Building an Efficient Land Information System in Ghana: Insights from Land Governance

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Abstract: Land governance is a linchpin for sustainable socioeconomic development and the protection of property rights in Ghana. Efficient land resource management is essential for fostering equitable access to land and ensuring the well-being of citizens. This study aims to explore the multifaceted landscape of land governance in Ghana and inform the development of an efficient Land Information System (LIS). Drawing from international perspectives and the legal framework of Ghana, this research unveils the complexities, challenges, and opportunities inherent in the land governance system of the country. The study delves into thirteen (13) key areas requiring attention and improvement, spanning legal frameworks, land surveying, digital technology adoption, decentralization, transparency, capacity building, public awareness, data security, collaboration, customary land systems, conflict resolution, regular updates, and financial sustainability. By dissecting these components, the research highlights the intricate interplay between effective land governance and the role of an efficient LIS. The study provides valuable insights and recommendations for policymakers, government agencies, and stakeholders, with the intent to enhance land governance practices and build effective LIS in Ghana. This study also contributes to the realization of a more transparent, accessible, and equitable land management system that aligns with the development aspirations of the nation. This study also serves as a roadmap for fostering sustainable growth, bolstering land tenure security, and driving positive institutional change in the land governance landscape of Ghana.

Keywords: Land Information System (Lis), Land Governance, Sustainable Land Management.

1. INTRODUCTION

Land governance is a fundamental pillar of any nation's socioeconomic development and the well-being of its citizens. In Ghana, as in many other countries, the efficient management of land resources is a critical factor for fostering sustainable growth, equitable access to land, and the protection of property rights. To achieve these objectives, the establishment of an efficient Land Information System (LIS) is essential. A LIS serves as the backbone for comprehensive land data management, facilitating transparency, land tenure security, and informed decision-making. A journey in the quest for developing a functional Land Information System in Ghana is not just about the new technological dimension; it is an important step in land governance practices in the country (Cotula et al., 2019). This study delves into the complexities of establishing an effective Land Information System (LIS) in Ghana, aiming to dissect land administration, tenure systems, and regulatory frameworks. Through scholarly research synthesis, policy analysis, and practical experiences, it offers strategic recommendations for successful LIS implementation, emphasizing stakeholder engagement and technological infrastructure.

2. RELATED WORKS

Several studies shed light on land governance challenges and solutions in Ghana. Nolte & Väth (2015) highlighted discrepancies between formal land acquisition procedures and actual practices, driven by powerful actors, impacting land governance systems. Karikari and Stillwell (2004) emphasized the need for modernizing land administration with GIS technology to overcome inefficiencies. Abubakari et al. (2020) stressed the importance of tailoring land registration efforts to local contexts for effective governance. This study aims to explore Ghana's multifaceted land governance landscape, focusing on developing an efficient Land Information System. By examining legal frameworks and international insights, it aims to provide comprehensive insights and recommendations for enhancing land governance practices in Ghana, fostering transparency and equitable land management.

3. STUDY AREA AND METHODS

Study Area
Ghana, in West Africa, offers a rich tapestry of culture and geography, influencing its complex land governance challenges. Customary and statutory land tenure systems coexist, shaping its historical and administrative landscapes. The country faces hurdles in improving land administration and tenure security, yet opportunities for innovation, such as Geographic Information Systems (GIS), abound. The government's reform efforts, including digitizing land records, underscore a dynamic context for research. With over 100 ethnic groups, Ghana presents a captivating arena for exploring land governance intricacies. Researchers and policymakers must navigate these nuances to address Ghana's unique land-related issues effectively.

Fig. 1 Map of Ghana (Study Area)

Method-Building an Effective Lis in Ghana

This section delves into each of the aforementioned thirteen (13) key areas, analysing the current state of affairs and offering forward-looking perspectives on how Ghana can strengthen land governance practices and optimize Land Information System for the benefit of Ghanaians.

