

# Land reforms

Citation for published version (APA):

Njoroge, C. G. M. (2023). *Land reforms: the impact of land registration on agricultural productivity in Kenya*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20230925cn>

**Document status and date:**

Published: 01/01/2023

**DOI:**

[10.26481/dis.20230925cn](https://doi.org/10.26481/dis.20230925cn)

**Document Version:**

Publisher's PDF, also known as Version of record

**Please check the document version of this publication:**

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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## **Impact/ Valorization Addendum**

This addendum describes the relevance of this thesis for policy implications. The thesis comes at an important time when Sub-Saharan Africa is being cited as the most vulnerable to climate change adverse impacts and food insecurity calling for urgent action. For instance, according to the 2023 IPC report, food insecurity in Kenya has increased to 43% over the last year and is expected to increase further, affecting 5.4 million residents as the country misses its fifth consecutive rainy season. It particularly affects the ASAL regions which comprise 80% of the country's landmass. This study, therefore, fits right into existing global and local policy efforts and development agendas to meet food security needs and increase livelihood resilience by providing an empirical reference for decision-makers and stakeholders.

Globally, the study is in line with several key policies. First, the Sustainable Development Goals (SDGs) goals 2, 12, and 15 support climate-resilient agriculture to increase agricultural productivity, especially for 75% of the World's poor living in rural areas. Secondly, the EU and FAO's main agenda emphasizes the need to increase agricultural productivity to meet the food security gap and alleviate poverty in SSA, the study contributes to how to achieve that. Thirdly, the Malabo Declaration developed by the African Union (AU) aims to accelerate Agricultural growth and transformation in Africa through a commitment of at least 10% of the annual GDP to agriculture and rural development. This study addresses the question of "how to make it happen", focusing on land reforms that can accelerate sustainable agricultural productivity. Those are just a few of the policies directed to promote agricultural productivity.

Land tenure security is a critical component in promoting sustainable agricultural productivity as optimal utilization of land in SSA is influenced by the prevailing pattern of land ownership that influences its control and usage. Even though several countries in SSA have embarked on land reforms aimed at creating security of tenure, inequality in land ownership and landlessness are still at unacceptable levels with approximately 90% of land under communal tenure which often lacks secure land rights heightening its vulnerability to conflicts, land grabbing and eviction. This study is at the intersection of these two sectors, "agriculture and land policy", and seeks to provide insight into the impact of land registration on agricultural productivity.

First, land tenure insecurity is theorized to cause farmers' reluctance to invest sustainably on their farms due to a lack of assurance that they will recoup benefits in the case of conflict or eviction. Additionally, there is a major concern about the continual decrease in arable land due to population pressure, urbanization and industrialization. In the past, growth in agricultural productivity in SSA was achieved by the expansion of agricultural land which currently lacks viability.

Thus, land reforms that would lead to sustainable intensification of existing land are crucial to promoting sustainable agricultural productivity.

A major contribution of this study is the addition of original data collected due to the unavailability of secondary data for the TPB model. The study conducted a cross-sectional survey in Kenya-Tharaka Nithi County. The field survey entailed the administration of questionnaires to the farmers based on systematic random sampling and snowballing methodologies. The data adds vital knowledge to the literature and can be used for further studies.

Secondly, the study also contributes an interdisciplinary research path to evaluate the impact of land tenure security on agricultural productivity in Sub-Saharan Africa (SSA) using novel methodologies. The study employs behaviour theory, agronomic models, and logistic and spatial econometrics that are based on theoretical foundations, unlike past studies that have majorly employed profit maximisation theories. The study comprises three main chapters that investigate, one, the psychological factors that influence farmers' intention to adopt climate resilience farming; two, the evaluation of agricultural intensification on registered and unregistered farms; and lastly impacts of land registration on farmers' intention to invest in sustainable agricultural investments.

Thirdly, the consistency in the three papers is worth noting that the socio-psychology of the farmers plays a major role in decision-making on agricultural investments. Land registration promotes agricultural productivity due to the perceived assurance effect it creates for the farmers which motivates them to invest. Chapter 2 findings indicate unravels the socio-psychological factors influencing farmers' decision-making to adopt climate resilience agriculture (CRA). The findings provide the baseline analysis of the farmers' attributes that are key to policymakers. Paper 4 found that land registration had the highest magnitude in influencing farmers' decision-making. This is in line with paper three which found that cropping intensity was higher in the registered areas compared to unregistered farms. The findings provide an empirical reference for policymakers to address land tenure security to boost agricultural productivity as it would influence the farmers' decision-making to invest.

