African Zoology Studies (Core Life Science)

Solar Farming Innovations Among Smallholder Farmers in Northern Nigeria: Energy Efficiency and Productivity Gains

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Abstract

Solar farming innovations have emerged as a promising solution for increasing energy efficiency and productivity among smallholder farmers in northern Nigeria. A mixed-methods approach involving surveys, interviews, and field observations was employed to gather data from a sample of 120 farmers in Kano, Sokoto, and Yobe states. Solar-powered irrigation systems showed an average yield increase of 25% across the three regions compared to conventional methods, with water savings ranging from 30% to 40%. Economic gains were also notable, particularly for women farmers who reported higher income levels due to reduced labour costs and increased crop yields. The study underscores the potential of solar farming innovations in enhancing productivity and sustainability among smallholder farmers in northern Nigeria. However, challenges such as initial investment costs and technical support remain significant barriers to wider adoption. Investment in solar technology should be prioritised through government grants and subsidies. Additionally, training programmes for farmers on efficient use of the systems are essential for maximising benefits.

Keywords: *African geography, Smallholder farming, Mixed methods, Energy efficiency, Productivity gains, Solar energy, Technological adoption*

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