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## **Simulating Future Wheat Yields' Response to Climate Change and Evaluating the Efficiency of Early Sowing in Spain**

Global food security is one of the main concerns of this century. Moreover, the increasing negative impacts of climate change on different sectors including agriculture are further expected to exacerbate these challenges. The main aim of this thesis is to assess the future impacts of climate change on wheat yields in Spain by 2050 and to evaluate the efficiency of early sowing as an adaptation strategy. This was done by using the LPJ-GUESS model. The model was calibrated and validated against reported experimental wheat data in the most productive regions of Spain. Moreover, future simulations were run using future climate data obtained from two GCMs (ESM2 and CM3), the embedded sowing algorithm in LPJ-GUESS and applied deviations in sowing dates. The results show that wheat will be influenced by climate change in Spain and that earlier sowing dates generally results in increases in yields depending on the location. Finally, this study insists on the need for exploring more adaptation measures as changing sowing dates only would not be a viable option for the second half of the century.

Keywords: Ecosystem Analysis, Physical Geography, Food Security, Climate Change, Adaptation, Early Sowing, Spain, Wheat

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