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Evaluating the Efficacy of SMS-Based Agricultural Extension on Maize Yields and Livelihoods in Eastern Zambia

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ABSTRACT

Agricultural extension services are critical for improving smallholder productivity, yet access remains limited across sub-Saharan Africa. Digital technologies, particularly mobile phone-based systems, offer a potential low-cost solution, but rigorous evidence of their efficacy on yields and broader livelihoods is scarce. This study evaluates the impact of an SMS-based agricultural extension service on maize yields, input adoption, and perceived livelihood outcomes among smallholder farmers in Eastern Zambia. A randomised controlled trial was conducted with 1,200 maize-growing households. Treatment group participants received a season-long package of timely, locally tailored agronomic advice via SMS, while the control group received no intervention. Data were collected through structured household surveys and yield measurements. The intervention significantly increased maize yields by an average of 17% for treated households compared to the control group. Furthermore, 63% of participants reported improved confidence in farm management decisions, and thematic analysis highlighted enhanced social capital through information sharing within communities. SMS-based extension can be an effective tool for improving agricultural productivity and farmer knowledge in this context. The findings support the scalability of such digital interventions within existing agricultural support frameworks. Integrate targeted SMS-based advisories into national extension programmes. Future initiatives should ensure message localisation, consider gender-differentiated access to phones, and explore hybrid models combining digital and in-person support. agricultural extension, digital agriculture, mobile phones, randomised controlled trial, smallholder farmers, sub-Saharan Africa This paper provides novel causal evidence on the impact of a low-cost digital extension model on measured crop yields, moving beyond self-reported data to quantify a significant productivity gain.

Keywords: *Agricultural extension, smallholder farmers, Sub-Saharan Africa, randomised controlled trial, mobile technology, livelihoods, Zambia*

Article Highlights

- SMS-based extension significantly increased maize yields by an average of 17%.
- 63% of participants reported improved confidence in farm management decisions.
- Thematic analysis highlighted enhanced social capital through community information sharing.
- Findings support the scalability of digital interventions within existing frameworks.

Policy Implication

Integrate targeted, locally tailored SMS-based advisories into national agricultural extension programmes to improve productivity and knowledge dissemination.

This study provides novel causal evidence using measured yield data rather than self-reports.