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Efficient irrigation water management practices to sustain irrigated agriculture in arid climates

Historically, agriculture was the main water consumer in the arid Eastern Colorado. But the state's demand for water has increased because of rapid urban growth and development of oil and gas industry. Urban communities started buying agricultural water rights to satisfy their growing demands. However, alternative land uses for farms without water right are limited and often they are left fallow. Therefore, rural communities are believed to be at risk because of the fast pace of this change. This paper will report on a collaborative research effort that is undertaken by the United Water and Sanitation District, the Platte River Water Development Authority and the Colorado State University. A combination of subsurface drip irrigation and deficit irrigation is under experimentation in the region with the objective of investigating alternatives to the current practice of buy-and-dry whereby urban cities buy and transfer water rights, leaving the rural agricultural lands fallow. The subsurface drip irrigation is an efficient water use technology that can be employed to raise crops with minimum amount of water. Also, the practice of deficit irrigation can assist farmers grow crops with small amounts of water. The proposed research will generate knowledge that can be used by the local farmers to successfully adopt these water management practices. In the context of deficit irrigation, the research will develop crop water production functions (CWPF) for selected crops. CWPF is the relationship between the amounts of water consumed by a crop and the resulting yield, and is used in water use optimization plans. The underlying promise of the research project is that farmers can keep part of their water for farming activities, rent the rest to other societal uses and benefit more from their water rights. The research will also provide a planning tool (software package) for farmers to decide on the amount of water dedicated to on farm and/or off farms uses. The research is undergoing in an experimental field of 82 acres in Kersey, Colorado. The experimental field is divided into 19 zones of 3.5 to 5 acres. Each zone can be irrigated individually, that is applied water is controlled at the head of the zone by a valve and measured by a flow meter. Zone size is larger than conventional research plots and closer to farming plot size in the area (normally farmers irrigate every 10 acres under one valve). The field was equipped with subsurface drip irrigation system from Netafim in spring 2015. Water application is controlled by a programmable controller according to calculated water requirement on a daily basis. A weather station has also been installed in the field to record data required for water requirement calculations.

Biography

Ramchand Oad has obtained his PhD degree from Cornell University and has been working as a Professor at Colorado State University since 1986. His career has focused on promoting economic welfare through sustainable development and management of water resources and by promoting its efficient use in irrigated agriculture. At Colorado State, in addition to teaching and research, he has worked with the North and Central Colorado Water Conservancy Districts and several Irrigation Companies to modernize their Water Delivery Systems. He has extensive work experience in developing countries, where he has worked as Consultant for the World Bank, Asian Development Bank and the USAID.

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