Land Use Policy 73 (2018) 195–204

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Farmers' responses to the winter wheat fallow policy in the groundwater funnel area of China

Hualin Xie[a,b,*], Lingjuan Cheng[a], Hua Lu[c,**]

[a] Research Center of Land Management, Jiangxi University of Finance and Economics, Nanchang 330013, China
[b] Co-Innovation Center of Institutional Construction for Jiangxi Eco-Civilization, Jiangxi University of Finance and Economics, Nanchang 330013, China
[c] Institute of Ecological Civilization, Jiangxi University of Finance and Economics, Nanchang 330013, China

ARTICLE INFO

Keywords:
Cultivated land
Fallow policy
Land use
Ordered logistic regression
Groundwater funnel
China

ABSTRACT

Farmers' responses to the winter wheat cropping policy in groundwater funnel areas are the key factor in promoting fallow plans. Therefore, this study discusses the farmers' responses and the influencing factors for the winter wheat fallow policy in the Hebei groundwater funnel area of China by using an ordered multivariate logistic model; it aims to provide a theoretical basis for scientifically and rationally developing a rotation policy in the groundwater funnel area. The results revealed that the number of households, proportion of farmers, per capita area of cultivated land, and machinery used had a negative impact on support for the fallow policy. The dependency ratio and land fragmentation had a significant positive impact on support for the fallow policy. Occupation had the greatest marginal effect on the understanding of the fallow policy and satisfaction with fallow policy compensation, and the dependency ratio has the greatest marginal effect on support for the fallow policy. Finally, this study proposes policy recommendations including the transfer of the surplus labor force, stronger government supervision of fallow policy compensation, stronger cultural education and greater promotion of the fallow policy.

1. Introduction

Due to socioeconomic development and some unreasonable land use, the North China Plain has become one of the most waterless areas in China, and the main water supply source for this region is groundwater. However, long-term overexploitation of groundwater leads to declines in the regional groundwater level, seawater intrusion, land subsidence and a series of other problems (Meng et al., 2011; Wu et al., 2010). In the Hebei Hengshui area, this series of problems is particularly prominent, making the governance of groundwater overexploitation critical. Therefore, Hebei Province has a groundwater funnel area to address the groundwater over-extraction problem; this is combined with a fallow plan proposed at the Fifth Plenary Session of the 18th CPC (Communist Party of China) Central Committee. Furthermore, the fallow plan also noted 500 yuan per mu subsidy per year, by cash or grain. We should respect the wishes of the famers in the pilot process. At this session, relevant policy measures were taken, such as the "Notice of Hebei Province People's Government on the printing and distributing a pilot program for comprehensive treatment of the overexploitation of groundwater in Hebei" (2015) and the "Hebei Provincial Department of Agriculture, Hebei Provincial Department of Finance issuance of the 2015 annual groundwater overdraft; comprehensive management of Hebei, notice of a pilot program for agricultural planting structure and agronomic water-savings-related project implementation". The purpose of these policies is to guide farmers in changing their planting habits, with the goal of achieving "a decrease in the area sown with winter wheat, which proves to be a practical strategy to reverse groundwater overexploitation and to promote groundwater storage." As a grain-producing province, agricultural water accounts for approximately 70–80% of total water resources in the Hebei Plain area (Wang et al., 2013); this is also the main cause of the decline of groundwater in the Hebei Plain (Xu, 2005). In some areas, an ecological fallow policy has been implemented; from the micro individual point of view, a fallow policy will reduce short-term agricultural income, while in the long run, it is conducive to reducing not only water pollution (Khanna et al., 2003) but also nonpoint source pollution and soil erosion (Ribaudo et al., 1994; Luo et al., 2006). Farmers are the most basic subject of land use (Li et al., 2015; Lu and Xie, 2018; Xie et al., 2017b). It is expected that farmers will aim to obtain the maximum profit from agriculture, so theories of farmer behavior have also been gradually introduced into the study of land use (Liu and Huang, 2015; Xin et al., 2009; Wu and Xie, 2017).

* Corresponding author at: Research Center of Land management, Jiangxi University of Finance and Economics, Nanchang 330013, China.
** Corresponding author.
E-mail addresses: landuse2008@126.com (H. Xie), luhuanj@126.com (H. Lu).

https://doi.org/10.1016/j.landusepol.2018.02.003
Received 29 November 2017; Received in revised form 2 February 2018; Accepted 3 February 2018
0264-8377/ © 2018 Elsevier Ltd. All rights reserved.

The groundwater funnel area in Hebei Province is the national pilot area of fallow farmland. Farmers are the main body and specific implementer of the cultivated fallow land. Therefore, the farmers' response to the fallow policy is critical; which is the main basis for testing the rationality of the fallow policy in the groundwater funnel area. Farmers' understanding and support of the fallow policy and their satisfaction with the amount of compensation will directly affect the implementation effect of the winter wheat fallow policy in the groundwater funnel area. Thus, we consider the farmers' understanding of the fallow policy, degree of support for the fallow policy, and degree of satisfaction with the fallow compensation and discuss the theoretical framework of farmers' responses to the fallow policy in the groundwater funnel area. Our results have important theoretical and practical value in the sustainable use and development of agriculture.

