



Adoption Trends of Smart Agriculture Technologies Among Farmers in South Sudan: Quantified Growth and Market Penetration Rates

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Abstract

South Sudan faces significant challenges in agriculture due to climate variability, limited infrastructure, and socioeconomic conditions. The adoption of smart agriculture technologies can enhance productivity and sustainability. A mixed-methods approach was employed, including a quantitative survey targeting 500 randomly selected farmers across different regions. Qualitative interviews were conducted with 30 key informants to gain deeper insights into farmer perceptions and challenges. The preliminary findings suggest an increasing trend in the adoption of smart agriculture technologies among farmers, particularly in irrigation systems and weather monitoring apps, with a growth rate of approximately 15% per annum over the last three years. Market penetration rates for these technologies show significant disparities between urban and rural areas. The survey reveals that while there is growing interest and adoption of smart agriculture technologies, barriers such as cost and lack of awareness persist, necessitating targeted interventions to increase accessibility and utilization. Investment in farmer training programmes and public-private partnerships could accelerate the adoption of these technologies. Additionally, government policies aimed at reducing costs and improving infrastructure are recommended.

Keywords: *African Geography, Technological Adoption, Precision Farming, Agricultural Innovations, IoT Applications, GIS Integration, Quantitative Analysis*

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