



Precision Agriculture Techniques in the Rift Valley Irrigation System of Northern Kenya: Farmer Adoption and Economic Benefits

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Abstract

Precision agriculture techniques have the potential to enhance crop yields and reduce input costs in resource-limited settings such as northern Kenya's Rift Valley Irrigation System (RVIS). However, farmer adoption rates of these technologies remain low. A mixed-methods approach was employed, including quantitative surveys of 200 farmers and qualitative interviews with 15 selected participants. Data were collected using structured questionnaires and semi-structured interviews designed to capture both quantitative data on adoption rates and qualitative insights into farmer perceptions and experiences. Findings suggest that while precision agriculture techniques show promise, significant barriers exist related to initial investment costs and perceived lack of technical knowledge among farmers. However, a notable proportion (35%) of respondents reported seeing economic benefits from adopting these technologies. Despite challenges, the preliminary evidence indicates that with appropriate support structures in place, farmer adoption rates for precision agriculture techniques can be increased significantly within the RVIS. Recommendations include the development and implementation of targeted training programmes to address knowledge gaps among farmers. Additionally, subsidies or financing mechanisms should be explored to mitigate initial investment barriers.

Keywords: *Rift Valley, Precision Agriculture, Irrigation, Farmer Adoption, Yield Gains, Economic Evaluation, Geographic Information Systems (GIS)*

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