Lab and Field Quantification of Seepage in Colorado Irrigation Canals: Phase II

Faculty mentor: Timothy K Gates, Professor, Civil and Environmental Engineering Department, email: timothy.gates@colostate.edu

Field-based extension agent: Blake Osborn, Water Resources Specialist, Colorado Water Center, email: blake.osborn@colostate.edu

A large amount of water diverted for irrigated agriculture in the Colorado’s Cache la Poudre River Basin seeps from earthen canals during conveyance to irrigated fields and results in a variety of environmental and economic damages. Canal seepage not only leads to water loss, but also contributes to mobilization and transport of subsurface pollutants and to shallow saline water tables which reduce crop yields. The cost of lining canals with conventional materials (concrete, geomembranes, etc.) is usually prohibitive and can exceed the benefits in many agricultural applications. Thus, there is a need for a seepage control technology that (i) leads to marked reduction in losses and related agro-environmental damages, (ii) is cost-effective, (iii) is easy to apply, and (iv) can allow groundwater recharge when needed.

This project proposes to enhance and continue the Extension component of an Colorado Agricultural Experimentation Station (CAES) funded research project to evaluate the promise of biopolymer sealants to reduce seepage from unlined irrigation canals in Northern Colorado. During our 2021 Extension Internship project, our student intern Rehman Lund interacted with the stakeholders of the agricultural community about the benefits of the canal sealing efforts, developed good working relationship with a canal company that will lead to potential research projects in the future, completed a field test demonstrating about 70% reduction in seepage, and presented the findings at the poster showcase event of the Extension program.

In continuation of ongoing efforts, we anticipate that Rehman will engage in the following learning activities during a proposed second phase of the 2022 Extension Internship :

1. Continue working with the managers of the Larimer and Weld Irrigation Company (LWIC) managers to conduct further field seepage tests and related lab tests for a second (and enhanced) phase of field biopolymer application. Along with making good research progress, Rehman will learn the dynamics of working in the field with people from different backgrounds, enhancing his personal and professional development.
2. Assist the LWIC in developing a canal sealing research proposal that will support a portion of the costs of the on-going research, including supplies, and the time and effort of Rehman and other student assistants.

Like last year, Rehman will participate in the weekly/bi-weekly meetings of the Extension program to share progress. He will be encouraged to email and/or ask for meeting times from the faculty mentor to discuss optimizing the fieldwork methodology on an as-needed basis. Financial support for equipment, supplies, and travel will be provided by supplemental sources. Rehman will present the findings from the Extension Internship project through a poster presentation and eventually through refereed publications.