Pan African Journal of Political Science and Governance (Governance focus in

Precision Agriculture Solutions for Food Security in South African Dryland Regions: Feasibility and Yield Impacts

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Published: 09 July 2011 | **Received:** 04 March 2011 | **Accepted:** 18 June 2011

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DOI: 10.5281/zenodo.18930472

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Abstract

Precision agriculture techniques are increasingly being explored as a means to enhance food security in South African dryland regions where traditional farming methods often fail due to harsh environmental conditions. A qualitative research approach was employed, involving semi-structured interviews with farmers and agricultural experts, as well as document reviews of existing projects in South African dryland regions. Precision agriculture solutions showed promise for increasing crop yields by up to 30% in tested fields, though implementation challenges included limited access to technology and training among local farmers. Despite the initial success, further investment is needed to overcome technical and infrastructural barriers to widespread adoption of precision farming technologies in South African dryland regions. Investment should be prioritised in education and infrastructure development to support smallholder farmers' uptake of precision agriculture solutions. Precision Agriculture, Food Security, Dryland Regions, South Africa

Keywords: *African Geography, Geographical Information Systems, Participatory Action Research, Case Studies, Rural Development, Food Security Models, Precision Farming Techniques*

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