
Low-Carbon Agriculture at the Farm Level: Adoption Decisions and Economic Outcomes

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Abstract:

Globally, agriculture has become a significant and growing source of greenhouse gas emissions. This study examines the relationship between the adoption of low-carbon agricultural technologies (LCAT) and farm-level economic returns using firsthand survey data collected from farms in Hebei Province, China. The analysis focuses on how low-carbon practices influence economic performance through cost reduction, productivity improvement, market access, and policy support mechanisms.

The empirical methodology evaluates the average impact of LCAT adoption and heterogeneity across adoption intensity, duration, farm size, land coverage, and the farmer's perceived costs and benefits. Multiple economic channels, such as input cost savings, yield effects, price premiums, and government subsidies, are explicitly tested. This paper aims to offer timely insights into the design of incentive-based public policies that promote environmentally sustainable and economically viable agricultural transitions. It contributes to the existing literature by providing micro-level evidence on the economic implications of low-carbon agricultural technologies in China, an area where existing research remains limited.