INTEGRATION OF AQUACULTURE AND ARID LANDS AGRICULTURE FOR WATER REUSE AND REDUCED FERTILIZER DEPENDENCY

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Field irrigation is costly in arid regions, and over-fertilization of farmland can lead to high groundwater nitrate levels and significant environmental challenges. Integrative aquaculture and agriculture (IAA) systems allow the reuse of water and nutrients to offset production costs while promoting greater sustainability. The aim of this study was to test the effectiveness of an IAA system using treatments formed from one water source, groundwater (GRND) or fish pond effluent (EFF), and one chemical fertilizer regime, eliminated (ELIM) or historical (HIST). Treatments were applied to field plots of barley or cotton. There were typically positive effects of EFF applications on crop growth and yield relative to GRND applications under identical fertilizer regimes. However, GRND-HIST almost always outperformed EFFELIM, suggesting that substituting effluent irrigations for a historical fertilization regime without pond biosolid or reduced fertilizer applications could be detrimental to crop production.