



Digital Land Governance and Women's Land Rights in Isiolo County, Kenya

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Abstract

Digital land governance in Kenya, implemented through the Ardhisasa platform, marks a major shift aimed at restructuring land services to ensure efficiency, transparency, and equity. This transformation is particularly consequential for women in arid and semi-arid lands (ASALs), such as Isiolo County, a semi-arid area where land is deeply tied to cultural identity, economic survival, and a source of livelihood for these communities. Despite global commitments and national legal reforms, such as the United Nations Sustainable Development Goals (SDGs 5 and 15), the Constitution of Kenya (2010), and the Community Land Act (2016), which aim to promote gender equity, women in arid and semi-arid regions in Kenya continue to face persistent barriers to secure land rights. This study adopts a qualitative desktop research approach to examine the nexus between digital land governance and women's land rights in Isiolo County, Kenya, focusing on how digital land registration, service efficiency,

digital literacy, and digital record-keeping and documentation processes impact women's land rights in Kenya's arid and semi-arid regions. The findings of the study indicate that women in Isiolo County continue to face challenges in navigating digital land registration systems. Limited digital literacy level of women in Isiolo County constrains their ability to access online land services, and gaps in digital documentation hinder secure land record management. While digitalization has improved efficiency in land service delivery, including reducing delays and manipulation in succession disputes for women, most women in Isiolo County are facing challenges with digital record keeping and documentation of their land in the digital platforms. The Study underscores the need for gender-sensitive digital land governance policies to ensure women's inclusion in land distribution, offering insights for policymakers to strengthen land governance frameworks, support Sustainable Development Goal 5, and foster equitable access to land resources in Kenya's drylands, particularly in Isiolo County.

Key words: Ardhisasa, Customary land, Digital Land Governance, Sustainable Development Goal, Women's Land Rights, Kenya.

1.0 Introduction

Land is a foundational factor of production that determines economic output and influences the distribution of resources within any society (Kameri-Mbote, 2016). Gender-inclusive land reforms are, therefore, crucial in advancing the social and economic empowerment of women by securing their land rights, which is a cornerstone for development and gender equity in Kenya (Atella, 2024). In Isiolo County, a semi-arid region where land is deeply tied to cultural identity, economic survival, and community livelihoods, women's access to land continues to be shaped by both formal and customary governance systems (Ontiri & Robinson, 2015).

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Globally, gender equity has become a cornerstone for sustainable development, reflected in international frameworks such as the 2030 Agenda for Sustainable Development. Digital land administration and management has emerged as a key strategy for strengthening tenure security, reducing poverty, and enhancing food security, particularly in contexts where traditional land governance systems are weak, opaque, or highly manual (Shaffer, 2019).

Digital land governance has the potential to promote effective land administration, reduce corruption, ensure secure land tenure, and foster economic growth. These technologies provide a platform for accessing land information and facilitate open communication and interaction between individuals and digital services offered by the government (Edepi, 2023). In Kenya, digital land governance reforms, including the *Ardhisasa* platform, aim to modernize land administration by improving transparency, reducing corruption, and enhancing service delivery.

Furthermore, digital technologies such as Global Positioning System (GPS) mapping, Public Key Infrastructure (PKI), remote sensing technology, and drone-based surveying have expanded opportunities for accurate land documentation, registration, record-keeping, and gathering and validating land information that are transparent, efficient, and safe from physical degradation (Chair, 2017). These innovations offer the potential to transform land governance by enabling more efficient, accessible, and secure land services. However, a critical question remains: Are these digital systems sufficiently gender-sensitive enough to enhance women's land rights in terms of access, ownership, and control, particularly in ASAL regions where structural inequalities persist?

This paper examines the intersection of digital land governance and women's land rights in Isiolo County. It highlights the importance of gender-sensitive digital land policies and provides insights for policymakers seeking to strengthen land governance frameworks, advance Sustainable Development Goal 5, and promote equitable access to land resources in Kenya's drylands.

1.1 Evolution of Land Reforms in Kenya

Digital land governance remains a complex and evolving concept globally, particularly in developing countries such as Kenya, where land administration systems were inherited from colonial rule, and continue to shape contemporary land management practices (Shaffer, 2019). Historically, land governance in Kenya has been deeply gendered. During the precolonial period in Kenya, land allocation and inheritance were controlled by men, while women had only user rights. Patriarchal norms structured decision-making and communal tenure systems reinforced gendered social relations that marginalized women from land ownership and governance.

