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Evaluating drought management strategies in Andean irrigation systems

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Abstract

In the Ecuadorian Andes, approximately 70 percent of people in rural communities rely on agriculture and livestock for their livelihoods. Recently, prolonged, and intensive droughts have caused significant negative impacts on agricultural activities because farmers are not ready to cope with this natural phenomenon. This is due to a lack of knowledge about agricultural water management, the high implementation cost of conventional drought management strategies, and the lack of data about their irrigation schemes. This has led to decreased production and has had profound economic, social, and labour repercussions within these communities. In this study, we worked together with irrigation water user associations to identify key cost-effective water management strategies that farmers can implement. Using farmers' knowledge about drought impact on water availability in the headwaters we reconstructed the hydrological and hydraulic conditions of severe and mild droughts. With this information, we developed scenarios for managing irrigation water effectively. Additionally, we conducted interviews with 45 water users to identify strategies for water management under droughts at the plot scale. A literature review was carried out to identify successful strategies implemented elsewhere. Strategies were ranked from low cost, fast implementation to high cost, highly technical. We used models to identify the impact of these strategies. Preliminary findings indicate that simple strategies (e.g., irrigation scheduling) will have a moderate impact on reducing the impact of droughts and that the best adaptation will require a combination of measures and strategies (e.g., building small-scale reservoirs, and adoption of rainwater harvesting systems). We also identified strategies that will never be implemented by farmers due to their complexity. A combination of soft data, modelling, economic costing, and farmer's participation is essential to generate sustainable solutions to droughts.

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