Title of the Impact Case Study: From Farmer Readiness to Community Action: Research-Led Sustainable Land Management in Ga-Matji, Limpopo Province

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Summary of the impact

Research undertaken by the University of Limpopo Centre for Global Change under the Global Environment Facility-funded GEF-7 project was translated into a practical, community-based sustainable land management intervention in Ga-Matji, Fetakgomo-Tubatse Local Municipality. Three peer-reviewed studies undertaken in the project area established that smallholder farmers were aware of land degradation and willing to adopt improved practices but were constrained by inadequate inputs, limited irrigation, financial barriers, generic extension advice, insufficient practical training, and weak follow-up support. The University used this evidence to move beyond extension information and introduce an approach that combined farmer profiling, community participation, practical demonstrations, and access to productive agricultural materials. Between December 2025 and January 2026, the intervention distributed 2,100 fruit tree seedlings and 270 vegetable seed packs for homegarden establishment. According to the project records, each selected household received one fruit tree. The University's technical team also demonstrated appropriate site selection, planting, watering, and basic tree management techniques. The direct beneficiaries were smallholder farming households, including resource-constrained farmers dependent on household and rainfed production. Traditional leadership, municipal officials, agricultural personnel, and community representatives also benefited from a strengthened platform for coordinating sustainable land management interventions. The project improved immediate access to productive resources and practical knowledge and strengthened collaboration between the University, the Batau-Ba-Matji traditional leadership, government institutions and community members.

Underpinning academic work

The underpinning work was conducted by the Centre for Global Change and associated agricultural research units at the University of Limpopo under the GEF-7 project, *Mainstreaming Sustainable Land Management for Large-Scale Impact in the Grazing Lands of Limpopo and Northern Cape Provinces in South Africa*, GEF ID 10179. The work is classified as Interdisciplinary, incorporating Agricultural Sciences, Natural Sciences, and Humanities and Social Sciences.

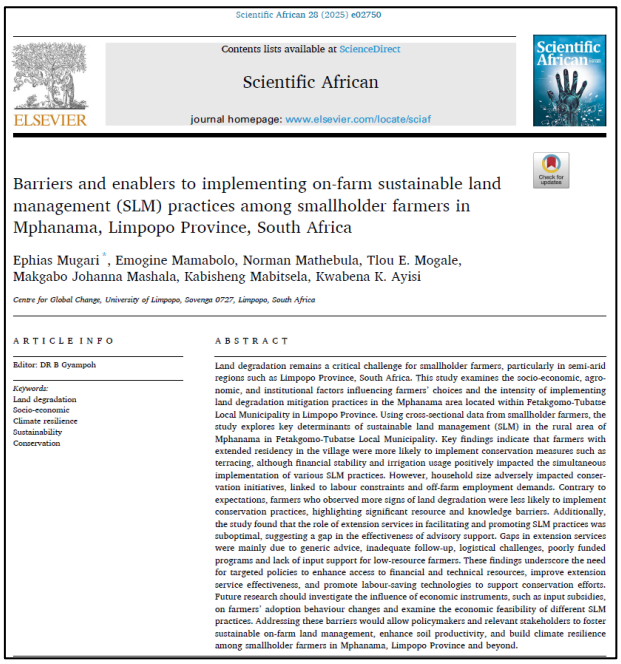
The first study examined barriers and enablers affecting the implementation of sustainable land management practices among 242 smallholder farming households in Mphanama, Ga-Radingwana, Ga-Matlala and Maseleseleng. Only 43% had implemented at least one of the assessed practices, while 57% had implemented none. Adoption was constrained by financial limitations, inadequate inputs and credit, limited irrigation, generic extension advice and

insufficient follow-up. The study recommended hands-on training, context-specific advisory support and improved access to productive resources.

The second study investigated the influence of public agricultural extension services among the same 242 households. It revealed that access to extension information alone did not guarantee successful implementation because farmers were often advised to use practices requiring water, equipment, labour or inputs they could not access. The study recommended combining technical information with resources, farmer participation, locally relevant knowledge and continuing support.

The third study assessed readiness for sustainable land management among 48 Ga-Matji farmers through surveys, interviews, observations, and community mapping. Most participants recognised land degradation and climate-related risks, and 93.8% had implemented at least one sustainable land management practice. However, training and extension access were limited. All participating farmers expressed willingness to adopt improved practices where practical demonstrations, training and follow-up support were available.

These studies demonstrated that the primary constraint was not farmer unwillingness but the absence of an enabling environment linking knowledge, resources, extension support and community institutions.