Colonialism fundamentally transformed land governance in Kenya through policies such as the Crown Land Ordinance of 1902, which vested extensive powers in the colonial state, intensified patriarchal control and formalised individual land ownership and registration in ways that privileged men. Colonial land alienation, individualization, and titling dismantled communal systems, formalized male ownership, and entrenched women's exclusion, inequalities that largely persisted into the postcolonial period. Although Sessional paper No 10 of 1965 sought to promote equity in land ownership for the people of Kenya, it failed to confront patriarchal norms and thus rendered women largely invisible in practice.

Post-independence reforms such as the Land Adjudication Act of 1968 aimed to protect indigenous land rights, particularly for pastoral communities. However, the Act did not address the gendered implications of customary law and, therefore, continued to exclude women from land registration and ownership. It excluded women due to the patriarchal lens and interpretation of customary law (Kameri-Mbote, 2009). While digital land management has been potentially transformative in land governance and has introduced new opportunities for transparency and efficiency, it has also caused systemic disparities in land governance.

Colonial interventions disrupted the way land was governed because ordinances were introduced, for example, the Crown Land Ordinance of 1902, which vested much power in the state to control unoccupied land and treated communities as tenants, leading to the imposition of statutory titles and dispossession that did not align with the communal norms and practices. Land governance in Kenya has experienced a significant transformation with the adoption of progressive legislation such as the Constitution of Kenya (2010), the Land Act (2012), the Land Registration Act (2012), the National Land Commission Act (2012), and the Community Land Act (2016). These frameworks seek to address

challenges, rectify historical land injustices, recognize customary tenure systems, and promote equitable access to and use of land. The Community Land Act, in particular, provides a landmark framework for the recognition, protection, and registration of community land.

To modernize land administration, Kenya introduced the National Land Information Management System dubbed *Ardhisasa* system, to streamline land administration activities and processes, including land registration, record keeping, valuation, surveying, adjudication, planning, allocation, land record access, clerical services, and general services deliveries (Taurus & Wamae, 2022). Kenya also has adopted remote sensing technologies to map out land tenure in remote zones (Koeva et al., 2020).

In Isiolo County, a semi-arid county inhabited predominantly by pastoralist communities such as the Borana, Turkana, Somali, and Samburu, alongside minority communities such as the Meru who are “sedentary farmers,” land governance has historically been rooted in customary tenure systems (Boye & Kaarhus, 2011). Land rights were acquired through clans and communities, permitting seasonal migration for water access and grazing. These traditional leadership in land administration and management were conducted by elders through cultural norms, which lacked formal documentation and failed to ensure that women's land rights are respected because these cultural norms were developed with male interest, hence neglecting women in land ownership, making them vulnerable to external shocks (Sharamo, 2014; Ontiri & Robinson, 2015).

Land governance in Isiolo County has evolved to integrate legal laws with customary laws. With devolution, county governments became trustees of unregistered community land under the Trust Land Act (Cap 288), a role previously held by the national government (Boye & Kaarhus, 2011; Mwathane et al., 2022). The Constitution of Kenya (2010) and the National Land Policy of 2012 aimed to address land injustices by introducing and recognising customary land rights, as well as establishing the Community Land Act of 2016.

The Land Registration Act of 2012 further provided mechanisms for land registration and communal titling. However, implementation in Isiolo County, has faced numerous challenges due to external shocks, land conflicts, and reliance on manual record-keeping systems that are prone to corruption and manipulation. These challenges disproportionately affect women, who often possess greater knowledge of household-level resource use but have limited influence over broader land governance processes (Kameri-Mbote, 2009). This paper examines whether technology can serve as a solution to this disparity.

Although digital technologies have transformed land governance worldwide (Edepi, 2023), their impact on women in Isiolo County remains limited. Persistent barriers, especially in Isiolo County, including high illiteracy rates, inadequate electricity, limited access to digital devices, insufficient information on digital land services, and gendered access to technology, continue to constrain women's participation in digital land governance (Chair, 2017). Without targeted land reforms to address these structural barriers, land digitization risks reinforcing inequalities and enabling land grabs by powerful elites, further marginalizing women in Isiolo County.

