management of irrigation for smallholder farmers. I have taught two 2-week courses in Egypt. I have spent 3 months in Mexico and 4 months in Chile investigating and teaching efficient methods of irrigation. In addition, my students have worked with farmers in India, Ecuador, Columbia and Poland.

As an example, one of my students, working in Jamaica on his Masters project, implemented a simple drip system for calaloo (Jamaican spinach) and cucumbers. The increases in yield and reduction in water usage were significant. After the experiment was finished, the farmer adopted the system on the entire farm.

Question 2. What opportunities exist, if any, to take the technology being used today by large-scale U.S. farmers and use it to help smallholder farmers in developing nations be more productive and sustainable?

New technologies can eliminate many maintenance mistakes through automation and sensor control. New technologies can provide inexpensive alerts, and in the future, automatic intervention.

Technology leapfrogging is likely in agriculture in developing countries. Use of cell phones in developing countries is often cited as an example of leapfrogging. Apps and advisory programs, built and available from the open sources, can be made available on the smartphones. Solar phone chargers are becoming available even in very remote locations without an electrical grid. Access to quality data is critical for development of Apps and tools that can be available to poor farmers. One of the examples of an open platform is the BioSense Institute in Serbia. This project was funded from the European program Horizon 2020.