At present, international scholars have conducted extensive research on the effects and influencing factors of fallow policies. For example, Duesberg et al. (2017) conducted a logistic regression analysis of the impact of farmers' characteristics on a fallow policy. For families, emphasizing farming and receiving only national pensions have a negative impact on retirement intentions, indicating that pension and age have a positive impact on fallowing willingness and making fallowing recommendations. Vogelsang and Dunbar (1963) used a graphical model to analyze the impact of amount of compensation, satisfaction with the amount of compensation, the amount of fallow land and other factors on farmers' voluntary fallowing. Bremer et al. (2014) used interviews to analyze the impact of different factors on participants in the PES project and found that land ownership, land use restrictions, laws, alternative source availability and other factors had different effects on project participants. Chang and Chen (2011) used a Tobit model and calculated the marginal effect of the impact of different factors on a fallow policy and concluded that the participants were not satisfied with the amount of fallow compensation, which was not sufficient to provide a strong incentive.

Based on the experience of international fallow policies, research in China on fallow policies has also begun to be emphasized in recent years. Some scholars have studied the response mechanism of agricultural policy from the behavioral perspective. For example, Liang et al. (2014) use descriptive statistics and correlation analysis methods to analyze farmers' cognition of and response to agricultural nonpoint source pollution and its influencing factors. This study finds that basic characteristics of household heads such as age, sex, party membership or village cadres have different degrees of influence on the attitude and responses of farmers to policies managing the environment. The willingness of farmers in major grain-producing areas to use water-saving irrigation technology was analyzed, and it was found that the proportion of farming income, government support, arable land, age and other factors have a positive correlation effect (Zhu, 2013). Some scholars also start from the perspective of the diversity of farmers' livelihoods; for example, Li and Cai (2014) used structural equation modeling to analyze the influence of farmers' livelihood diversity on their willingness to participate in compensation policies and the effect of policy implementation and proposed relevant reference suggestions. Cost-benefit analysis, stakeholder analysis, and optimal scale regression models have been used by some scholars to study farmers' responses to policies such as ecological compensation and direct subsidies for food and grazing land. For example, Zhang (2006) uses the cost-benefit analysis method to construct a correlation analysis model between the state compensation policy and farmers' responses and proposes corresponding measures and suggestions. Stakeholder analysis and comparative analysis methods were used by Long et al. (2015) to identify the differences in the attributes, types and behaviors of local government-paid eco-compensation stakeholders and reveal the causes of these differences. Yuan (2013) established an ordered logistic model to study farmers' satisfaction with a directly subsidized food policy and its influencing factors. An optimal scale regression model was used by Gong et al. (2012) to study the behavioral responses of local herdsmen under the influence of the grazing land reclamation project and their influencing factors. Two evolutionary game models are used by Xie et al. (2018) to examine the dynamic changes of management strategies of fallow cultivated land between the central government, local government, and peasants in Hunan province, China.

In summary, we can see that the micro-subject of the effect of farmers' characteristics on their responses needs to be researched in depth. The main contributions of this paper are as follows. First, it uses a multiple and ordered logistic model to reveal the impact of the winter wheat fallow policy and the factors influencing farmers' response; this research is targeted to improve the farmers' response to the fallow policy. Second, the marginal effect is calculated to further analyze the response of different factors to the winter wheat fallow policy. Third, the paper proposes relevant suggestions for the winter wheat fallow policy in the underground funnel area to further improve this policy and provides a theoretical and practical basis for the effective implementation of the fallow policy in the underground funnel area.

2. Theoretical analysis, research methods and data sources

2.1. Theoretical analysis

Farmers' economic behavior refers to the response of peasant households to external economic signals to realize economic benefits in a particular social environment.

In a different external environment, farmer behavior will be different. The main factors affecting peasant households are their individual factors, economic factors and external factors. As a farmland policy, cultivated land rotation directly affects the income of peasant households. Will farmers respond as a rational economic actor, driven by the maximization of profit? Based on the theory of farmer households, this study draws on the existing research results and discusses the farmer' responses to the fallow policy. The functional path of peasant

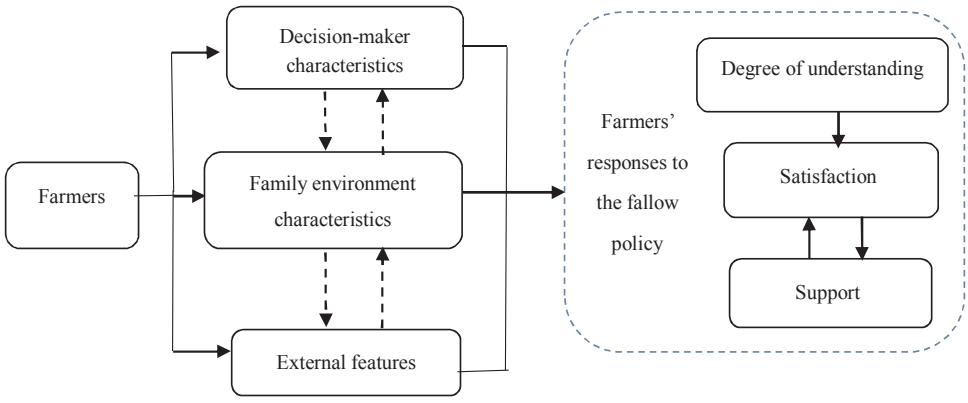

Fig. 1. Framework of farmers' responses to fallow policy.

Download English Version:

https://daneshyari.com/en/article/6546513

Download Persian Version:

https://daneshyari.com/article/6546513

Daneshyari.com