The social implications of these inequalities extend beyond individual dispossession, intensifying vulnerabilities and eroding community cohesion in Isiolo County. High illiteracy rates among women, compounded by cultural stigmas, viewing women's land ownership rights as a taboo, and early marriages, limit their participation in land governance and awareness of the statutory legal protection, pushing them to the periphery (Boye & Kaarhus, 2011). Climate-induced resource scarcity has intensified land conflicts, undermining community cohesion and weakening adaptive capacities. Women's exclusion from land adjudication processes stifles their adaptive mechanisms, such as cooperative resource management, which is crucial for pastoral economic survival.

Ensuring that women are well-informed about bridging the digital gender gap is essential. This study is grounded in the Technology Adoption Model, an approach that explains how groups of people accept, adopt, and apply newly developed technologies, considering factors such as perceived usefulness, compatibility, usability, and social influence. This model focuses on understanding the slow adoption of digital land governance structures among indigenous women in Isiolo County, Kenya, who face barriers such as limited digital literacy, affordability issues, a lack of relevant information and poor infrastructure. Addressing these challenges requires targeted interventions, including tailored training on digital skills, improved connectivity, and empowerment initiatives that enhance women's capacity to navigate digital land systems.

2.0 Methodology

This study employed a qualitative desk-based research design, specifically a critical document analysis of secondary sources. This approach was selected because it aligns with the research objectives which focuses on policy frameworks, institutional arrangements, and socio-cultural dynamics shaping digital land governance and women's land rights. Conducting primary research in remote regions such as Isiolo presents logistical constraints while digital governance data and policy documents are readily accessible through online platforms. Desk-based analysis, therefore, enabled a rigorous and systematic engagement with diverse documentary evidence to critically assess how digital land governance influence women land rights, especially in Isiolo County.

A critical interpretive method guided the identification, reading, and interrogation of key research assumptions, gendered implications, and power relations embedded in academic scholarship, official policy documents, and organizational reports. All sources were critically evaluated for contextual relevance, internal consistency and alignment with Kenya's land governance and gender equality frameworks. Data were collected from government policy documents, peer-reviewed journal articles, NGO reports (including those from the Kenya Land Alliance and IGAD), and grey literature published between 2010 and 2025. This period captures major transformations in Kenya's land governance landscape, beginning with the promulgation of the 2010 Constitution, which marked a turning point in land governance recognizing community land rights, mandating equitable access, and establishing the National Land Commission to oversee land management and administration. It also encompasses the introduction of devolved governance structures in the counties and the most recent developments in *Ardhisasa* implementation and digital land governance.

A purposive sampling strategy was used to select secondary data sources that directly addressed digital land governance and women's land rights, provided comparative evidence from arid and semi-arid areas, and were published within the specified timeframe. This sampling technique was used because it relied on the researcher's judgement, expertise, and familiarity with the subject matter to identify materials containing relevant insights.

Thematic analysis was conducted using a deductive-inductive approach. Initial themes were drawn from the study objectives, after which inductive coding was applied within each theme.

Codes were reviewed iteratively to ensure coherence, internal consistency, and alignment with the objectives of the study. Thematic analysis enabled the identification of patterns, contradictions, and emerging insights across multiple data sources, including government reports on digital land governance, academic papers, and NGO publications.

3.0 Literature Review

The literature review focused on Isiolo County women's land rights in relation to: Digital Land Efficiency; Digital Land Records and Documentation; Digital Land Registration; and Digital Illiteracy.

3.1 Digital Land Efficiency and Women's Land Rights in Isiolo County

According to the study conducted by Tarus & Wamae (2022), digital land governance has increasingly been promoted as a solution to longstanding land governance challenges due to its potential to reduce transaction time, cost, bureaucratic hurdles, and corruption, thereby improving transparency and accessibility of land records. Globally, efficiency gains are consistently reported among the primary motivations for land digitization (Rodima-Taylor, 2024). In Sub-Saharan Africa, the World Bank estimates that digitizing land registries across 44 countries would cost approximately US\$880 million, with expected returns including reduced land conflicts, enhanced tenure security, and accelerated economic development (Springer, 2026).

For women, improvements in efficiency are particularly significant. Women in Kenya disproportionately bear the time and financial burdens associated with navigating bureaucratic land processes such as records, registration, documentations, and dispute resolution (KIPPRA, 2024). For women in rural areas such as Isiolo County, accessing land offices requires travel, financial resources and time away from domestic responsibilities. These are constraints that disproportionately affect women in Isiolo County (Otieno & Muga, 2024). A streamlined digital system that reduces the physical visits and

bureaucratic hurdles when processing land documents is therefore essential for enhancing women's access to land services.

