

Global Adoption of the Framework for Effective Land Administration: Synthesis Research

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SUMMARY

The Framework of Effective Land Administration (FELA), endorsed by the United Nations Global Geospatial Information Management (UN-GGIM), supports the establishment and modernisation of country-level land administration systems worldwide. This synthesis research aims to provide a comprehensive overview of FELA application and research progress made since the endorsement by the United Nations in 2020. Through a synthesis of existing research, the current state of FELA adoption in the research community and its impact on land administration globally is provided. By identifying challenges and successes relating to FELA, it contributes to ongoing efforts to refine and enhance land administration practices, promoting effective land administration and equitable access to land worldwide. While the FELA framework has gained global recognition, its recognition at the national level remains challenging. Research on the uptake of FELA can provide insights into how countries are incorporating FELA principles and pathways into their policy development and implementation. Specific case applications such as Pakistan, Ethiopia, Armenia, Indonesia, Nigeria, Mexico, the Netherlands, and various European countries helps to show how FELA is being discussed and considered. This is crucial for aligning national land administration strategies with global best practices, ensuring that land administration systems are effective and responsive to local needs. Countries that are considering or implementing FELA may require capacity-building efforts, including training and technical assistance. Research can further identify these gaps, helping international organizations and governments tailor their support to meet specific needs. Further, the fact that the private sector, is considering FELA as an important milestone. It indicates that businesses and, in the land sector donors, recognise the importance of effective land administration. Research can show how private sector actors are engaging with the FELA principles and how they can contribute to the framework's successful implementation. The synthesis on the usage and application of the FELA across countries and regions allows for the identification of common challenges and successful strategies. This information can facilitate peer learning and the sharing of best practices, enabling countries to learn from each other's experiences. Research on the Integrated Geospatial Information Framework (IGIF1) and the FELA adoption further support UN-GGIM to coordinate their efforts more effectively. It allows them to target support to countries where it is most needed and to ensure that the frameworks principles are consistently applied and

¹ The IGIF and the FELA complement each other whereas the FELA specifically focuses on land and its administration and management.

adapted to different contexts. Finally, FELA is closely linked to several Sustainable Development Goals, particularly those related to poverty reduction, gender equality, and others. Research on FELA's adoption and impact can contribute to the achievement of the 2030 Agenda.

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1. Introduction

In the context of the 2030 Agenda for Sustainable Development, adopted in 2015, the need for an effective land administration is recognised. The Framework for Effective Land Administration (FELA), endorsed by the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), serves as a policy guide for Member States (UN-GGIM, 2020). This framework is a set of guidelines and a comprehensive approach to managing and modernising land administration systems to support economic growth, social inclusion, and environmental sustainability. The adoption of FELA aims to promote prosperity while protecting the planet, recognising that sustainable management of land is integral to achieving the 17 Sustainable Development Goals (SDGs).