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Barriers and enablers to implementing on-farm sustainable land management (SLM) practices among smallholder farmers in Mphanama, Limpopo Province, South Africa

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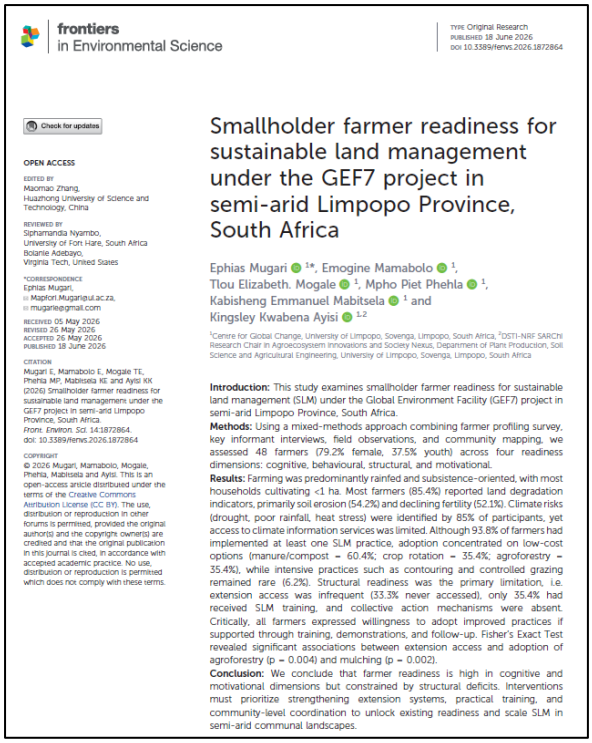
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ABSTRACT

Land degradation remains a critical challenge for smallholder farmers, particularly in semi-arid regions such as Limpopo Province, South Africa. This study examines the socio-economic, agronomic, and institutional factors influencing farmers' choices and the intensity of implementing land degradation mitigation practices in the Mphanama area located within Fetakgomo-Tubatse Local Municipality in Limpopo Province. Using cross-sectional data from smallholder farmers, the study explores key determinants of sustainable land management (SLM) in the rural area of Mphanama in Fetakgomo-Tubatse Local Municipality. Key findings indicate that farmers with extended residency in the village were more likely to implement conservation measures such as terracing, although financial stability and irrigation usage positively impacted the simultaneous implementation of various SLM practices. However, household size adversely impacted conservation initiatives, linked to labour constraints and off-farm employment demands. Contrary to expectations, farmers who observed more signs of land degradation were less likely to implement conservation practices, highlighting significant resource and knowledge barriers. Additionally, the study found that the role of extension services in facilitating and promoting SLM practices was suboptimal, suggesting a gap in the effectiveness of advisory support. Gaps in extension services were mainly due to generic advice, inadequate follow-up, logistical challenges, poorly funded programs and lack of input support for low-resource farmers. These findings underscore the need for targeted policies to enhance access to financial and technical resources, improve extension service effectiveness, and promote labour-saving technologies to support conservation efforts. Future research should investigate the influence of economic instruments, such as input subsidies, on farmers' adoption behaviour changes and examine the economic feasibility of different SLM practices. Addressing these barriers would allow policymakers and relevant stakeholders to foster sustainable on-farm land management, enhance soil productivity, and build climate resilience among smallholder farmers in Mphanama, Limpopo Province and beyond.



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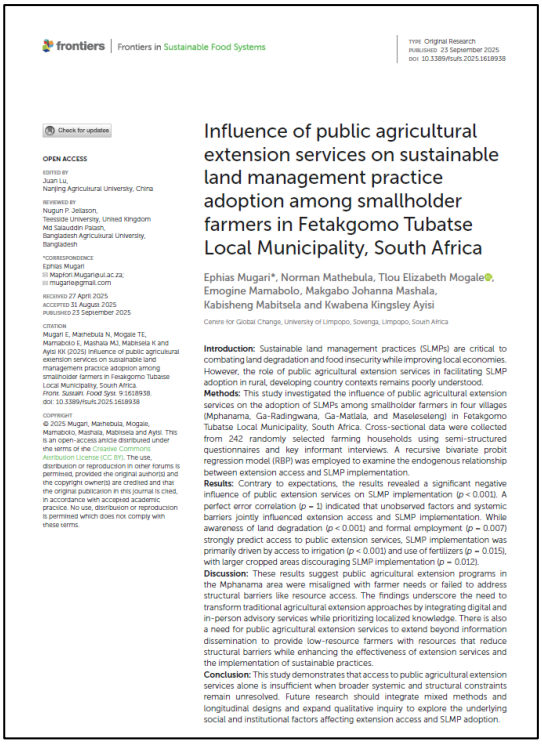
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Smallholder farmer readiness for sustainable land management under the GEF7 project in semi-arid Limpopo Province, South Africa