Despite their central role in agricultural production, women remain severely disadvantaged in land ownership. The Kenya Demographic and Health Survey (2022) reports that 75% of women in Kenya lack access to or ownership of agricultural land, and 93% have no claim to non-agricultural land due to entrenched patriarchal norms which are male dominant, even though women constitute 70% of the agricultural labour force (Nation, 2024).

However, digital efficiency gains are undermined by persistent digital divides. A 2024 study by Strathmore University's Centre for Intellectual Property and Information Technology Law (CIPIT) found that, although Kenya had 98% 4G network coverage in 2023, more than 65% of Kenyans remained offline due to device affordability constraints and limited digital literacy (CIPIT, 2024). Internet access in Kenya is highly unequal: the Internet Society (2023) reports 43% internet use in urban areas against only 14% in rural areas (CIPIT, 2025). Isiolo County falls squarely within this rural, underserved category. KIPPRA (2021) data show that internet access in rural Kenya stands at 17%, compared to 44% in urban areas, a disparity that directly limits women's ability to access digital land services. Moreover, a 2025 Springer study on Kenya's e-governance further found that among women in impoverished communities, the probability of being online was 50% lower than for men (Springer, 2026).

Digital land governance has also helped reduce processing times and minimized bureaucratic inefficiencies associated with manual systems. Online platforms have simplified access to land services theoretically enabling women to bypass intermediaries and reduce exposure to corruption. However, women in Isiolo County continue to experience challenges in accessing land and registering due to low literacy levels, limited access to information, and inadequate digital skills (Anjanah & Subhashini 2024). Kameri-Mbote (2016) notes that pastoral communities experience a lot of hurdles when navigating land in land demarcation and registration due to limited access to smart phones and digital devices. In Sub-Saharan Africa, smartphone ownership disparities favour men by 14%.

Digital technologies promote equity, transparency, and efficiency, as demonstrated by the electronic land administration platform (Edepi, 2023). Despite challenges related to digital literacy gaps and incomplete digitization, digital land governance has contributed to poverty reduction, gender equality and institutional strengthening (Fatima et al. 2024). In terms of gender equity, improved access to land information and registration processes has enabled women to participate more equitably in land markets with no gender restrictions or differentiation, secure land property rights, and access economic opportunities (Zambrano & Lufwig, 2012).

3.2 Digital Land Records and Documentation and Women Land Rights in Isiolo County

Women Isiolo County continue to face significant challenges with the land documentation and digital record keeping due to limited access to information on how to navigate online land processes (Taurus & Wamae, 2022). Information on how to access and use platforms such as *Ardhisasa* is not readily available, particularly in remote areas where digital literacy is low and connectivity is inconsistent. This lack of accessible guidance prevents many women from benefiting from digital tools, including remote sensing technologies that are increasingly used for land mapping in arid and semi-arid regions.

Additionally, the absence of a formal land administration system poses a challenge. Koeva et al. (2020) estimate that only 30% of the world's population has formally documented land rights recorded in official land administration systems. Technology adoption models help explain this gap, highlighting that access, perceived usefulness, and ease of use are critical determinants of whether individuals engage with digital systems. In Isiolo County, digital land records often exclude women's names in the system because most title deeds are registered in the names of husbands or male relatives. As a result, when these records are County, digital's names are not captured in the system, reinforcing their marginalization. Patriarchal norms in Isiolo County that prioritize male ownership continue to shape land governance, rendering women secondary beneficiaries of land rights and ownership. Taurus & Wamae (2022) note that widows and daughters face particular challenges in accessing land records and even documentation because customary norms dictate that land documents should bear the names of husbands and male counterparts, hence hindering them from accessing land records. Digital land documentation in Isiolo County also lack inclusive stakeholder engagement. Women are frequently excluded from digital mapping and land adjudication

processes due to limited information and inadequate representation in land committees (Zambrano & Lufwig, 2012). This exclusion has contributed to elite capture, where powerful and politically connected men dominate digitized land records, formalizing historical biases (Hughes, 2020). Atellah (2024) similarly observes that land records in Isiolo have been politicized and controlled by local elites, further marginalizing women. Limited empowerment and exclusion from community mapping processes increase women's vulnerability to land grabbing and corruption (Ontiri & Robinson, 2015).