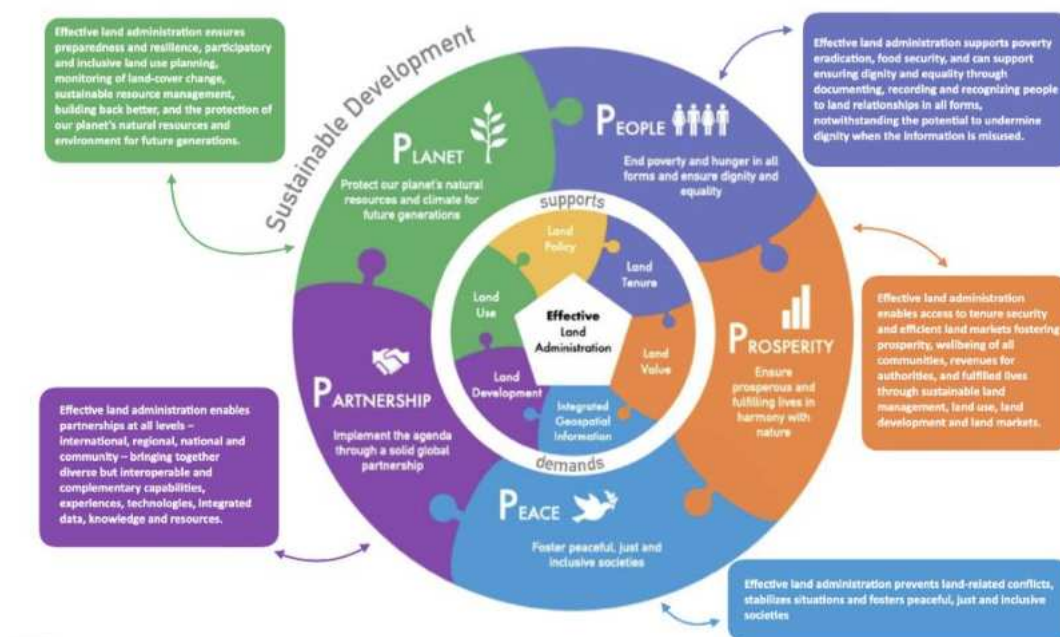


Figure 1: FELA in relation to the 5Ps, adapted from (UN-GGIM, 2020) by Unger, E.M.

Land administration defines the relationships between people and land, which is argued to be crucial for ensuring security of tenure, supporting economic opportunities, and reducing conflicts over land and resources. (UN-GGIM, 2020; UN-ECE, 1996) Despite its crucial role in a countries development, numerous countries face challenges such as inadequate inclusion

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of all people to land relationships, corruption, lack of transparency, limited public participation in land governance and many more (Zevenbergen et al., 2016; Zevenbergen, 2021; FAO, 2020; Lengoiboni et al. 2019; Augustinus et al.; 2021). This research seeks to examining the adoption and impact of FELA globally, with a particular focus on understanding how its pathways are integrated into national practices to address these challenges.

This paper aims to provide a comprehensive overview of FELA's application and the research progress since its endorsement. By synthesising existing research, publications, reports and conference papers, this study will highlight the current state of FELA adoption in the research community and its impact on global land administration practices. The research will explore both the successes and challenges of FELA implementation, contributing to ongoing efforts to refine and enhance land administration systems worldwide.

Through specific research from countries like Pakistan, Ethiopia, Armenia, Indonesia, the Netherlands, and other European nations, this research will demonstrate how FELA is being discussed and considered. It will also investigate the engagement of the private sector and its contribution to the successful implementation of the framework.

Ultimately, this research intends to spark further interest and investigation into how FELA could be a useful framework in the domain of land administration, aligning national strategies with global best practices and ensuring that land administration systems are effective and responsive to local needs.

This conference paper is organised into several sections, beginning with an introduction that broadly outlines the development of the UN-GGIM Framework for Effective Land Administration (FELA) and the objectives of this paper. It proceeds with a literature review that examines a range of scholarly works related to FELA, followed by a synthesis of the reviewed literature to integrate, and summarise the insights gathered. The paper concludes with a discussion that interprets the findings, highlighting both successes and challenges associated with FELA implementations.

2. Literature Review

The aim of this literature review is to investigate the application of the Framework for Effective Land Administration (FELA) across diverse contexts, including policy transfer, data capture mechanisms like UAVs and GIS, and digital transformation. It examines case studies from various countries such as Europe, Pakistan, Chad, Nigeria, and the DRC, exploring how FELA influences land administration practices and addresses local challenges within these regions.



Figure 2: FELA Application and Research Timeline

First, the initial research that mentioned the Framework for Effective Land Administration (FELA) for the first time focused on global policy transfer for land administration and disaster risk management (Unger et al. 2020). The study examined the development and integration of two frameworks, FELA and the Strategic Framework for Geoinformation Services for Disaster (SFGISD). The research aimed to assess the extent and way these global frameworks are transferred into national laws, regulations, and local community initiatives. Specifically, it explored the limitations and opportunities for enhancing this policy transfer process. At the time of the research, FELA was still in the drafting phase and undergoing consultation, and it was used as a case study to illustrate the dynamics of global policy transfer without being fully adapted yet.

Second, the paper titled ‘Exploring PPPs in Support of Fit-For-Purpose Land Administration: A case study from Cote d’Ivoire’ introduces a novel form of public-private partnerships (PPPs) in the context of fit-for-purpose land administration (FFPLA), expanding the current discussions on PPPs in land administration (Garcia-Moran et al., 2021). While traditional PPPs have been a longstanding method in land administration, there remains potential for involving non-traditional land sector actors more extensively. This is explored through a case study in Côte d’Ivoire, where a partnership between the government and a consortium of private companies has been analysed. The study highlights the innovative aspects, challenges, opportunities, and critical success factors of this new PPP model compared to traditional approaches.

