

摘 要

确保口粮绝对安全的同时推广有机肥替代化肥技术是亟需解决的关键问题。化肥虽作为重要的农业生产资料，但现已进入边际报酬递减阶段，继续增施化肥会加剧损害土壤结构并引起农产品质量安全等问题。现有研究表明使用有机肥替代化肥等绿色生产技术在保证粮食产量的同时可改善土壤肥力水平。近年来，政府多次提出推进有机肥替代化肥，实现化肥减量化。农户作为农业生产决策的行为主体，是有机肥施用的微观基础及关键。本文在农户行为理论、计划行为理论、产权理论及社会认知理论的基础上，以水稻种植农户在不同农业生产环节（产前、产中及产后）的风险感知为基础，构造分析农户有机肥施用行为的理论分析框架；并基于 2021 年四川省宜宾市高县、乐山市夹江县及广安市岳池县的 427 份水稻种植农户的实地调研数据及各农业生产统计资料，首先对四川省和研究区域内近年来水稻产出情况、化肥施用情况及样本区域内水稻种植农户有机肥施用情况进行描述性统计，然后利用 Probit 模型和 OLS 模型实证分析了水稻种植农户的多维风险感知与有机肥施用选择和施用程度间的作用机理，以及土地政策关注度、气候变化关注度及水稻收入占比对农户多维风险感知影响有机肥施用行为的调节作用；并根据不同水稻种植规模、不同集市距离及不同信息来源等变量对农户进行异质性分析，得到以下研究结论。

（1）四川省及研究区域内水稻总产量均稳中求进，呈现出缓慢上升趋势；农用化肥施用折纯量总体呈现出不断下降趋势，并伴随着持续的负增长。样本区域内多数水稻种植农户进行了有机肥的施用，但对有机肥的了解不够深入。

（2）水稻种植农户的多维风险感知对有机肥施用行为具有显著的抑制作用。具体而言，水稻种植农户的地权风险感知与受灾风险感知抑制了有机肥的施用选择与施用程度；而价格风险感知仅对有机肥施用选择决策产生了显著的负向影响，对有机肥施用程度并未产生显著的影响。

（3）土地政策关注度、气候变化关注度及水稻收入占比对水稻种植农户多维风险感知影响有机肥施用行为产生了不同的调节作用。具体而言，水稻种植农户对土地政策关注度越高，越会减弱地权风险感知对有机肥施用选择与施用程度的抑制作用；水稻种植农户对气候变化关注度越高，越会增强受灾风险感知对有机肥施用选择与施用程度的抑制作用；而水稻种植农户的水稻收入占比越高，仅仅增强了价格风险感知对有机肥施用选择的抑制作用，对有机肥施用程度并未产生显著的影响。

（4）不同种植规模、不同集市距离和不同信息来源的水稻种植农户群体间的多维风险感知对有机肥施用行为的影响效应有所差异。具体而言，大规模种植农户更容易受到地权风险感知的影响从而降低有机肥施用选择的可能性；距离集市较近的农户更容易受到受灾风险感知与价格风险感知的影响从而降低了有机肥施用选择的可能性与施用

程度；以互联网为主要信息源的农户更容易受到价格风险感知的影响从而降低有机肥施用选择的可能性。

基于前文理论分析与实证研究结果，本文进一步提出加大政府宣传，为农业生产者树立正确的农业风险感知；深化农业土地制度改革，依法规范土地流转；加强气候变化科普知识宣传，强化农业生产者在农业碳排放的主体地位，促进有机肥替代化肥技术推广；扩大有机肥补贴投入与财政支持，完善有机农产品认证制度，提高有机肥等绿色生产技术的推广力度等政策建议，以促进有机肥施用。