3.3 Digital Land Registration and Women's Land Rights in Isiolo County

Digital land registration in Kenya has faced numerous implementation challenges, particularly in complex tenure systems such as those in Isiolo County. Hoefsloot and Gateri (2024) note that digital registration efforts must navigate community lands governed under the Community Land Act (2016), which aims to recognize, protect, and register community land to ensure that there is inclusive land governance in Isiolo County, public lands, and settling disputes in conservation areas that are prone to conflicts. Structural challenges, including limited information, inadequate digital literacy, and poor infrastructure, make digital registration more difficult in rural counties such as Isiolo than in urban areas.

Shaffer (2019) confirms that challenges in land digitalization are not unique to Kenya; countries, such as Turkey, Bangladesh, and Indonesia, face similar obstacles. In Kenya, barriers such as limited digital literacy, affordability constraint, and inadequate infrastructure continue to hinder online land registration (Chair, 2017).

Land grabbing and corruption remain widespread in Kenya, disproportionately affecting women, particularly widows who traditionally are not landowners and do not often inherit land. Their land needs are often disregarded in succession processes. Inheritance statistics and recent court proceedings underscore the scale of the challenges: 59% of all land cases in Kenya involve disputes over rights, and home ownership declined from 64% to 61% between 2013 and 2024, partly as a result of contested successions (FAO, 2024). Digital records have helped in creating audit trail that prevents documents from being altered, lost, or withheld.

However, digital land records in Kenya have not automatically improved women's land registration outcomes. The central problem is that digital land record systems inherit and replicate the gendered inequalities embedded in the manual records they replace. The Ardhisasa platform normally feeds data into its digital registry from existing paper-based registries after verification (Nation, 2024). Since historical records overwhelmingly list men as landowners digitization reproduces these inequities, leaving women with user rights only.

3.4 Digital Illiteracy and Women's Land Rights in Isiolo County

Digital illiteracy, defined as the inability to access, use, and benefit from digital platforms and technologies, is one of the most foundational barriers to women's land rights in Isiolo County. It creates structural gaps in access, ownership, and participation in land governance. Kenya's digital divide is both substantial and gendered. Despite 98% 4G network coverage countywide, more than 65% of Kenyans remain offline due to limited digital literacy and device affordability (CIPIT, 2024). Internet access stands at only 14% in rural areas compared to 43% in urban areas (Internet Society, 2023, as cited in CIPIT, 2025). Women in rural and impoverished communities are 50% less likely to be online than men (Springer, 2026).

KIPPRA (2024) identifies digital literacy as one of the most underdeveloped components of digital inclusion in arid and semi-arid areas. These regions face compounded disadvantages, including limited access to training, low literacy levels, and inadequate infrastructure, factors that disproportionately affect women. The GSMA Mobile Gender Gap Report (2022) identifies two primary barriers to women's mobile internet use: functional literacy and affordability, especially the cost of handsets. These barriers affect women especially in Isiolo County where many women have limited formal education. Viamo (2024) notes that in sub-Saharan Africa, women use mobile internet 37% less than men. In rural areas, mobile internet use is 54% lower than among the richest 40%. These disparities significantly limit women's ability to engage with digital land governance systems, access information, and secure their land rights.

4.0 Results and Discussion

4.1 Digital Land Efficiency and Women's Land Rights in Isiolo County

The findings from this study demonstrate that digital land governance has contributed to more transparent, efficient, and streamlined land administration processes in Isiolo County, including reductions in duplication of land records (Ahsan, 2025). According to research conducted by the Kenya Land Alliance (2015), only 5% of women in Isiolo county have successfully registered land online, demonstrating both progress and persistent gaps in women's digital land engagement.

Digital platforms have enabled some women in Isiolo County to access land information, conduct land transactions, and even acquire title deeds, thereby strengthening their land rights (Akinola, 2018). These findings align with global evidence. For instance, Anjanah & Subhashini (2024), show that in India, digital land systems have significantly reduced land-related scams, improved land record maintenance, and enhanced transparency. It has helped to eradicate the problem of duplication of records, creation of false records, and will make evasion of tax difficult for the public (Anjanah & Subhashini, 2024). Technology thus serves as a critical tool for accountability, enabling verification of land records “at the click of a button”.