The findings suggest that this innovative partnership model could open new avenues for financing FFPLA in developing countries, involving the private sector more actively in land tenure governance. This model supports sustainable engagement from corporations, which although not traditionally involved in land administration, are increasingly recognising its value in achieving corporate social responsibility objectives. The paper argues that land administration systems should align with emerging global policies and the Framework for

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Effective Land Administration (FELA), which provides comprehensive guidance for policy. It emphasises that implementing FFPLA requires a multi-stakeholder and multi-disciplinary approach, which can complicate technical processes. Thus, a clear understanding of the roles, responsibilities, funding, and partnerships as outlined in FELA's strategic pathways is crucial. The partnership utilises FELA to merge objectives from diverse actors typically not engaged together in land administration, promoting innovation and integration in the sector.

Third, during the 10th online meeting of the UN-GGIM Expert Group on Land Administration, Claudio Martinez Topete from INEGI presented on their application of the Framework for Effective Land Administration (FELA) in the drafting of the General Law of Cadastre and Public Registry of Property. This proposed law aims to standardise and harmonise terminologies, standards, procedures, and operational systems across registry and cadastral institutions, and to establish a national registry and cadastral database beneficial for local and federal governments to support public policy implementation for national development. INEGI and SEDATU reviewed the draft law to ensure it aligns with FELA's guidelines, making necessary adjustments to encompass recognition of various land relationships, ensure legal certainty to prevent land-related conflicts, promote equity, and uphold data protection and privacy.

Fourth, the paper titled 'Scaling up UAVs for land administration: Towards the plateau of productivity Unmanned aerial vehicles (UAVs) are considered an innovative tool for land administration (Stöcker et al., 2021). Despite the prospects and market opportunities in the domain, there is a gap between experimentation and widespread technology diffusion. In this paper, the Framework for Effective Land Administration (FELA) and the Hype Cycle concept are integrated to understand the dynamics of the innovation process of UAVs for the land administration sector. Empirical data stems from literature and interviews of UAV and land administration experts worldwide. Most experts estimate UAV technology to be in a phase in which the innovation needs to overcome initial unmet expectations to foster market development and increased adoption. The assessment indicates the changing importance of different FELA pathways during this process. Enabling laws and policies and supporting governance, accountability and institutions are crucial to create such a UAV-friendly national ecosystem early on and align expectations. Once this ecosystem has been developed, market demand is expected to surge driven by partnerships, adapted standards, tech advocacy and awareness-raising campaigns, highlighting the superiority of high-resolution data amongst other benefits of UAV technology. These insights can be used as a baseline to direct national strategic decisions towards the increased adoption of UAVs in land administration using the FELA as an overall guide.

Fifth, (Bennett et al., 2022) examines the preliminary outcomes of recent and ongoing digital transformation initiatives in land administration, focusing on the assessment and design phases of projects in Indonesia and Armenia, conducted in collaboration with KI (The Netherlands) and respective local partners ATR/BPN and CC. The UN-GGIM's Framework for Effective Land Administration (FELA) served as a foundational tool for understanding and implementing digital transformation at both organisational and sectoral levels, aiding in the analysis of digital transformation stages and identifying viable paths toward fully digital

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systems. Both Indonesia and Armenia have made substantial strides in establishing unified digitalisation policies, manifested in IT infrastructure upgrades, digitisation of data and internal processes, and the development of electronic services for citizens. Utilising FELA, the analysis highlighted that despite significant country-specific differences in legal frameworks, financial resources, partnerships, legacy IT systems, and capacities, both nations encounter similar challenges. These include issues with archive digitisation and storage, maintaining the quality of spatial/textual data, enforcing standards, designing digital transactions, system maintenance, and fostering public awareness and trust. The case studies underscore the value of integrating local insights with global expertise and standards to enhance digital transformation efforts in land administration.

Sixth, the 2022 FIG Working Week paper titled "GIS in Land Administration Can Help You Implement the FELA and Support the SDG's" discusses the integration of Geographic Information System (GIS) technology with the Framework for Effective Land Administration (FELA) and its support for the Sustainable Development Goals (SDGs). (Tourtelotte B., 2022) highlights FELA as a robust conceptual framework that provides best practices for land administration and discusses the challenges cadastral agencies face in implementing these practices daily without incurring high costs from custom software development. It points out that existing GIS technologies align well with several FELA Strategic Pathways and can effectively support at least five SDGs. The presentation emphasises the potential of configuring existing software tools to operationalise FELA and enhance the realisation of SDGs, presenting GIS as a scalable, cyber-secure, and sustainable technological solution.