Strengthening the Legal Framework for Land Governance

The legal framework is fundamental for effective land governance, shaping property rights and land tenure (Cotula et al., 2019). In Ghana, aligning the legal framework with global trends, such as the Land Act-2020 (Act 1036), modernizes land tenure and clarifies property rights. An efficient Land Information System (LIS) must synchronize with this framework to ensure accurate record-keeping and compliance (Shi et al., 2023). Recent literature stresses the necessity of such alignment for seamless integration and transparency in land transactions and land use regulation. Challenges persist in implementing legal reforms, particularly in reconciling traditional and customary land tenure systems (Schoneveld & German, 2013). Community involvement and public participation are highlighted as crucial for robust lawmaking processes (Rijal, 2023). While Ghana's Land Act of 2020 signifies progress, ongoing attention is needed to address remaining challenges and optimize opportunities for effective land governance (Ameyaw & De Vries, 2021).

Land Surveying

Accurate land surveying and mapping, particularly through initiatives like the Ghana Land Administration Project (LAP), enhance land data quality and support an effective Land Information System (Byamugisha, 2014). Despite notable improvements, sustainability concerns persist (Mensah, 2019). Building capacity for modern surveying tools is crucial for long-term maintenance (Akramov & Khozhimurodov, 2022). The LAP's contribution to digital mapping has laid the foundation for a robust LIS (Moses & Lawani, 2023).

Digital Technology

Embracing modern technology, notably Geographic Information Systems (GIS), is crucial for enhancing land governance, as demonstrated by successful adoption in Ghana (Ameyaw & De Vries, 2021). GIS facilitates efficient, accurate, and transparent management of land data (Quinn et al., 2022). It enables seamless integration of spatial data, enhancing accessibility and reducing opportunities for corruption (Dev et al., 2022). The adoption of GIS has revolutionized land data management in Ghana, contributing to the foundation of the Land Information System (Thambikeni, 2023; Agyei-Holmes et al., 2022). Challenges remain, particularly in data security and capacity building, highlighting the need for comprehensive training programs (Lane et al., 2023). Despite challenges, the success of GIS adoption in Ghana underscores its promise for improving land governance.

Decentralization

Community engagement plays a pivotal role in land governance decentralization in Ghana (Akrofi & Akanbang, 2021). Decentralization practices empower local communities to participate in decision-making, fostering sustainable land use and conflict resolution (Mohammed, 2016). Abubakari et al. (2023) highlight the positive impact of decentralization

on participatory decision-making. Community Land Committees, a product of decentralization, mediate land disputes and manage local resources (Adam et al., 2021). Decentralization also integrates customary land governance into formal frameworks, recognizing its significance (Ameyaw & De Vries, 2021). Capacity building and inter-agency collaboration are essential for successful decentralization (Waeterloos, 2021). Despite challenges, Ghana's experiences with decentralization offer valuable insights for effective land governance.

Transparency
Transparency in land transactions is vital, and Ghana's establishment of an online land registry exemplifies efforts to enhance accountability and deter fraud (Ghana Lands Commission, 2020; Mintah et al., 2021). This digital platform provides easy access to land records, reducing opportunities for corruption (Ameyaw & De Vries, 2020). Efforts to reduce corruption in land transactions through transparency measures are evident (Ameyaw & De Vries, 2021). Challenges such as data security and public awareness require attention (Boadi & Dankwah, 2021; Nkansah et al., 2022). Despite challenges, Ghana's strides towards transparency in land governance signify progress in combating fraudulent practices and promoting accountability.

Capacity Building
Capacity building for land administrators and officials is crucial for effective Land Information System (LIS) management (Ehwi & Asante, 2016). Continuous training is essential to enhance skills and adapt to the evolving nature of land management (Deininger et al., 2014). Engaging local communities in capacity building efforts further strengthens land governance and LIS management (Lukman et al., 2023). Despite the benefits, challenges such as resource allocation and ICT integration persist and require attention for comprehensive capacity building.

Public Awareness
Raising public awareness about land rights is crucial for promoting responsible land management and community participation in land governance (Yeboah & Kakraba-Ampeh, 2016; Umar et al., 2023). Initiatives like the Ghana Responsible Land-Based Investment project (GYBILP) emphasize the role of informed citizens in ensuring sustainable and ethical land use (McLain et al., 2021). Community-based initiatives empower citizens with knowledge about their land rights, enhancing transparency and accountability (Heuty, 2012). Digital platforms and social media also play a significant role in disseminating information about land rights (Aker, 2017). Targeted campaigns, especially focusing on women's land rights, are essential for addressing specific issues (Hull et al., 2022). However, evaluating the impact of these campaigns and improving assessment methods remain areas of concern (Chinie et al., 2021). In summary, public awareness campaigns, community-based initiatives, and digital platforms are vital for educating citizens about their land rights, with future directions focusing on more targeted efforts and enhanced impact evaluation methods.

