Evaluating the Adaptive Capacity of Smallholder Farmers to Climate Change: Evidence from Southern Brazil

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Abstract. The increasing frequency of climate-related challenges poses significant risks to agricultural productivity and food security. This study investigates the adaptive capacity of smallholder farmers in southern Brazil, leveraging both qualitative interviews and quantitative surveys to assess coping strategies and the efficacy of government policies. Through a mixed-methods approach, the findings reveal that farmers employing diversified cropping systems demonstrate higher resilience against climate variability. Additionally, the research highlights critical gaps in policy support and educational resources that hinder effective adaptation. The implications of these findings underscore the urgent need for tailored interventions to enhance the adaptive mechanisms of vulnerable farming communities.

Keywords: climate change adaptation, smallholder farmers, agricultural resilience, mixed-methods analysis, policy implications, southern Brazil, crop diversification, food security

Introduction

The impact of climate change on agriculture is a pressing global concern, particularly in regions where smallholder farmers play a crucial role in ensuring food security and sustaining livelihoods. In recent years, climatic extremes—such as droughts, floods, and temperature anomalies—have increasingly threatened agricultural productivity, with smallholder farmers disproportionately affected due to their reliance on rain-fed systems and limited access to resources. This issue is of paramount importance, especially in the context of the upcoming years (2024-2026), as global climate models predict exacerbated climatic variability, which could have detrimental effects on crop yields and food availability. Understanding how smallholder farmers adapt to these changes is essential for

formulating effective agricultural policies and interventions that aim to bolster food resilience. This study specifically focuses on southern Brazil, a region characterized by a diverse agricultural landscape yet vulnerable to climate-induced challenges. We utilize a mixed-methods approach to evaluate the adaptive strategies employed by smallholder farmers, incorporating both qualitative and quantitative data. Through this comprehensive analysis, we aim to provide insights into the factors that enhance or impede farmers' adaptive capacity in the face of climatic uncertainty. The structure of the paper is as follows: we begin with a review of the relevant literature on agricultural adaptation to climate change, followed by a detailed description of our research methodology. Next, we present our findings and discuss the implications for policy and practice. Finally, we conclude with recommendations for future research and interventions aimed at supporting smallholder farmer resilience.

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