Seventh, the "Digital Transformation and Land Administration – Sustainable Practices from the UNECE Region and Beyond," FIG Publication No. 80, co-authored by FAO, UN, and FIG, explores how the COVID-19 pandemic catalysed digital transformation in the land administration sector (FAO et al., 2022). The publication highlights both the challenges and successes experienced during the pandemic, noting that many land administration systems not only coped but thrived during lockdowns due to the acceleration of digital services. To implement effective digital transformation, the publication advocates for a holistic approach that involves key stakeholders, aligns with broader government policies, and includes comprehensive planning stages such as baseline assessments, policy alignment, benefits analysis, impact assessment, and the development of both an action and an investment plan. It also recommends incorporating the nine strategic pathways outlined by the UN-GGIM's Framework for Effective Land Administration (FELA), while addressing specific gaps and seizing opportunities within the FELA and the IGIF.

Eight, the paper titled "Fit-for-purpose Land Administration and the FELA: Synthesis of Contemporary Experiences" focuses on integrating the Framework for Effective Land Administration (FELA) with the Fit-For-Purpose Land Administration (FFPLA) approach (Metaferia et al., 2023). Despite a strong emphasis on the United Nations Sustainable Development Goals (SDGs), many land rights worldwide remain unrecorded due to cumbersome, costly, and expert-dependent land administration processes. FFPLA offers a more efficient alternative by being both time and cost-effective, addressing global tenure insecurity as advocated by FELA.

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The study, conducted in 2022, employed a systematic review methodology to synthesise global best practices in FFPLA implementation, examining articles from leading land administration discussions. It developed a checklist based on the strategic pathways of FELA and the foundational principles of FFPLA to identify optimal implementation practices. The research highlights successful FFPLA practices in Asia and Africa, suggesting their potential applicability and effectiveness in securing land tenure in rapidly urbanising regions. However, it notes that further research is needed to evaluate the efficacy, practicality, innovativeness, and transferability of these practices to different land administration contexts.

Ninth, the research titled "EuroSDR Advancing FELA - The Framework for Effective Land Administration" by EuroSDR (European Spatial Data Research) aimed to enhance the awareness and application of FELA across Europe (EuroSDR; 2023). Initiated in the summer of 2021 with support from UN-GGIM Europe and the UN-GGIM Expert Group on Land Administration and Management (EG-LAM), this project was designed to assess and promote the effectiveness of land administration using FELA as a key policy guide. The project recognized FELA as a "living document" adaptable to changing societal, economic, environmental, political, and technological contexts.

The objectives were pursued through several methods: promoting FELA at events, conducting an online survey to collect wide-ranging insights, performing in-depth interviews with key experts, and a workshop to validate research findings after all pathways have been investigated. Additionally, the results were to be published as an Official EuroSDR Publication. The research presents preliminary findings from this collaborative effort, demonstrating the project's comprehensive approach to understanding and promoting FELA in European land administration practices.

Tenth, the FIG paper titled "FELA-based Geospatial Knowledge Infrastructure" emphasizes the critical role of effective land administration and tenure security in tackling global challenges such as climate change and poverty (Tourtelotte et al., 2023). It highlights the Framework for Effective Land Administration (FELA) and its nine strategic pathways that guide the design and evaluation of Land Administration Systems. The paper advocates for the creation of a robust Geospatial Knowledge Infrastructure (GKI) on Land Administration, which necessitates reliable foundational data and a supportive technology architecture. This infrastructure aims to go beyond mere community practice by integrating expertise in tools and software and implementing scalable and secure solutions. The paper promotes a collaborative approach to innovation and capacity building in land administration, facilitated by public-private partnerships and international networks.

Eleventh, the FIG paper (Unger et al., 2023) titled "Fit-For-Purpose Land Administration and the Framework for Effective Land Administration in Chad" examines the significant challenges faced by Chad's land administration system, including outdated land legislation, prevalent land conflicts, and inefficient agricultural and urban land use. The paper details the collaborative efforts of an international team in implementing the Fit-For-Purpose Land Administration approach in N'Djamena to enhance tenure security.

Using the Framework for Effective Land Administration, the paper identifies critical issues needing to be addressed in future projects to improve land administration practices in Chad.

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The context of Chad is explained together with an overview of methodologies applied, and an analysis using the FELA to highlight key areas for future piloting, and a conclusion summarizing the main findings. This paper serves as a foundational document for guiding further improvements in Chad's land administration system.

