CASE STUDY 3A: Sustainable Groundwater Management

Managed Aquifer Recharge (MAR)
Site Selection, Characterization, and Monitoring

Participants

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Introduction

Changing global climate extremes, including some of the most severe droughts on record in California, spotlight the need to more precisely observe and allocate our water supply for agriculture, ecosystems, and growing population in semi-arid regions. The varied geography, hydroclimates, ecosystems, and system shocks that have occurred and are expected in California and Mexico provides compelling intersections of water resource availability and demand.

The goal of this proposal is to collaboratively explore combinations of precision water monitoring and modeling strategies in support of integrating agriculture with managed aquifer recharge (AgMAR). In short, AgMAR has the potential to enable subsurface storage gains achieved during wet years to supplement irrigation needs in dry to normal years. As we complete our understanding of and gain the capacity to precisely monitor AgMAR processes and systems, growers and water resources managers will be more able to act decisively with respect to water allocations.

Objectives

- Developing and testing measurement and modeling strategies for assessing AgMAR potential on farmland or marginal lands near farms, and identifying best practices.
- Identifying metrics for success in AgMAR and developing a pilot program for testing these metrics.
- Exploring the potential impact of widespread AgMAR implementation in vulnerable agricultural regions in California and Mexico, particularly in severely over-drafted groundwater basin.
- Identifying metrics for success in AgMAR and developing a pilot program for testing these metrics.

Hypothesis/Expected Outcomes

- The proposed research will explore current approaches and develop new strategies for AgMAR monitoring and management in California and Mexico.

Figures/Tables

Figure 1. Illustration of monitoring, modeling, and management technology for an agricultural managed aquifer recharge (AgMAR) system, showing optimization of short-term (irrigation event) and long-term (aquifer recharge event) operations.