

Next generation models of farm management and rural change

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Agricultural modeling, as an applied science, is driven by two general concerns. The first is the problem of building a thorough understanding of the system under analysis and, secondly, to predict potential changes to that system. Agriculture is a complex system of individual farms operating within an equally complex and dynamic environment. The importance of understanding the interaction between individual farm operators is particularly evident in the competition for limited land resources.

In general, current models of farm behavior and investment, do not adequately account for the interactions between individual farms and the spatial region within which they operate. As a result, these models have a limited ability to predict the long term structure of individual farms and rural regions. Rural societies are significantly impacted by shifts in farm structure through the influence producers have on local markets, demand for education and health services and other rural infrastructure.

Agent-based models promise to overcome the limitations of existing farm-level models and will allow researchers the ability to better understand the dynamics of a rural region which are driven primarily by individual farm management decisions. A basic agent-based model of a western Canadian agricultural region, limited to annual crop production, is developed on the NetLogo platform to examine the impacts of producer risk attitudes and government policy on farm and rural structure. The primary objective of the paper is to evaluate the role of agent-based modeling as a tool for appraising and predicting changes in farm and rural structure, specifically related to farm size and management practices.