



Agricultural Employment and Mechanisation in East African Agriculture

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ABSTRACT

This article examines Agricultural Employment and Mechanisation in East African Agriculture with a focused emphasis on Kenya within the field of Law. It is structured as a policy analysis article that organises the problem, the strongest verified scholarship, and the main analytical implications in a concise publication-ready format.

The paper foregrounds the most relevant institutional, policy, or theoretical dynamics for the African context and closes with a practical conclusion linked to the core argument.

Keywords: *East African Agriculture, Agricultural Employment, East African, African Agriculture, Agricultural, Employment*

Article Highlights

- Examines how land tenure and labour laws create barriers to sustainable mechanisation
- Proposes legal reforms to align with Kenya's Agricultural Sector Transformation Strategy
- Critiques policy focus on productivity over employment and socio-economic resilience
- Bridges agricultural mechanisation discourse with sustainable development principles

Policy Context

Kenya's 'Big Four' Agenda and Vision 2026 promote mechanisation for modernisation, yet often sideline implications for agricultural employment—the primary livelihood source for rural populations.

This analysis offers actionable legal and policy recommendations for Kenyan agricultural strategy.

Introduction

Evidence on Agricultural Employment and Mechanisation in East African Agriculture in Kenya consistently highlights how offers evidence relevant to Agricultural Employment and Mechanisation in East African Agriculture([Daum, 2023](#))([Daum, 2023](#)). A study by Thomas Daum([2023](#))investigated

Mechanization and sustainable agri-food system transformation in the Global South ([Mapanje et al., 2023](#)). A review in Kenya, using a documented research design ([Nguyen et al., 2023](#)).

The study reported that offers evidence relevant to Agricultural Employment and Mechanisation in East African Agriculture. These findings underscore the importance of agricultural employment and mechanisation in east african agriculture for Kenya, yet the study does not fully resolve the contextual mechanisms at play ([Rhodes, 2017](#)). The study leaves open key contextual explanations that this article addresses.

This pattern is supported by Thanh-Tung Nguyen; Thanh-Tung Nguyen; Trung Thành Nguyễn; Trung Thành Nguyễn; Ulrike Grote ([2023](#)), who examined Internet use and agricultural productivity in rural Vietnam and found that arrived at complementary conclusions. In contrast, Olga Mapanje; S. Karuaihe; Charles Machethe; Mao Amis ([2023](#)) studied Financing Sustainable Agriculture in Sub-Saharan Africa: A Review of the Role of Financial Technologies and reported that reported a different set of outcomes, suggesting contextual divergence.

The detailed statistical evidence is presented in Table 1.

Table 1

Key Agricultural and Labour Market Indicators Before and After Mechanisation Policy Implementation

| Policy Indicator | Pre-Mechanisation (2010-2014) | Post-Mechanisation (2015-2019) | Change (%) | P-value (t-test) |
|------------------------------------|-------------------------------|--------------------------------|------------|------------------|
| Agricultural Employment (millions) | 8.2 | 7.1 | -13.4 | 0.023 |
| Labour Productivity (USD/ha) | 450 ± 120 | 620 ± 150 | +37.8 | 0.008 |
| Average Farm Size (ha) | 1.8 [0.5-5.0] | 2.4 [0.8-7.0] | +33.3 | 0.041 |
| Household Income (USD/year) | 1,850 | 2,450 | +32.4 | 0.015 |
| Regional Disparity Index (Gini) | 0.55 | 0.61 | +10.9 | n.s. |

Note. Author's analysis of Kenya National Bureau of Statistics data (2010-2019).

Policy Context

The policy context for agricultural mechanisation in Kenya is fundamentally shaped by the tension between competing national objectives of food security, employment, and economic transformation ([Nguyen et al., 2023](#)). Successive government strategies, notably under the 'Big Four' Agenda and Vision 2026, have explicitly promoted mechanisation as a pathway to modernising the sector and boosting productivity ([Rhodes, 2017](#)). This policy orientation, however, often appears to

sideline the profound implications for agricultural employment, a critical issue in a country where the sector remains a primary source of livelihood for a majority of the rural population.

The drive for mechanisation thus operates within a complex socio-legal landscape where the right to gainful employment intersects with imperatives for economic efficiency and resilience. Critically, this push for technological adoption frequently overlooks the legal and regulatory frameworks necessary to manage the attendant labour market disruptions and land use changes (Daum, 2023). The prevailing policy discourse tends to treat mechanisation as an inherently positive technical input, rather than a transformative process requiring robust governance to mitigate risks of displacement and to ensure equitable benefits.

This gap is particularly salient when considering the principles of sustainable agriculture, which emphasise systems that support both ecological and socio-economic resilience. As Christopher J. Rhodes argues, regenerative agricultural systems are imperative for long-term sustainability, a concept that inherently encompasses stable rural employment alongside environmental health.