Twelve, the publication (Ahsan et al. 2023) titled "Assessing the Status and Challenges of Urban Land Administration Systems Using FELA: A Case Study in Pakistan" investigates the effectiveness and issues of urban LASs in Pakistan, utilising the Framework for Effective Land Administration (FELA). Employing a combination of questionnaire surveys, group discussions, and desk reviews with 525 stakeholders (including owner-buyers, real estate agents, bankers, lawyers, and LAS organisations), the study identifies significant dissatisfaction with governance, accountability, and legal frameworks of urban LASs. It highlights prevalent corruption, frequent disputes related to fraud and joint ownership taking over two years to resolve, and financial inefficiencies like property undervaluation and low revenue collection. The research stresses the need for digital transformation in LASs, showing strong stakeholder interest in modernising systems with technologies such as GIS and 3D mapping to improve efficiency and standardisation. The findings suggest that the vision for smart cities in Pakistan could be realised through such innovations and the enhancement of skills in GIS and Remote Sensing among LAS personnel.

Thirteenth, the FIG paper (Ajayi et al., 2024) titled "Exploring Technology Integration through FELA in Nigeria" investigates the integration of technology into Nigeria's land administration systems, a crucial area especially given the country's rapid urbanization and changing land use patterns. Recognizing the importance of land in the 2030 Agenda for Sustainable Development Goals, this study evaluates Nigeria's land administration through the lens of the Framework for Effective Land Administration (FELA). The focus is on assessing the integration of technology, historically limited due to reliance on manual practices.

The research involves a systematic review of existing literature, utilizing focused keyword searches related to land administration technology in Nigeria. It discusses the historical evolution of land administration in the country and examines the various dimensions of technological integration.

The study concludes with the critical need for ongoing technological innovation, policy reform, and capacity building to fully implement FELA in Nigeria. It identifies the challenges of integrating technology in Land Administration Systems (LAS) and outlines key factors needed for effective technology integration. The findings aim to lay a groundwork for future enhancements in Nigeria's land administration framework.

Fourteenth, the FIG paper titled "Land reforms and implementation of the framework for effective land administration (FELA): a case study for customary land registry implementation in the Democratic Republic of Congo" delves into the land reform initiatives in the DRC, supported since 2012 by GLTN/UN-Habitat (Mballo et al., 2024). The reform aims to develop a national land policy and a legal framework, focusing particularly on establishing a customary land registry to manage the rights of customary landholders, who often lack formal recognition. Implemented in two pilot sites, Mambasa and Mai Ndombe, the registry employs the Social Tenure Domain Model (STDM) to facilitate local cadastres and participatory mapping. This

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innovative approach helps secure land rights and prevent conflicts, particularly in the conflict affected Babila Bakwanza Chiefdom in Ituri Province. The outcomes have been positive, with over 340 family plots identified and mapped in Ituri, leading to the resolution of over 100 land conflicts and the issuance of around sixty land certificates. The paper highlights the success of using a flexible, participatory approach to land information management, which has proven effective in promoting good land governance and peace at the local level. This case study exemplifies the benefits of FELA in guiding such reforms and underscores the potential for scaling up and replicating these interventions to enhance land administration and conflict resolution in other regions.

