African Cyber Security Studies (Technology Focus)

Integrating IoT Sensors into Livestock Management Systems for Zambian Cattle Ranchers: A Comparative Study

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Published: 25 March 2011 | **Received:** 05 November 2010 | **Accepted:** 27 February 2011

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DOI: 10.5281/zenodo.18930466

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Abstract

The integration of Internet of Things (IoT) sensors into livestock management systems has emerged as a promising approach for enhancing productivity and sustainability in agricultural settings. The research utilised a mixed-methods approach combining quantitative data from IoT sensors with qualitative interviews among selected ranchers. Statistical analysis included regression models to assess the impact of sensor data on operational outcomes. A notable finding was that the average reduction in feed wastage per herd equipped with IoT sensors was 10%, indicating a significant improvement in resource management. The study concludes that while IoT integration offers substantial benefits, further research is needed to optimise sensor placement and data interpretation for broader application across different ranching environments. Ranchers are advised to prioritise system scalability and cost-efficiency when considering IoT investments. Training programmes should be developed to ensure effective use of the technology by farmers. Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *African, Geographic, IoT, Sensors, Analytics, Precision, Sustainability*

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