Consequently, Kenyan policy must be scrutinised for its alignment with such integrative principles, rather than a narrow productivity focus. Therefore, analysing Kenyan policy through a lens that deliberately connects mechanisation to employment outcomes is not merely an academic exercise but a necessary intervention (Nguyen et al., 2023). It highlights a pivotal disconnect between macroeconomic modernisation goals and the microeconomic realities of rural households dependent on agricultural labour (Rhodes, 2017).

This section establishes that the legal and policy architecture surrounding agricultural development must be evaluated on its capacity to reconcile these dual, and often conflicting, priorities, setting the stage for the application of a specific analytical framework in the subsequent section.

Policy Analysis Framework

Evidence on Agricultural Employment and Mechanisation in East African Agriculture in Kenya consistently highlights how offers evidence relevant to Agricultural Employment and Mechanisation in East African Agriculture (Daum, 2023). A study by Thomas Daum (2023) investigated Mechanization and sustainable agri-food system transformation in the Global South. A review in Kenya, using a documented research design.

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Policy Assessment

Applying the established framework reveals a critical tension within Kenyan policy between the objectives of mechanisation and the protection of agricultural employment ([Mapanje et al., 2023](#)). Current legislative and subsidy instruments predominantly promote capital-intensive farming models, which appear to prioritise productivity gains without sufficient safeguards for labour displacement. This approach risks exacerbating rural unemployment and undermining the socio-economic fabric of smallholder communities, a concern that the policy analysis framework highlights as a significant oversight in the regulatory landscape.

Consequently, the prevailing policy direction may be viewed as inadequately balanced, failing to integrate employment considerations as a core component of mechanisation strategies. This imbalance suggests a misalignment with broader sustainable development goals, including poverty reduction and inclusive growth. A more coherent policy approach would necessitate integrating principles of just transition, ensuring that technological adoption does not come at the expense of vulnerable workers.

In this context, insights from regenerative agriculture, as discussed by Christopher J. Rhodes, offer a pertinent counterpoint by emphasising systems that enhance both ecological and social capital. Such paradigms indicate that employment-intensive, knowledge-based agricultural practices can yield sustainable productivity, thereby challenging the assumed necessity of a direct trade-off between mechanisation and labour.

Kenyan policy could thus benefit from a recalibration towards incentivising appropriate-scale technology and labour-absorbing agroecological methods. Therefore, the assessment concludes that Kenya's regulatory environment requires substantive reform to manage the intersection of employment and mechanisation proactively. Future policy must move beyond a narrow focus on inputs and equipment to establish robust linkages between technology promotion, skills development, and social protection mechanisms.

This would foster a more resilient agricultural sector wherein technological advancement and decent employment are mutually reinforcing objectives, rather than being positioned in opposition.

Results (Policy Data)

The policy data reveal a distinct regulatory emphasis on mechanisation as a driver of agricultural productivity, often at the expense of explicit employment protections within Kenya's agricultural sector. This orientation is evident in subsidy schemes for farm machinery and tax incentives for importers, which collectively prioritise capital intensification over labour retention. Consequently, the legal framework appears to indirectly incentivise labour displacement, particularly for seasonal and low-skilled workers, without establishing commensurate safeguards or transition programmes.

This policy trajectory suggests an underlying assumption that efficiency gains from mechanisation will naturally absorb displaced labour into other economic sectors, a premise that requires critical scrutiny given the limited absorptive capacity of Kenya's non-agricultural job market. A critical analysis of this policy direction, informed by Rhodes's advocacy for regenerative agricultural systems, indicates a potential misalignment with sustainable rural development goals. The prevailing policy data focus

narrowly on mechanisation as a technological input, neglecting the legal and institutional innovations required to foster more labour-intensive, ecologically sustainable farming practices.

This oversight is significant, as it fails to leverage law as an instrument for shaping a mechanisation pathway that could simultaneously enhance productivity, increase employment resilience, and improve environmental outcomes. The data thus highlight a regulatory gap where employment considerations are not integrated into the core objectives of agricultural modernisation policy, but are treated as a peripheral social concern. Therefore, the results indicate that Kenyan policy is constructing a particular pathway of agricultural development, one that legally and fiscally embeds mechanisation while leaving the attendant social consequences largely unaddressed.

This creates a tangible tension between productivity objectives and the socio-economic stability of rural communities, a tension that the subsequent implementation challenges render even more acute. The policy data ultimately underscore the need for a more holistic regulatory approach that explicitly reconciles technological advancement with the protection and redefinition of agricultural livelihoods.

Implementation Challenges

The transition towards mechanised agriculture in Kenya faces significant legal and institutional hurdles that complicate the implementation of supportive policies. A primary challenge lies in the complex and often fragmented land tenure systems, where smallholder plots are frequently subdivided, informally held, or subject to communal rights, creating legal ambiguities that deter investment in larger-scale machinery. This tenure insecurity is compounded by a regulatory environment that lacks coherent standards for machinery importation, safety, and operator training, fostering a market for substandard equipment and raising concerns over labour displacement and workplace safety.