No.	Title	Journal or means of Publication	Key Focus	Methodology/Approach	Findings	Date	Citation
1	Global policy transfer for land administration and disaster risk management	Land Use Policy	Examines global policy transfer for FELA and SFGISD	Case study, Literature review	Identified transfer limitations and enhancement opportunities for the two framework but also for policy transfer approaches	06/2020	(Unger et al., 2020)
2	Exploring PPPs in Support of Fit-for-Purpose Land Administration: A Case Study from Cote d'Ivoire	Land	Examines PPPs to identify financing mechanism for FFPLA approaches guided by the FELA	Case study, Literature review	Innovative partnership approach may create novel avenues for financing	03/2021	(Garcia-Moran et al., 2021)
3	Mexico Legal Framework	10 th UN-GGIM EG LAM Online Meeting	Mexico has used the FELA to update their legal framework	Comparative analysis	FELA was working well in this context and lead to some updates to the legal framework of Mexico	07/2021	
4	Scaling Up UAVs for land administration	Land Use Policy	Integrates UAVs with FELA for LA	Interviews, literature review	Highlights the role of enabling laws and supportive governance	03/2022	(Stöcker et al., 2021)
5	Digital Transformation of Land Administration: Stages, Status and Solutions	FIG Working Week 2022	FELA provided a means for understanding and undertaking digital transformation within land administration system	Interviews, literature review	By applying FELA it was revealed potential solutions to speed up responsibly moving towards fully digital systems	05/2022	(Bennett et al., 2022)
6	GIS in Land Administration Can Help You Implement the FELA and Support the SDGs	FIG Working Week 2022	Discusses various GIS applications/integrations with FELA and SDGs	Conceptual analysis	Outlining GISs role in operationalising FELA and achieving the SDGs	05/2022	(Tourtelotte B., 2022)
7	Digital Transformation and Land Administration	FIG Publication	Explores digital transformations impact during the COVID-19 pandemic	Literature research	Advocates for a holistic approach and FELA pathway incorporation	11/2022	(FAO et al., 2022)
8	Fit-For-Purpose Land Administration and the Framework for Effective Land Administration	Land	Integrates FELA with the Fit-For-Purpose approach	Systematic Review	Synthesised global best practices, highlighted need for further research	12/2022	(Metaferia et al., 2023)

9	EuroSDR: Advancing FELA – The Framework for effective land administration	EuroSDR	Promote FELA, awareness around FELA and pathway application in Europe	Surveys, interviews	Demonstrate a comprehensive approach to FELA in Europe	02/2023	(EuroSDR; 2023)
10	FELA-based geospatial knowledge infrastructure	FIG Congress 2023	Advocates for a robust GKI to integrate expertise tools and software facilitated by PPPs and international networks	Desktop research	Conceptual application of FELA to guide geospatial knowledge infrastructure development	05/2023	(Tourtelotte et al., 2023)
11	FFFPLA and the FELA in Chad	FIG Congress 2023	Examines challenges faced by Chad's LA, utilises FELA to identify critical issues for future projects	Case study, group discussion	Applying the FELA to identify key aspects to improve land administration in Chad	05/2023	(Unger et al., 2023)
12	Assessing the Status and Challenges of Urban LAS in Pakistan using FELA – a case study in Pakistan	Land	Investigates the effectiveness and issues of urban LASS in Pakistan, utilising the FELA	Surveys, group discussion and desk reviews	Identifies significant dissatisfaction with governance, accountability, and legal frameworks of urban LASS in Pakistan	08/2023	(Ahsan et al. 2023)
13	Exploring Technology integration through FELA in Nigeria	FIG Working Week 2024	Examines the fulfilment of FELA's objectives within Nigeria regarding technology integration	Case Study	Developing a basis for further FELA guided technological improvements in land administration	05/2024	(Ajayi et al., 2024)
14	Land reforms and implementation of the framework for effective land administration: case study in DRC	FIG Working Week 2024	Case study on community land registry implementation in DRC – conflict affected region using the FELA	Systematic Review	Pilot projects successfully enhanced land tenure security; FELA being used to assess the success	05/2024	(Mballo et al., 2024)

3. Discussion and Conclusion

The synthesis examining the Framework for Effective Land Administration (FELA) implementations across various studies, shows similarities and challenges, showcasing both common strategies and unique adaptations tailored to diverse geographical and administrative contexts across the globe.

A consistent theme across the case studies is the adaptation of FELA to meet specific local governance and societal needs. This is evident in the standardization and harmonisation efforts in different environments, such as urban areas in Pakistan and customary land rights contexts in the DRC. Another recognisable trend is the technological integration in land administration systems, where advancements range from the deployment of unmanned aerial vehicles (UAVs) and geographic information systems (GIS) to report on the SDGs to broad digital transformation initiatives in countries like Indonesia and Armenia. These cases underline a significant push towards modernizing land administration to improve efficiency and accessibility guided by the FELA.

Furthermore, the involvement of various stakeholders, from local communities to international partners and the private sector, plays a crucial role. This is illustrated through diverse initiatives, such as public-private partnerships in Côte d'Ivoire and collaborative efforts between local and federal governments in Mexico, aligning new legislations with FELA's standards.

Despite these similarities, the studies reveal significant challenges and differences. The scope and scale of technological adoption differ, while some regions like Nigeria are in the early stages of developing digital practices, others are advancing towards more advanced applications like including UAV generated imagery. Challenges faced by these initiatives are also context specific. For instance, Europe focuses on policy harmonization, while the DRC deals with issues related to conflict and governance. The outcomes and successes vary widely, with procedural successes such as policy developments in Europe contrasting tangible outcomes like conflict resolution in the DRC or the establishment of a comprehensive legal framework in Mexico under consideration of the FELA.