Data Security in Land Information System
Ensuring data security is paramount in protecting sensitive land information, with efforts in Ghana focusing on data protection regulations and cybersecurity measures (Asenso-Gyambibi et al., 2019; Moses & Lawani, 2023; Ulven & Wangen, 2021). Training programs and regular

security audits help enhance awareness and identify vulnerabilities (La Torre et al., 2019). Collaboration among government agencies and international partners is vital for efficient land information management (Takyi et al., 2022). Public-private partnerships bring additional resources for LIS development (Akomea-Frimpong et al., 2021). Specific initiatives with organizations like UN-Habitat focus on sustainable urban land management and LIS development (Baffoe et al., 2021). Effective communication and involving local communities ensure inclusive collaboration and diverse perspectives (Musheke & Phiri, 2021; Luongo et al., 2023). Recent literature highlights the importance of collaboration in developing effective land information systems, emphasizing the benefits of partnerships and addressing challenges for successful implementation.

Feedback Mechanisms
Establishing feedback mechanisms for stakeholders is critical in land governance, with innovative mobile technology applications exemplifying their importance (Møller-Jensen et al., 2023). Recent literature emphasizes the value of feedback channels in Ghana's land administration system, enhancing transparency and accountability (Fatile et al., 2022). Integration of mobile apps facilitates real-time feedback collection, empowering citizens and aiding authorities in resolving disputes efficiently (Siegler et al., 2021; Abubakari et al., 2020). Community-based feedback mechanisms, involving local representatives and traditional leaders, also play a vital role in land dispute resolution (Asaaga, 2021). Capacity-building initiatives for officials and community leaders are proposed to effectively manage feedback data (Mensah et al., 2016). While feedback mechanisms foster transparency, addressing data security and enhancing stakeholder capacity are essential for their effectiveness (Antwi-Agyei et al., 2015; Lambrecht & Asare, 2016; Anku et al., 2022; Ansah & Chigbu, 2020; Biitir & Nara, 2016; Enemark & Williamson, 2004).

Conflict Resolution
Effective mechanisms for resolving land conflicts are crucial for maintaining transparent land governance in Ghana. Yaro et al. (2023) provide insights into the Ghana Lands Commission's approach to mediating disputes, emphasizing its importance. Community-based mediation, as discussed by Golar et al. (2021), has shown success but faces implementation challenges. Crook (2004) highlights legal framework issues and practical difficulties in mediation, pointing to areas needing improvement. Ibrahim et al. (2022) suggest integrating alternative dispute resolution into the land information system to streamline processes. Training programs for mediators, recommended by Yaro et al. (2023) and Omodo et al. (2023), can enhance conflict resolution. The Ghana Lands Commission serves as a model for conflict resolution efforts, focusing on community mediation and innovative approaches like alternative dispute resolution (Roopnarine et al., 2021; Kansiime, 2022).

Regular Updates
Regular updates and maintenance are vital for the Land Information System (LIS) to remain relevant, as seen in Ghana's Continuous Land Registration Project (CLRP) (Biraro et al., 2021; Touray, 2021). Modern technology like Geographic Information Systems (GIS) enhances efficiency (Moses & Lawani, 2023), supported by robust policy frameworks (Appiah et al.,

2022; Kubuga et al., 2023). Involving local communities ensures accuracy and ownership (Agu et al., 2023; Agyei-Holmes et al., 2022). Challenges like resource constraints require innovative solutions such as public-private partnerships (Moses & Lawani, 2023). The CLRP demonstrates successful implementation, emphasizing technology, policy, community involvement, and addressing challenges for effective LIS updates and maintenance.

Financial Sustainability
Exploring sustainable funding options for the Land Information System (LIS) is crucial, with user fees, public-private partnerships, and international aid offering viable avenues (Asongu & Odhiambo, 2023). In Ghana, user fees have been effective in generating revenue for LIS operation and improvement (Osei et al., 2023). Public-private partnerships present opportunities for long-term financial support, drawing from successful models implemented elsewhere (The Impact of Economic Growth of Middle-Income on Individuals Level of Savings in Ghana, 2023). International aid plays a significant role in funding specific projects and capacity-building initiatives, contributing to LIS financial sustainability (Forson, 2023). Recommendations include exploring innovative funding mechanisms like land-linked financial instruments to support LIS financial sustainability (Ofori & Obeng, 2023). Financial sustainability is essential for maintaining an effective LIS, with strategies like user fees, public-private partnerships, international aid, and innovative funding mechanisms providing valuable insights for other countries facing similar challenges (Awadzie et al., 2022).