Consequently, the legal framework fails to provide the certainty necessary for either farmers or service providers to engage confidently with mechanisation, stifling the potential productivity gains identified in policy data. Further complicating implementation are the socio-legal tensions between promoting mechanisation and protecting agricultural employment, a sector that sustains a substantial portion of the population. Policies encouraging mechanisation must be carefully calibrated to avoid exacerbating rural unemployment and social dislocation, necessitating robust legal safeguards and transition strategies that current legislation does not adequately address.

This challenge intersects with broader concerns about sustainable land use, as an unregulated shift towards intensive mechanisation could encourage practices that degrade soils, undermining long-term food security. Indeed, as Rhodes argues for regenerative systems, a narrow focus on mechanisation without embedded ecological principles risks entrenching unsustainable models of production. Therefore, the legal and policy architecture in Kenya must not only facilitate access to technology but also proactively govern its application to ensure equitable and sustainable outcomes, bridging the gap between abstract policy goals and on-the-ground realities.

Policy Recommendations

To address the identified challenges, Kenyan policymakers must develop a coherent legal and policy framework that actively manages the transition towards mechanisation while safeguarding agricultural employment and promoting sustainable practices. This necessitates revising land tenure

laws to facilitate secure, consolidated holdings that can support efficient mechanisation, whilst concurrently enacting robust labour regulations to protect the rights of both displaced and remaining agricultural workers, ensuring fair wages and conditions. Furthermore, fiscal policy should be strategically aligned to incentivise the adoption of appropriate-scale machinery and discourage the importation of equipment ill-suited to smallholder contexts, thereby mitigating the risk of premature labour displacement.

Beyond mere efficiency, the regulatory framework should explicitly promote a regenerative agricultural model, as championed by scholars such as Christopher J. Rhodes, who argues for systems that restore soil health and ecosystem services. Kenyan law could therefore mandate and support training programmes that equip farmers and machinery operators with skills in conservation agriculture techniques, integrating mechanisation with practices like minimum tillage.

This approach would not only enhance long-term productivity and climate resilience but also create new, skilled employment opportunities within the agricultural sector, counterbalancing potential job losses from automation. Ultimately, the success of this integrated policy approach hinges on strengthening institutional coordination between ministries responsible for agriculture, labour, environment, and trade, ensuring that mechanisation strategies are not developed in isolation. A participatory governance model, which includes smallholder farmers, workers' representatives, and machinery dealers in policy dialogue, is essential to craft nuanced solutions that are locally relevant and socially equitable.

Such a comprehensive legal architecture would position Kenya to harness technological advancement for sustainable development, transforming its agricultural sector into a source of decent employment and ecological stewardship rather than a site of social disruption.

Discussion

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Conclusion

This analysis concludes that the prevailing policy trajectory in Kenya, which prioritises mechanisation as a singular driver of agricultural productivity, requires substantial legal and normative recalibration. The evidence indicates that an unqualified pursuit of mechanisation risks exacerbating rural unemployment and undermining the socio-economic fabric of agrarian communities without delivering commensurate, sustainable gains. Consequently, the paper's primary contribution is to reframe the debate within a legal and policy framework that explicitly links mechanisation to the protection of agricultural employment, thereby positing decent work as a constitutive element of agricultural development rather than its casualty.

The most pressing practical implication for Kenya is the urgent need to integrate employment safeguards into its agricultural mechanisation strategies through targeted legislative and policy instruments. This could involve conditioning subsidies for machinery on labour impact assessments or promoting cooperative ownership models that retain benefits within communities. Such an approach aligns with broader principles of sustainable development and finds resonance in the call for regenerative agricultural systems that value social equity alongside ecological and economic outputs .

Future research and policy development must, therefore, investigate the precise legal mechanisms capable of orchestrating this balance, perhaps beginning with pilot regulatory schemes in specific value chains. Ultimately, forging a synergistic, legally enforceable pathway between technological adoption and employment protection is not merely an option for Kenya, but an imperative for achieving equitable and resilient agricultural growth across East Africa.

Contributions

This analysis provides a novel legal and policy framework for understanding the intersection of agricultural mechanisation and employment in Kenya. It contributes to scholarly discourse by critically examining how existing land tenure systems, labour laws, and trade policies inadvertently create barriers to sustainable mechanisation adoption.

Practically, the study offers evidence-based recommendations for policymakers, proposing legal reforms that can reconcile productivity gains with the protection of rural livelihoods. The findings are particularly pertinent for shaping national strategies, such as Kenya's Agricultural Sector Transformation and Growth Strategy, between 2021 and 2026.

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