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Introduction: This study examines smallholder farmer readiness for sustainable land management (SLM) under the Global Environment Facility (GEF7) project in semi-arid Limpopo Province, South Africa.
Methods: Using a mixed-methods approach combining farmer profiling survey, key informant interviews, field observations, and community mapping, we assessed 48 farmers (79.2% female, 37.5% youth) across four readiness dimensions: cognitive, behavioural, structural, and motivational.
Results: Farming was predominantly rainfed and subsistence-oriented, with most households cultivating <1 ha. Most farmers (85.4%) reported land degradation indicators, primarily soil erosion (54.2%) and declining fertility (52.1%). Climate risks (drought, poor rainfall, heat stress) were identified by 85% of participants, yet access to climate information services was limited. Although 93.8% of farmers had implemented at least one SLM practice, adoption concentrated on low-cost options (manure/compost – 60.4%; crop rotation – 35.4%; agroforestry – 35.4%), while intensive practices such as contouring and controlled grazing remained rare (6.2%). Structural readiness was the primary limitation, i.e. extension access was infrequent (33.3% never accessed), only 35.4% had received SLM training, and collective action mechanisms were absent. Critically, all farmers expressed willingness to adopt improved practices if supported through training, demonstrations, and follow-up. Fisher's Exact Test revealed significant associations between extension access and adoption of agroforestry ($p = 0.004$) and mulching ($p = 0.002$).
Conclusion: We conclude that farmer readiness is high in cognitive and motivational dimensions but constrained by structural deficits. Interventions must prioritize strengthening extension systems, practical training, and community-level coordination to unlock existing readiness and scale SLM in semi-arid communal landscapes.



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Influence of public agricultural extension services on sustainable land management practice adoption among smallholder farmers in Fetakgomo Tubatse Local Municipality, South Africa

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Introduction: Sustainable land management practices (SLMPs) are critical to combating land degradation and food insecurity while improving local economies. However, the role of public agricultural extension services in facilitating SLMP adoption in rural, developing country contexts remains poorly understood.
Methods: This study investigated the influence of public agricultural extension services on the adoption of SLMPs among smallholder farmers in four villages (Mphanama, Ga-Radingwana, Ga-Matlala, and Maseleseleng) in Fetakgomo Tubatse Local Municipality, South Africa. Cross-sectional data were collected from 242 randomly selected farming households using semi-structured questionnaires and key informant interviews. A recursive bivariate probit regression model (RBP) was employed to examine the endogenous relationship between extension access and SLMP implementation.
Results: Contrary to expectations, the results revealed a significant negative influence of public extension services on SLMP implementation ($p < 0.001$). A perfect error correlation ($\rho = 1$) indicated that unobserved factors and systemic barriers jointly influenced extension access and SLMP implementation. While awareness of land degradation ($p < 0.001$) and formal employment ($p = 0.007$) strongly predict access to public extension services, SLMP implementation was primarily driven by access to irrigation ($p < 0.001$) and use of fertilizers ($p = 0.015$), with larger cropped areas discouraging SLMP implementation ($p = 0.012$).
Discussion: These results suggest public agricultural extension programs in the Mphanama area were misaligned with farmer needs or failed to address structural barriers like resource access. The findings underscore the need to transform traditional agricultural extension approaches by integrating digital and in-person advisory services while prioritizing localized knowledge. There is also a need for public agricultural extension services to extend beyond information dissemination to provide low-resource farmers with resources that reduce structural barriers while enhancing the effectiveness of extension services and the implementation of sustainable practices.
Conclusion: This study demonstrates that access to public agricultural extension services alone is insufficient when broader systemic and structural constraints remain unresolved. Future research should integrate mixed methods and longitudinal designs and expand qualitative inquiry to explore the underlying social and institutional factors affecting extension access and SLMP adoption.