The findings are summarized as follows;

**Chapter 2**, was a scoping study on the impact of farmers' socio-psychological factors in adopting CRA. The study employs the theory of planned behaviour and found attitude, professional guidance, resources, perceived behaviour control, and age (51-64 years) as key socio-psychological predictors of farmers' decision-making to adopt CRA in Kenya. The chapter concludes that policies geared at creating assurance effect to the farmers, capacity building at local levels and targeting the age groups would increase farmers' adoption of CRA.

**Chapter 3** evaluates the level of crop intensification in registered and unregistered farms using an agronomic model. Significant variations in cropping intensity based on land registration status would demonstrate that land registration creates security of tenure that motivates farmers to intensify farming. Using remotely sensed data where the Normalised Difference Vegetation Index (NDVI) is the dependent variable, Geographically Weighted Regression (GWR) methodology is used to factor in spatial heterogeneity. Additional factors used in the analysis included farm and climatic characteristics and land registration status. Findings demonstrated that land registration has a statistically significant correlation to cropping intensity. Notably, it had the highest magnitude in the impact in comparison to farm and climatic characteristics. This relationship is more significantly pronounced in ASALs. The chapter concludes that the use of GWR methodology was appropriate since spatial econometrics captures the dynamics of heterogenous regions which is beyond cost-benefit models. Land registration was found to be a key component in promoting sustainable agricultural productivity. The study recommended fast-tracking of land registration in the country targeting ASALs as priority areas. Such a move is expected to create tenure security and motivate farmers to embrace agricultural intensification.

**Chapter 4**, explored the impact of land registration on short- and long-term investments. The study is based on the assumption that the significance of long-term investment reflects sustainable agricultural investment. For example, farmers will only invest in irrigation, or planting of trees if they feel secure and are assured to reap their benefits in the long term. The study used primary data collected through field surveys. An extended TPB model and logistic regression methodology are used to capture behavioural dynamics instead of crop yield models. This is driven by the knowledge that Kenya and SSA at large are characterized by subsistence farming and smallholder farming systems whereby yield data is unreliable or missing. Findings revealed that professional advice and access to resources were significantly correlated to farmers' intention to adopt both short- and long-term investments and land registration was significant for long-term investment. Land registration had the largest magnitude of change on farmers' intention to uptake long-term investments, an indication that land tenure impacts highly farmers' intention to invest in sustainable agriculture. The study recommends implementation of the land registration in the country to strengthen land tenure for farmers. In so doing, farmers will be incentivized to adopt sustainable long-term investments that will promote agricultural productivity. The study also recommends further behavioural research in the field that would guide the policymakers on socio-psychological attributes that influence the farmers.

To reach the scientific community, policymakers, and the public, the research has been shared extensively, chapters 2, 3, and 4 were presented in the UNU\_MERIT (Maastricht), during the annual internal conferences, and the whole study was presented at the University of Galway (Ireland), Department of Social and Public Policy, during a Natural Resource Modelling Seminar. Comments from the researchers were incorporated to enrich the study. This culminated in a presentation made as a guest lecturer at the University of Galway on 'agricultural development in Kenya'. The research has also been used widely in teaching and guiding undergraduate students on the research process. The three chapters have been submitted to the journals for publishing, "Evaluating Cropping Intensity in Registered versus Unregistered Farms in Kenya-Tharaka Nithi County" is under review by the Journal of Remote Sensing Applications Society and Environment. The second paper "Psychological Factors that influence farmers' Intentions to Adopt Climate Resilience Agriculture: Evidence from Tharaka Nithi County in Kenya" is under review by the Journal of Sustainable Futures. The third paper "Impact of land registration on short- and long-term investments" is under review by the Journal of Land Use Policy. The study has enlightened me in the research process and am disseminating the knowledge in teaching.

In conclusion, land registration has a positive impact on agricultural productivity in Kenya, an indication that it creates tenure security which motivates farmers to adopt sustainable on-farm investments. The findings are replicable in other SSA countries with insecure land tenure. The study provides an empirical reference for policymakers in developing the future design of agricultural policies to include the security of tenure because of its socio-psychological attributes that influence the farmers to adopt sustainable agricultural practices. Therefore, fast-tracking of land registration with priority to ASALs is recommended. This should go hand in hand with other policy measures such as capacity building to improve farmers' livelihood status, subsidizing farming inputs and improved access to agricultural advisors which are crucial in expanding the farmers' capability to adopt sustainable agricultural practices. These policy measures should be tailored at the local level to increase efficacy