Despite these gains, reliable county-level statistics on women's land ownership, their use of the *ArdhiSasa* platform, and their awareness of digital land systems remain limited. Less than 10% of land in Isiolo is privately owned, with the majority under communal tenure arrangements. This structural context, coupled with cultural restrictions on women's inheritance and ownership rights, constrains women's ability to engage with formal land registration systems, including digital platforms and their adoption of digital land administration systems such as *ArdhiSasa*.

The Technology Adoption Model helps explain these findings: when digital systems are perceived as useful, accessible, and compatible with users' needs, adoption increases. Evidence from Lagos State's Integrated Land Administration Automation System demonstrates that automated systems can significantly improve efficiency and reduce bureaucratic delays (FAO, 2024). Similarly, digital land governance in Isiolo has also helped reduce the time required for land processing, and minimized the inefficiencies associated with manual system. Online platforms have simplified access to land services, enabling women in Isiolo County to bypass intermediaries and reduce exposure to corruption.

However, these benefits remain unevenly distributed. Women in Isiolo continue to face barriers related to digital literacy, limited access to information, and infrastructural constraints. As Anjanah and Subhashini (2024) argue, the transformative potential of digital land administration depends on addressing the structural inequalities that shape access to technology. The Technology Adoption Model confirms this finding by explaining how the Technology Acceptance Model can be used to facilitate the adoption of technology as key drivers, particularly in land governance processes.

4.2 Digital Land Records, Documentation, and Women's Land Rights in Isiolo County

The study found that women in Isiolo County face significant challenges in digital land record keeping and documentation due to limited access to information on how to navigate online systems (Taurus & Wamae, 2022). Information on how to access and use *Ardhisasa*, and related platforms is not readily available, particularly in remote areas like Isiolo where digital literacy is low. This limits women's ability to benefit from digital tools such as remote sensing technologies.

Globally, only 30% of the world's population has formally documented land rights (Koeva et al., 2020). This gap is reflected in Isiolo County, where most land records are historically registered in the names of male household heads. When these records are digitized, women's names are often absent, reinforcing their marginalization. Patriarchal norms in Isiolo County that prioritize male ownership continue to shape land governance, rendering women secondary beneficiaries of land rights and ownership.

Studies show that widows and daughters, normally face a lot of challenges in accessing land records and even documentation because of customary norms that require land documents to bear the names of husbands and male relatives (Tarus & Wamae, 2022).

In Isiolo County women's exclusion from digital land documentation processes is further exacerbated by their underrepresentation in land adjudication committees. This has contributed to elite capture where politicians and powerful men dominate digitized land records, hence formalizing patriarchal

biases based on historical exclusions (Hughes, 2020). Bhatt et al. (2017) similarly note that land records in Isiolo County have been politicized and controlled by local elites, increasing women's vulnerability to land grabbing and corruption. Also lack of empowerment has caused women to be left out of community mapping processes, hence increasing land grabbing and corruption Taurus & Wamae, (2022).

Despite these challenges, digitized platforms have reduced manipulation in succession disputes, an area where women are disproportionately affected, by providing verifiable and tamper-proof records (Haugerud & Mwangi, 2024). However, digital land record keeping and documentation systems risk perpetuating the digital divide if women lack the skills, devices, or information needed to engage with them. Access to land information remains gendered: while most men own smartphones, women in Isiolo have limited access to smartphones (Hughes, 2020). While this technology can provide a solution to challenges affecting land management, women in Isiolo County need to have their land rights recorded in the land systems. In Sub-Saharan Africa alone, the discrepancies in smartphone penetration ownership are 14% in favor of men further constraining women's participation in digital land governance.

4.3 Digital Land Registration and Women's Land Rights in Isiolo County

The findings indicate that digital land registration in Isiolo County continues to face numerous implementation challenges particularly due to the complexity of the county's tenure systems and structural inequalities (Mwathane et al., 2022). Isiolo's land governance landscape includes community lands governed under the Community Land Act (2016), public lands, and conservation areas, which are prone to conflicts. These overlapping systems require coordinated approaches to ensure inclusive and gender-responsive land registration.

National and County officials have emphasized the importance of collaboration, public sensitization, and data sharing to streamline services and prevent corruption. Tools such as remote sensing and participatory Geographic Information Systems (GIS) have been piloted in Isiolo County, enabling communities to map their land, such as grazing areas, conflict zones, and water points. These innovations thereby integrate local knowledge into digitized records and build on land reforms introduced by the Constitution of Kenya (2010), the National Land Act (2012), and the Land Registration Act (2012), which collectively promote equitable access to land.