Narrative description of the impact

Ga-Matji is situated in a semi-arid communal landscape where household livelihoods depend substantially on small-scale crop production, livestock keeping and social grants. Agricultural production is affected by rainfall variability, drought, restricted water access, nutrient-poor soils, erosion and overgrazing. The community's traditional governance structures play an important role in land allocation, beneficiary identification and community mobilisation. The University of Limpopo's farmer profiling and academic research established that farmers were already applying practices such as manure or compost use, crop rotation, agroforestry and mulching. However, adoption was uneven because households lacked the resources and institutional support required to maintain or expand these practices. Community mapping, field observations and interviews also documented degraded areas, farming activities, local knowledge and training needs. The academic findings influenced the project in four important ways.

First, the project shifted from an information-centred approach to one that paired technical guidance with productive materials. Fruit trees and vegetable seed were selected according to community needs, local agroecological suitability, drought tolerance, nutritional value and livelihood relevance. Second, practical training was linked directly to implementation. The University's technical team demonstrated site selection, planting methods, appropriate watering regimes and early tree management. This addressed the research finding that farmers needed hands-on guidance rather than only general extension messages. Third, the intervention adopted a participatory beneficiary-selection process. The Royal Council selected beneficiaries according to agreed criteria, including interest in household gardening, access to water and willingness to maintain the trees. Beneficiary registers were compiled to support accountability, monitoring and follow-up. Fourth, the intervention strengthened coordination between academic, traditional and government institutions. The municipality received and safeguarded the trees before distribution, traditional leadership supported beneficiary selection and community mobilisation, and University personnel provided technical support. The

involvement of these stakeholders strengthened local participation and ownership of the initiative.

The impact occurred primarily between December 2025 and January 2026. Its reach includes:

- 2,100 fruit tree seedlings distributed, with one tree allocated per selected household.
- 270 vegetable seed packs distributed to pre-selected community members.
- 48 farmers profiled to inform intervention design.
- 60 prospective training beneficiaries identified through the Traditional Council;
- traditional leadership and municipal structures involved in implementation; and
- extension, agricultural and environmental stakeholders engaged through the wider project.



Figure 1. Tree distribution and planting demonstration at Ga-Matji community

The significance of the impact lies in the change to how sustainable land management support was designed and delivered. Farmers gained direct access to resources and technical knowledge, while local institutions became active implementation partners rather than passive recipients of project information. The University also established a baseline, beneficiary database and monitoring framework through which tree establishment, garden development,

practice adoption and future livelihood outcomes can be evaluated. Claims concerning improved household food security, increased income, reduced erosion and tree-survival rates will require follow-up monitoring. These are therefore treated as emerging or anticipated outcomes rather than completed impact. The monitoring framework already identifies tree survival, vegetable harvests, garden beds, crop diversity, sales income and adoption of improved practices as indicators for subsequent assessment.

Evidence and sources to corroborate the impact.

1. Peer-reviewed publications
    - Mugari, E. et al. (2025). *Barriers and enablers to implementing on-farm sustainable land management practices among smallholder farmers in Mphanama, Limpopo Province, South Africa*. *Scientific African, 28*, e02750. DOI: 10.1016/j.sciaf.2025.e02750.
    - Mugari, E. et al. (2025). *Influence of public agricultural extension services on sustainable land management practice adoption among smallholder farmers in Fetakgomo Tubatse Local Municipality, South Africa*. *Frontiers in Sustainable Food Systems, 9*, 1618938. DOI: 10.3389/fsufs.2025.1618938.
    - Mugari, E. et al. (2026). *Smallholder farmer readiness for sustainable land management under the GEF7 project in semi-arid Limpopo Province, South Africa*. *Frontiers in Environmental Science, 14*, 1872864. DOI: 10.3389/fenvs.2026.1872864.
2. GEF-7 farmer profiling, implementation and quarterly reports prepared by the University of Limpopo and project partners.
3. Beneficiary registers documenting tree and seed recipients.
4. Delivery and distribution records for the 2,100 fruit trees and 270 vegetable seed packs.
5. Photographs of tree delivery, community distribution, seed distribution and planting demonstrations included in the project reports.
6. Community-mapping records, stakeholder meeting minutes, attendance registers and field-observation records.
7. Independent testimonies from beneficiaries, traditional leaders, extension personnel and municipal representatives.

Any other information considered relevant.

The case contributes to SDG 1 on poverty reduction, SDG 2 on food security, SDG 5 on gender equality, SDG 13 on climate action, SDG 15 on life on land and SDG 17 on partnerships. It demonstrates how a rural university can integrate academic evidence, community knowledge, traditional governance and government partnerships to design locally relevant sustainable land management interventions.

15/07/2026
Signed off on behalf of the Univeristy of Limpopo
Prof Marlise van Staden
Acting Deputy Vice Chancellor: Research, Innovation, and Partnerships

