

## Analysis of Willingness and Behavior for Fallow Land Management and Protection Based on Structural Equation Modeling: A Case Study of Xingtai City, Hebei Province (Postprint)

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### Abstract

Implementing farmland fallow is a major national strategy for farmland protection and transformation of farmland utilization in China in recent years, and farmers' management and maintenance of fallow farmland is an important prerequisite for ensuring the ecological effects of farmland fallow. This study selected 12 villages in 2 townships of Xingtai City, Hebei Province as the analysis sample, established a set of influencing factors including farmer characteristics, household characteristics, cognitive awareness, and farmland utilization conditions, and used a structural equation model to analyze farmers' willingness and behavioral choices regarding participation in fallow farmland management and maintenance. The results show that: (1) Whether economic compensation is provided has a significant impact on farmers' willingness to manage and maintain fallow farmland. (2) The latent variables affecting farmers' willingness and behavior regarding fallow farmland management and maintenance are not identical, but cognitive awareness plays a significant role in both. (3) Indicator variables such as Party member status, village cadre status, total household population, perceived responsible party for farmland protection in farmers' minds, satisfaction with fallow policy, understanding of fallow farmland management and maintenance techniques, farmland area, and grain planting proportion have positive effects on the willingness and behavior of fallow farmland management and maintenance; while indicator variables such as farmer age, number of non-agricultural employment laborers, household income, and farmland fragmentation have negative effects on the willingness and behavior of fallow farmland management and maintenance. The research findings provide references for further expanding and promoting the implementation of the farmland fallow system: it is recommended to broaden policy publicity channels, improve compensation methods

for fallow farmland management and maintenance, strengthen training on management and maintenance techniques, stimulate farmers' enthusiasm for fallow farmland management and maintenance, enhance their management and maintenance capabilities, and ensure the effectiveness of farmland fallow.

## Full Text

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### Abstract

Cultivated land is a critical resource for agricultural development. Amid rapid urbanization, China's cultivated land resources face numerous challenges, including quantity reduction, quality decline, and ecological degradation, necessitating a transformation in protection and utilization strategies. Land fallowing represents an important approach for maintaining soil quality and restoring fertility. As direct users of cultivated land, farmers are key stakeholders in fallow land management. Understanding the factors that influence farmers' willingness and behavior regarding fallow land management and protection is crucial for promoting the adoption of fallowing systems.

This study employs a Structural Equation Model (SEM) based on survey data from 12 villages across two towns in Xingtai, Hebei Province. The model incorporates four latent variables: household characteristics, family characteristics, cognitive characteristics, and awareness of cultivated land utilization factors. Additionally, two latent variables represent farmers' willingness and behavior, with 12 observable variables including farmer age, Communist Party membership, village cadre status, number of family members, number of non-agricultural employment in family, family income, perceived farmland protection responsibilities, satisfaction with fallow policy, understanding of fallow land management and protection technology, farmland area, grain planting proportion, and land fragmentation.

The analysis yields three main findings. First, economic compensation significantly influences farmers' decisions to manage and protect fallow land. Specifically, 26.44% of farmers are willing to manage fallow land without compensation, while 53.55% require economic compensation to do so. Second, cognitive consciousness exerts the strongest influence on both willingness and behavior regarding fallow land management and protection. While family characteristics, cognitive consciousness, and farmland status significantly affect willingness, farmer

characteristics, family characteristics, and cognitive awareness significantly influence actual behavior. Finally, several factors positively influence farmers' willingness and behavior: Communist Party membership, village cadre status, number of family members, perceived responsibility for farmland protection, satisfaction with fallow policy, understanding of management and protection technologies, farmland area, and grain planting proportion. Conversely, farmer age, number of non-agricultural employment opportunities, family income, and land fragmentation negatively impact these outcomes.

Based on these findings, several policy implications emerge. First, expanding outreach and education regarding fallow land policies and management practices is essential for encouraging farmer participation. Second, providing adequate economic compensation is fundamental to fostering farmers' voluntary engagement in fallow land management and protection. Finally, strengthening farmer training on fallow land management and protection technologies and exploring innovative management approaches for the future are also critical.

**Keywords:** fallow farmland management and protection; farmers' willingness; behavior; SEM; Xingtai

*Note: Figure translations are in progress. See original paper for figures.*

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