Despite these efforts, implementation in Isiolo lags behind due to infrastructural challenges and a lack of information on how to effectively apply digital platforms. A lack of stable and reliable internet access has been a significant challenge in Isiolo County. This aligns with global evidence showing that digital land reforms face similar obstacles countries, such as Turkey, Bangladesh, and Indonesia (FAO,2024). The Technology Adoption Model helps understand the slow adoption of digital land governance structures among indigenous women in Isiolo County, Kenya who experience barriers including limited digital literacy, affordability constraints, inadequate information and poor infrastructure.

Technology is a tool whose impact is determined by intent and human capacity (Toyama, 2011). Digital land registration systems cannot achieve their intended impact if they are not designed to accommodate local norms and user needs (Toyama, 2011). Women in Isiolo County continue to face challenges with the digital land registration process due to low literacy levels, limited understanding of land registration process, and male control over formal land documentation in Isiolo County (Boye & Kaarhus, 2011). Such technologies are more likely to benefit well-educated and wealthy individuals, rather than ensure fairness for both genders (Toyama, 2011). Also, perceptions and motivation of women in Isiolo to use technology have been a challenge in accessing digital land services. Furthermore, many women in Isiolo County lack confidence in using technology, which they perceive as a way of neglecting their families and husbands, Chair (2017). These women use mobile phones primarily for making phone calls and are not familiar with the internet or more advanced mobile services. Limited financial resources further constrain women's ability to purchase smartphones or access the internet (GSMA, 2015).

4.4 Digital Illiteracy and Women's Land Rights in Isiolo County

The findings of the study on digital literacy and women land rights have varied, with some revealing that technology functions as a double-edged sword. When gender-sensitive, it can promote socioeconomic growth; when poorly designed, it can deepen exclusion (Wyche, Simiyu, & Othieno, 2016). As Toyama (2011) argues, technology is a tool whose impact is determined by intent and human capacity. In Isiolo,

low literacy levels among women is significantly limit their ability to utilize digital platforms to advance their land rights (FAO. 2024).

Most women in Isiolo County lack comprehensive understanding of land digitization processes, which restricts their ability to register or access online land services (Daily Nation, 2024). Formal land documentation remains largely controlled by men in Isiolo County (Odeny, 2013) Language barriers further complicate adoption. Many Isiolo residents are more fluent in local languages than in English, making it difficult to navigate platforms such as *Ardhisasa* or remote sensing tools. Koeva et al. (2020) emphasize that digital land governance cannot be effective where the population lacks foundational knowledge.

The Technology Acceptance Model helps explain and understand these dynamics: digital literacy, affordability issues, access to relevant information, and inadequate infrastructure shape whether women adopt digital land systems. Women's lack of confidence and digital skills, combined with designs that do not consider their needs and challenges, which are heterogeneous and perceived as a motivation for utilizing existing technology, further limits adoption in Isiolo County.

5.0 Conclusion

This study demonstrates that innovative digital technologies are revolutionizing digital land governance in Kenya by enhancing transparency, efficiency, and accountability. In Isiolo County the *Ardhisasa* platform has reduced duplication of land records, improved service delivery, and created formal pathways for tenure security and land ownership. These are meaningful steps and advances in a context where manual land administration was historically prone to manipulation and corruption.

However, women in Isiolo County continue to face substantial barriers despite all these gains in digital platforms. Structural challenges, including exclusion from digital land records, limited digital literacy, hindrances in online land registration, unreliable internet connectivity and limited access to smartphones, persist. These barriers are reinforced by cultural norms and practices that continue to prioritize male land ownership and decision-making authority. Women voices remain marginalized in land governance committees, leaving them with secondary user rights rather than secure ownership.

Without targeted interventions, digital land platforms risk deepening existing inequalities by embedding patriarchal biases into digitized systems. A multi-level approach is, therefore, essential. Gender-sensitive digital land policies must be designed to include all stakeholders, particularly women in pastoralist communities. Digital literacy programs should be delivered in local languages and tailored to local contexts. Women's representation in land governance committees must be strengthened to ensure that their needs incorporated.