关键词：农户风险感知；有机肥施用行为；水稻种植生产环节

Abstract

The promotion of organic fertilizer as a substitute for chemical fertilizer while ensuring absolute food security is a key issue that needs to be addressed urgently. Although chemical fertilizers are an important means of agricultural production, they have now entered a stage of diminishing marginal returns, and their continued application will exacerbate problems such as damage to soil structure and the quality and safety of agricultural products. Existing studies have shown that green production techniques such as the use of organic fertilizers instead of chemical fertilizers can improve soil fertility levels while ensuring food production. Farmers, as actors in agricultural production decisions, are the micro-foundation and key to organic fertilizer application. This thesis constructs a theoretical analysis framework for analysing farmers' organic fertilizer application behaviour on the basis of the theory of farmer behaviour, the theory of planned behaviour, the theory of property rights and the theory of social cognition, and on the basis of the risk perception of rice farmers in different stages of agricultural production (pre-production, mid-production and post-production); and based on the field research data of 427 rice-growing farmers in Gao County, Yibin City, Jiajiang County, Leshan City, and Yuechi County, Guang'an City, Sichuan Province, and various agricultural production statistics in 2021, firstly, we conducted descriptive statistics on rice output, chemical fertilizer application, and organic fertilizer application by rice-growing farmers in Sichuan Province and the study area in recent years, and then we used the Probit model and the OLS model to empirically analyse the mechanism between the multi-dimensional risk perceptions of rice farmers and organic fertilizer application choices and application extent, and the moderating effects of land policy concern, climate change concern and rice income share on farmers' multi-dimensional risk perceptions affecting organic fertilizer application behaviour; and to analyse the heterogeneity of farmers according to variables such as different rice planting scales, different market distances and different information sources, and to obtain the the following research conclusions.

(1)The total rice production in Sichuan Province and the study area were both stable and showed a slow upward trend; the discounted amount of agricultural fertilizer applied generally showed a decreasing trend, accompanied by a continuous negative growth. Most of the rice farmers in the sample area applied organic fertilizers, but their knowledge of organic fertilizers was not deep enough.

(2)The multi-dimensional risk perception of rice farmers had a significant inhibitory effect on organic fertilizer application behaviour. Specifically, rice farmers' perceptions of land rights risk and disaster risk inhibited the choice of organic fertilizer application and the extent of organic fertilizer application; while price risk perception only had a significant negative effect on the choice of organic fertilizer application decision, and did not have a significant effect on the extent of organic fertilizer application.

(3)Land policy attention, climate change attention and rice income proportion have different moderating effects on the multi-dimensional risk perception of rice planting farmers affecting their organic fertilizer application behavior. Specifically, the higher the attention of rice-growing farmers to land policies, the more they will weaken the inhibitory effect of land rights risk perception on the choice and extent of organic fertilizer application; the higher the attention of rice-growing farmers to climate change, the greater the inhibitory effect of disaster risk perception on the choice and extent of organic fertilizer application; while the higher the proportion of rice income of rice farmers, it only enhances the inhibitory effect of price risk perception on the choice of organic fertilizer application, but does not have a significant impact on the extent of organic fertilizer application.

(4)There are differences in the impact of multi-dimensional risk perception on organic fertilizer application behavior among rice-growing farmer groups with different planting scales, different market distances and different information sources. Specifically, large-scale planting farmers are more susceptible to the impact of land rights risk perception and thus reduce the possibility of organic fertilizer application; farmers who are closer to the market are more susceptible to disaster risk perception and price risk perception, which reduces the possibility and extent of organic fertilizer application choices; farmers who use the Internet as their main source of information are more susceptible to price risk perceptions and thus reduce the possibility of choosing organic fertilizers.

Based on the results of the previous theoretical analysis and empirical research, this thesis further proposes to increase the government's publicity to establish a correct perception of agricultural risk for agricultural producers; deepen the reform of the agricultural land system and regulate the transfer of land in accordance with the law; strengthen the publicity of climate change science and technology to enhance the main position of agricultural producers in agricultural carbon emissions, and to promote the technology of organic fertilizer substitution for chemical fertilizers; expand the subsidized inputs of organic fertilizers and financial support to improve the certification system for organic agricultural products and

enhance the promotion of green production technologies such as organic fertilizer in order to promote the application of organic fertilizer.

Key Words:Farmers' risk perception; Organic fertilizer application behavior; Rice planting and production links

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