Further from this synthesis, several patterns emerge. Effective stakeholder collaboration often underpins successful implementations, where diverse groups including governments, private sectors, and local communities collaborate towards common goals under FELA's guidance/application. Technology acts as a catalyst for improvement, with effective integration tailored to specific regional needs which may lead to significant enhancements in land administration systems. Additionally, the adaptability of legal frameworks and institutional arrangements to incorporate FELA's principles proves crucial for the successful implementation of land reforms.

Unique outcomes in specific regions further highlight the versatility of FELA. In the DRC, using FELA to guide the establishment of community-focused tenure registration and recordation has been key in mitigating conflicts and enhancing land tenure security. In Côte d'Ivoire, innovative PPP models explore how non-traditional land sector actors can significantly contribute to land administration. In Nigeria and Mexico, the introduction of comprehensive legal reforms guided by FELA demonstrates the framework's capacity to foster administrative and policy-oriented transformations.

This synthesis provides a comparative insight into the global application of FELA and underscores common strategies and unique adaptations that can inform future implementations and application of the FELA globally. Important also, this literature review does not claim to be complete. There may be additional relevant studies that were not within the scope of the authors' current research focus. Initially, this review aims to provide an overview of the existing literature on the Framework for Effective Land Administration (FELA), with the intention to extend and deepen the analysis in a subsequent journal paper.

REFERENCES

(UN-GGIM, 2020) Framework for Effective Land Administration, August 2020, New York, United States. Available online: https://ggim.un.org/meetings/GGIM-committee/10th-Session/documents/E-C.20-2020-29-Add_2-Framework-for-Effective-Land-Administration.pdf (accessed on 10 May 2021).

(Unger et al., 2020) Unger, E.M.; Bennett, R.; Lemmen, C.; de Zeeuw, K.; Zevenbergen, J.; Teo, C.; Cromptoets, J. Global policy transfer for land administration and disaster risk management. *Land Use Policy* 2020, 99, 104834. (9) (PDF) Land Administration As-A-Service: Relevance, Applications, and Models. Available from: https://www.researchgate.net/publication/367112467_Land_Administration_As-A-Service_Relevance_Applications_and_Models

(Garcia-Moran et al., 2021) García-Morán, A.; Ulvund, S.; Unger, E.-M.; Bennett, R.M. Exploring PPPs in Support of Fit-for-Purpose Land Administration: A Case Study from Côte d'Ivoire. *Land* 2021, 10, 892. <https://doi.org/10.3390/land10090892>

(Stöcker et al., 2021) Stöcker, C.; Bennett, R.; Koeva, M.; Nex, F.; Zevenbergen, J. Scaling up UAVs for land administration: Towards the plateau of productivity. *Land Use Policy* 2022, 114, 105930.

(9) (PDF) Land Administration As-A-Service: Relevance, Applications, and Models. Available from: https://www.researchgate.net/publication/367112467_Land_Administration_As-A-Service_Relevance_Applications_and_Models

(Bennett et al., 2022) Bennett, R.; Unger, E.M.; Verheij, V.; Van der Vegt, H.; Tovmasyan, S.; Hutabarat, I.; Gugarats, A.; Latif, A.; Trdat, C.; Digital Transformation of Land

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Administration: Stages, Status and Solutions In FIG Congress 2022: Volunteering for the future-Geospatial excellence for a better living; International Federation of Surveyors: Copenhagen, Denmark, 2022.

(Tourtelotte B., 2022) Tourtelotte Brandon.; GIS in Land Administration Can Help You Implement the FELA and Support the SDG's In FIG Congress 2022: Volunteering for the future-Geospatial excellence for a better living; International Federation of Surveyors: Copenhagen, Denmark, 2022.

(Metaferia et al., 2023) Metaferia, M.T.; Bennett, R.M.; Alemie, B.K.; Koeva, M. Fit-for-Purpose Land Administration and the Framework for Effective Land Administration: Synthesis of Contemporary Experiences. *Land* 2023, 12, 58. <https://doi.org/10.3390/land12010058>

(EuroSDR; 2023) Unger, E.M.; Bennett, R.; Crompvoets, J.; Lisec, A.; Cantat. F.; EuroSDR Advancing FELA – The Framework for effective Land Administration. EuroSDR Publication, No. 74, European Spatial Data Research.

