

A Strategy to Conserve Agricultural Water Use in Colorado's Front Range Region

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Abstract. For the joint sustainability of agriculture and other economic sectors, agriculture water use will need to become more efficient and productive in the future. And, indeed, there are opportunities in the agriculture sector for water conservation by utilizing modern technology such as the drip irrigation and the practice of deficit irrigation. The overall goal of the proposed research is to generate knowledge for preserving the strong agricultural economy of the South Platte Valley in Eastern Colorado, while at the same time freeing up some water for other societal needs. This will be done by establishing a research/extension station in the region and conducting experimentation on more efficient irrigation technologies such as subsurface drip irrigation and deficit irrigation. The research would provide the local farmers the scientific knowledge of crop production functions or the water stress-crop yield relationships. This is important for making informed decisions related to the optimum level of deficit irrigation that will result in desirable water savings and increased revenues but not reduce the crop yields beyond a certain target. The underlying premise is that by following such crop and water management practice, the farmers can increase their net economic returns. This collaborative research effort will be conducted by the United Water and Sanitation District, the Platte River Water Development Authority, the 70 Ranch, and the Colorado State University. An experimental field of about 100 acres has been made available by the project sponsors, which will be arranged in 18 test parcels equipped with Netafim drip irrigation system. The test parcels will be cultivated with local crops and irrigated under different levels of water deficit. The crop water production functions will be determined and an economic analysis will determine the optimum level of deficit. At the same time, the local agricultural economy and institutional structure of agricultural production will be studied in order to explore actual ways of implementing temporary or permanent transfer of water to non-agricultural sector. Our planning horizon to achieve these long-term goals is about 15-20 years, but some practical answers to specific research questions should be available in early phases.

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