Policy Review
Periodically reviewing land policies and regulations is vital for adapting to emerging challenges in land governance, with Ghana making efforts to revise its legal framework in response to evolving needs (Moses & Lawani, 2023; Adu & Ofori, 2022). Stakeholder engagement, including local communities and civil society organizations, enhances the comprehensiveness and effectiveness of policy reforms (The Impact of Economic Growth of Middle-Income on Individuals Level of Savings in Ghana, 2023c). Adzei and Alornu (2022) highlight the importance of Customary Land Secretariats in aligning land policies with local customs and practices, emphasizing the need for periodic reviews. Technology, such as GIS and remote sensing, aids in evaluating policy effectiveness and supports a data-driven approach to policy reviews (Abdul-Ganiyu, 2022). Balancing traditional practices with modern policies and adopting a dynamic, iterative approach to policy reform are essential for addressing challenges and maximizing opportunities (Delladetsimas & Katsigianni, 2023). Recent literature underscores the importance of adaptive land policies, stakeholder engagement, localization of policies, technology integration, and a dynamic approach to ensure effectiveness and relevance in land governance contexts.

4. RESULTS AND DISCUSSION

An integrated approach based on identified key areas through an intensive review of relevant literature and consultation with key stakeholders needs to be followed in developing an effective Land Information System, LIS in Ghana. The results and discussions highlight the progress made in building an effective Land Information System in Ghana, as well as the

challenges and opportunities that lie ahead. Continuous efforts and collaboration among stakeholders are essential to address remaining challenges and optimize land governance practices for the benefit of Ghanaians. Through the methodological framework outlined so far, important results and insights on improved land governance practices and effective management of land data have been produced.

Ghana's land governance progress, epitomized by the Land Act-2020, modernizes land tenure and property rights, yet struggles persist in reconciling traditional systems. Initiatives like the Ghana Land Administration Project (LAP) bolster land data quality and foster digital mapping. While GIS adoption enhances transparency, challenges like data security remain. Decentralization empowers local communities, but capacity building is imperative. Transparency improves via online registries, yet corruption and public awareness persist. Capacity building and feedback mechanisms enhance governance, with customary systems integration and conflict resolution efforts ongoing. Regular updates and financial sustainability are vital for long-term success (Ameyaw & De Vries, 2021; Moses & Lawani, 2023).

5. CONCLUSIONS

In conclusion, this comprehensive study has illuminated the multifaceted landscape of land governance in Ghana and underlined the crucial role of an efficient Land Information System in fostering sustainable development, equitable land access, and property rights protection. Addressing the thirteen key areas of concern, ranging from legal frameworks to data security and customary land systems, critical challenges and opportunities that can guide policymakers and stakeholders in enhancing land governance practices, findings emphasize the need for a nuanced, context-specific approach to land registration and management, as well as the urgency of embracing modern technologies, including Geographic Information Systems (GIS), for more effective administration. With the potential for driving institutional change and achieving transparency, this research provides a vital roadmap for achieving a more transparent, accessible, and equitable land management system in Ghana, aligning with the development goals and aspirations of the country.

Recommendations
1. Ghana should prioritize the adoption of modern technologies, such as Geographic Information Systems (GIS), to streamline land administration processes, enhance data accuracy, and improve efficiency within the Lands Commission Secretariat (LCS).
2. Policymakers should recognize the nuanced nature of land registration and tailor strategies to specific contexts and challenges in Ghana, acknowledging the complexity of the process and varying desirability of registration in different situations.
3. Enhanced collaboration among government agencies, stakeholders, and local communities is imperative for fostering transparency and equitable land governance. Promoting dialogue and cooperation can lead to more effective conflict resolution and capacity building.
4. To maintain the efficiency of a Land Information System, a sustainable financial model must be established, ensuring ongoing funding for system maintenance, updates, and the development of necessary infrastructure.

Conflict of Interest
The authors declare no conflict of interest.

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