(Tourtelotte et al., 2023) Tourtelotte, B.; Pickett, K.; de Zeeuw, K.; FELA-based geospatial knowledge infrastructure in FIG Working Week 2023: Protecting Our World, Conquering New Frontiers; International Federation of Surveyors: Copenhagen, Denmark, 2023

(Unger et al., 2023) Unger, E.M.; Bennett, R.; Malloum, M.; Van den Berg, C.; et al. Fit-For-Purpose Land Administration and the Framework for Effective Land Administration in Chad in FIG Working Week 2023: Protecting Our World, Conquering New Frontiers; International Federation of Surveyors: Copenhagen, Denmark, 2023

(Ahsan et al. 2023) Ahsan, M.S.; Hussain, E.; Ali, Z.; Zevenbergen, J.; Atif, S.; Koeva, M.; Waheed, A. Assessing the Status and Challenges of Urban Land Administration Systems Using Framework for Effective Land Administration (FELA): A Case Study in Pakistan. *Land* 2023, 12, 1560. <https://doi.org/10.3390/land12081560>

(Ajayi et al., 2024) Ajayi, O.; Riekkinen, K.; Adekola, O.; Exploring Technology integration through FELA in Nigeria in FIG Working Week 2024: Your World, Our World: Resilient Environment and Sustainable Resource Management for all; International Federation of Surveyors: Copenhagen, Denmark, 2024

(Mballo et al., 2024) Mballo, M.; Gitau, J.; Ndung'u, H.; et al.; Land reforms and implementation of the FELA: a case study for customary land registry implementation in the Democratic Republic of Conco in FIG Working Week 2024: Your World, Our World: Resilient Environment and Sustainable Resource Management for all; International Federation of Surveyors: Copenhagen, Denmark, 2024

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(Zevenbergen et al., 2016) Zevenbergen, J.A.; De Vries, W.; Bennett, R.M. (Eds.) *Advances in Responsible Land Administration*; CRC Press: Boca Raton, FL, USA, 2016.

(Zevenbergen, 2021) Zevenbergen, J.A. *Handling Land: Innovative tools for Land Governance and Secure Tenure*: E-Book; UN-HABITAT, International Institute of Rural Reconstruction (IIRR), Global Land Tool Network (GLTN): Nairobi, Kenya, 2012; 152p. Available online: <https://www.local2030.org/library/76/Handling-land,-Innovative-Tools-for-Land-Governance-and-Secure-Tenure.pdf> (accessed on 23 February 2024).

(FAO, 2020) FAO. *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security*; Food and Agriculture Organization (FAO): Rome, Italy, 2012; 40p. Available online: <http://www.fao.org/3/i2801e/i2801e.pdf> (accessed on 21 January 2024).

(Lengoiboni et al., 2019) Lengoiboni, M.; Richter, C.; Zevenbergen, J. Cross-cutting challenges to innovation in land tenure documentation. *Land Use Policy* 2019, 85, 21–32.

(Augustinus et al., 2021) Augustinus, C.; Tempra, O. Fit-for-Purpose Land Administration in Violent Conflict Settings. *Land J.* 2021, 10, 139. Available online: <https://www.mdpi.com/2073-445X/10/2/139/htm> (accessed on 13 January 2021).

(UNECE, 1996) *Land Administration Guidelines*; UNECE: New York, NY, USA; Geneva, Switzerland, 1996. Available online: <http://www.unece.org/fileadmin/DAM/hlm/documents/Publications/land.administration.guidelines.e.pdf> (accessed on 7 November 2023).

(Williamson et al, 2010) Williamson, I.; Enemark, S.; Wallace, J.; Rajabifard, A. *Land Administration for Sustainable Development*; ESRI Press: Redlands, CA, USA, 2010.

BIOGRAPHICAL NOTES

Dr. Eva-Maria Unger works with the international arm of the Netherlands national mapping, land registration and cadastral agency as a Senior Land Administration Advisor. She holds a MSc. in Geodesy and Geoinformation, and a PhD in Land Administration. Eva-Maria was chair of the FIG Young Surveyors Network and initiated the Volunteer Community Surveyors Program (VCSP) supporting the UN-Habitat GLTN's county-level implementation plans and programmes. Dr. Unger completed a secondment with UN-GGIM and is the director of OICRF.

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