



Solar-Powered Irrigation Systems and Livestock Production Among Zimbabwean Smallholder Farmers in Masvingo Province: A Three-Year Survey Analysis

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Abstract

Solar-powered irrigation systems have been increasingly adopted by smallholder farmers in Zimbabwe's Masvingo Province to enhance livestock production and crop yields under challenging climatic conditions. A mixed-methods approach was employed, including surveys and interviews conducted among 150 randomly selected smallholder farmers to gather data on their irrigation systems usage, livestock productivity, and socio-economic conditions. The analysis revealed a statistically significant increase of approximately 20% in average milk production per cow when solar-powered irrigation was implemented compared to non-solar powered systems. This trend was consistent across different livestock types (cattle, goats, sheep). Solar-powered irrigation systems have demonstrated substantial benefits for smallholder farmers in enhancing their livestock productivity in Masvingo Province. Farmers and policymakers should be encouraged to adopt solar-powered irrigation technologies as a key strategy to improve agricultural sustainability and livelihoods in the region. solar-powered irrigation, smallholder farmers, livestock production, Masvingo Province, Zimbabwe

Keywords: *Zimbabwe, Masvingo, Irrigation, Livestock, Renewable, Technological Adoption, Sustainable Practices*

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