

Understanding and Modeling the Scope for Adaptive Management in Agroecosystems in the Pampas in Response to Interannual and Decadal Climate Variability and Other Risk Factors

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Agricultural ecosystems play a central role in world food production and food security. Agroecosystems combine the complexity, multiplicity of scales, and feedbacks of biophysical interactions in natural ecosystems with the additional intricacies of human decision-making. This abstract summarizes preliminary results from a multi-disciplinary project aimed to understand and model the dynamic interactions of natural and human components in agroecosystems, with special emphasis on assessing the scope for adaptive management in response to climate information. The work focuses on the Argentine Pampas, a major agricultural area affected by inter-annual (El Niño-Southern Oscillation phenomenon) and inter-decadal climate variability. The project combines a rich set of methodologies, including linked modeling approaches for generation of climate scenarios and simulation of decision outcomes, controlled experiments on farmers' decision-making and participatory research that draws on stakeholders' experiences and preferences. Results of ongoing activities encompass (a) the understanding and modeling of impacts of inter-annual and inter-decadal climate variability and the use of climate information within an adaptive management framework, (b) the understanding and modeling of decision-making in the light of climate variability, probabilistic climate information (e.g., seasonal forecasts of regional climate), and other factors (economic, social), and (c) the assessment of environmental consequences of production systems that evolved in response to changing climate and technologies. A distinctive element of our work is the emphasis on realistic approaches to understand how human and natural systems respond to climate uncertainty. Therefore, although focused on inter-annual and decadal scales, results derived from our project will provide useful insights for future agricultural adaptation to climate change.