

Presentation Information

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| Title | Agent Based Simulation of Recent Changes in Agricultural Systems of the Argentine Pampas |
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Abstract:

The Pampas of central-eastern Argentina is a major cereal and oilseed producing area. In the last decades, this region has undergone significant changes in climate, land use, and structural characteristics of its agricultural production systems. This abstract describes the initial version of an agent-based model of agricultural production systems in the Pampas. The model aims to provide insight on recently observed patterns such as the expansion of soybean-dominated agriculture, a reduction in the number (but increase in the size) of farms, and an increase in the proportion of land operated by short-term tenants (tied to a decrease in adherence to ecologically-beneficial crop rotations). The model targets two contrasting regions of the Pampas: the northern part of Buenos Aires Province, a climatically optimal area with a long tradition of agriculture, and the north of Córdoba Province, a marginal sub-region where agriculture became widespread only in the last 20-30 years. On each simulated production cycle, farmers allocate owned and rented land to a realistic range of activities specified for each region. Each agent has different land allocation strategies, and varying personality (e.g., risk and loss aversion) and financial (wealth, working capital) characteristics. After land is allocated, yields and economic returns are calculated. Based on achieved outcomes, farmers update their economic aspirations for the next production cycle. Depending on their accumulated capital, farmers can expand the area they crop by renting additional land. Model design involves close and continuous interaction with regional stakeholders (farmers and their technical advisors). We intend to use the model in two ways: (a) to understand and reproduce land use and farm structure patterns observed in recent decades and (b) once the model is validated, to explore possible trajectories over the next 25-30 years in response to plausible scenarios of future climate and other drivers (e.g., innovative technologies).