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Farmers’ Adoption of Improved Nitrogen Management Strategies in Maize Production in China: An Experimental Knowledge Training

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Abstract

Chemical fertiliser plays an important role in increasing food production in China. Nevertheless, excessive nitrogen fertiliser use in China has resulted in severe environmental problems. Scientists attribute the excessive use of nitrogen (N) fertiliser in China to inappropriate farming management and propose site-specific nitrogen management that targets input applications more precisely to match the spatial and seasonal variability in soil conditions has been studied. However, despite great efforts made by scientists to improve the efficiency of fertiliser use, N fertiliser use continues to rise while its efficiency remains low, which has brought economists’ attention to the rationality of overusing N fertiliser.

The goal of this paper is to examine the impacts of an improved nitrogen management (INM) training experiment on farmers’ chemical N use behaviours in maize production in China. The knowledge training of INM was randomly assigned to 18 treated villages while keep the 12 villages in the neighbourhood as a control. Uniquely, this training was delivered by the public extension system so that the research results have profound policy implications in its generalisability.

The research was conducted in Shandong, China, where household data was collected from 813 maize farmers. This study finds that while INM training can significantly reduce farmers’ N fertiliser use, an INM training is not sufficient to change farmer’s practices significantly, and farmers only partially adopted the recommended INM. The recommended INM technology requires farmers to spend additional time on fertiliser application, which is a significant challenge for a farming system dominated by small-scale farms, many with family labourers who engaged in off-farm employment in urban areas where wages have been rising significantly since the early 2000s. This study reveals that China faces challenges to transform its agriculture to a low-carbon one. The research also sheds light on China’s extension system and future technologies in meeting the objectives of reducing the excessive nitrogen fertiliser use in agricultural production.

Keywords: China, farmer, maize, nitrogen, training