The nexus between digital land governance and women's land rights in Isiolo County is both promising and precarious. Digital systems offer pathways for secure land rights through accountable and transparent titling processes and digitized tools, while also risking deepened marginalization if the digital divide is not addressed. Prioritising digital literacy, community sensitization on land issues, and gender-responsive policy implementation, aligned with national and county policies on land is essential.

Realizing the transformative potential of land digitalization requires more than technological innovation; it demands intentional, inclusive and context-responsive policy action aligned with the Constitution of Kenya, 2010, the Community Land Act (2016), and Sustainable Development Goal 5. When all these conditions are met, digital land governance can become a powerful driver of women's empowerment and equitable development in Kenya's drylands.

6.0 Recommendations

Land digitization, that is, the adoption of digital technologies for land mapping, registration, and administration, holds significant potential to reduce enhance efficiency, and improve transparency. However, as demonstrated in Isiolo County, these platforms, for instance, have not yet meaningfully reduced gender-differentiated barriers. To ensure that digital land governance advances women's land rights in Isiolo, the following recommendations are proposed.

6.1 Strengthen Gender-Responsive Digital Land Policies

The Ministry of lands should ensure that all digital land governance frameworks are explicitly gender sensitive. This includes amending digital land platforms such as *Ardhisasa* to incorporate:

- i. Clear grievance-handling mechanisms tailored to women's needs;
- ii. Protocols for addressing digital divides like access to internet in arid and semi-arid areas;
- iii. Gender-responsive data collection and reporting.

The Ministry should collaborate with Non-Governmental Organizations and international partners, such as the Food and Agriculture Organization, which have their headquarters in Isiolo County, to implement redistributive measures that enhance women's tenure security and economic empowerment.

6.2 Expand Digital Literacy and Land Rights Awareness for Women

The County government of Isiolo should prioritize gender inclusive digital literacy training programs and land rights awareness campaigns in Isiolo County to empower women on their constitutional land rights. These should be delivered through civil society organizations and in partnership with the Ministry of Information, Communication and Digital Economy. Training should:

- i. Be offered in local languages;
- ii. Focus on practical navigation of *Ardhisasa*;
- iii. Build women's confidence in using digital tools;
- iv. Strengthen understanding of constitutional land rights.

Such initiatives will enhance women's capacity to participate meaningfully in land adjudication and governance processes.

6.3 Ensure Women's Representation in Land Governance Structures

Land Agencies and Community Land Management Committees in Isiolo should actively advocate for women's representation in land adjudication committees. This will help curb biases embedded in manual systems and ensure that digitization processes formalize women's land rights under the Constitution of Kenya (2010). Additional measures include:

- i. Equipping women with *Ardhisasa* apps to manage rangelands and community land;
- ii. Implementing gender-responsive budgeting to allocate county land revenues toward women's microfinance for land acquisition.

This will help curb biases embedded in manual systems and ensure that digitization processes formalize women's land rights under the Constitution of Kenya (2010). Additional measures include:

- i. Equipping women with *Ardhisasa* applications to manage rangelands and community land
- ii. Implementing gender-responsive budgeting to allocate county land revenues toward women's microfinance for land acquisition These steps will strengthen women's voices in digital decision-making processes and reduce pastoralist conflicts and dispossession.

6.4 Integrate Digital Succession Planning into Customary Systems

The National Government should incorporate digital succession planning Modules into the customary law in Isiolo under the Community Land Act (2016) to harmonize customary practices with statutory protections. This can be achieved through:

- i. Biometric verification to reduce manipulation in family succession disputes;
- ii. Partnerships with IGAD's women leadership platforms, which regularly target widows in Isiolo;
- iii. Data anonymization and legal aid linkages to protect women against retaliation.

Such measures will safeguard women's inheritance rights and reduce vulnerabilities associated with patriarchal succession systems.

6.5 Establish Mobile Digital Literacy Hubs in Isiolo County

The County government of Isiolo should establish Mobile Digital Literacy Hubs, particularly in underserved wards such as Garbatulla. These hubs should provide:

- i. Annual hands-on training for women on how to navigate the *Ardhisasa* platform;
- ii. Practical sessions on mapping communal grazing lands using GPS;
- iii. Cybersecurity awareness training.

Also, the County government should collaborate with the Kenya Land Alliance to integrate community sensitization forums that challenge patriarchal norms, hindering women's land inheritance.

7.0 References

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