

STDM Conceptual Model in Action: Towards Bridging Tenure Gaps to Meet Global Land Challenges



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FOREWORD (FIG)

The Social Tenure Domain Model (STDM) represents a significant and successful collaboration between FIG and GLTN/UN-Habitat. This publication examines the evolution of STDM and its growing role in addressing global challenges such as food security, housing rights for displaced populations, migration and climate resilience.

The Model has evolved as a transformative response to these global challenges, offering a flexible, inclusive, and innovative approach to understanding the people to land relationships. By applying the continuum of land rights, as developed by the Global Land Tool Network (GLTN) the STDM addresses shortcomings in Land Administration Systems to recognise the realities of informal and customary tenure. The recordation of these legitimate rights has contributed to poverty reduction, gender equality, and environmental sustainability,

The journey of STDM, as documented in this publication, is one of impactful partnership working. In the early years of GLTN (2006 -2010) STDM was developed as a multi-partner pro-poor land tool in support of sustainable land management. It was seen as the key tool for implementing the GLTN foundational concept of a “continuum of land rights” and presented in the joint FIG/GLTN publication (FIG Pub. 52, 2010).

Now, after 15 years, this publication provides an insight into the further evolution and use of STDM including its integration with the Land Administration Domain Model (LADM), which is recognised as a normative annex in the ISO standard, a significant milestone. Moreover, this integration enables the direct use of STDM-based information within national land information systems, thereby broadening the scope and impact of STDM on pressing global issues. Furthermore, the publication also outlines the possible pathways for aligning the STDM Model with the UN-GGIM Framework for Effective Land Administration (FELA).

At the heart of STDM's success are partnerships and capacity-building that initiates and empowers local communities, governments, and professionals. Notably, the STDM model has been used successfully within the FIG Volunteer Community Surveyor Program (VCSP) providing the opportunity for young surveyors to engage and foster collaboration in the fieldwork of recording customary and informal land rights.

STDM distinguishes itself through its adaptability and inclusivity, proven its value in diverse contexts, from urban slums and rural communities to post-conflict and post-disaster settings. Its ability to enhance tenure security for marginalised populations is

particularly noteworthy. Such recordation of legitimate land rights is the foundation for adequate housing, improved living conditions, agricultural productivity, and the resolution of land disputes

Looking ahead, the future of STDM depends on its ability to scale and sustain implementations while remaining inclusive and adaptable. Advocacy and awareness efforts, both nationally and globally, alongside robust governance and financial sustainability are essential to drive adoption and ensure that STDM reaches those who need it most.

The authors from Kadaster International, the University of Twente, NL and the GLTN secretariat are to be congratulated with providing this insightful publication, with contributions from the wider community.

This publication stands as a testament to the power of collaboration, innovation, and community-driven solutions in the pursuit of sustainable development. It is hoped that this work will be widely used and that the evolution and adaptability of the STDM Conceptual Model continue for decades to come.

Diane A Dumashie
FIG President (2023–2026)



FOREWORD (UN-HABITAT)

In many developing countries, tenure insecurity persists not because people lack legitimate land rights, but because systems for recognizing, recording, and protecting those rights still fail to reach the communities that need them most. With much of the world's landholdings still undocumented, millions remain excluded from legal protection, which weakens their access to basic services and the full enjoyment of economic opportunities that derive from secure land and property rights. UN-Habitat's 2026 – 2029 Strategic Plan recognizes the significance of this correlation, noting that adequate housing cannot be achieved without secure land rights and that tenure insecurity aggravates an already severe global housing crisis.

The Social Tenure Domain Model (STDM) was created more than a decade ago as an innovative and practical approach to document the full spectrum of legitimate people-to-land relationships as envisioned within the continuum of land rights. Since then, it has matured into a robust model and information tool used across diverse contexts, helping previously excluded groups gain recognition within land administration systems. As one of GLTN's flagship tools, STDM acknowledges that legitimate rights extend far beyond what is formally registered, and does so in ways that are inclusive, affordable, gender-responsive, incremental and therefore scalable.

Its use across informal settlements, customary areas, and crisis-affected fragile settings in Africa, Asia-Pacific and the Arab region demonstrates that STDM does more than document land rights. It also creates space for meaningful dialogue by bringing together communities, local authorities, traditional leaders and governments to address tenure issues, resolve disputes and shape more responsive land-related policies and laws.

This publication comes at a time when global priorities are shifting, making STDM even more relevant. Food security demands stronger recognition of smallholder and women farmers' land rights. The climate crisis requires data and tools that help communities adapt and manage risks. Displacement and conflict continue to uproot millions, underscoring the urgency of protecting Housing, Land and Property (HLP) rights. Globally, the adoption of STDM as an annex to the revised ISO Land Administration Domain Model (LADM) elevates it from an alternative approach to an internationally recognized pathway for inclusive land administration.

These priorities reflect GLTN's commitment to securing land rights for all and align closely with UN-Habitat's Strategic Plan, which places housing, land and basic services

at the center of sustainable urbanization. STDM continues to show how GLTN's mission is realized in practice through tools that are inclusive, gender-responsive and fit for purpose.

While much has been achieved, continued effort is needed. Sustaining country-level results, integrating STDM with national land information systems, maintaining long-term capacity development and securing financial support remain critical. This publication demonstrates that strong foundations have been laid through a shared commitment to ensuring no person, community or tenure type is left behind.

UN-Habitat remains determined to continue working with GLTN partners to bridge the gap between global policy and local experiences and to advance land tenure security, good land governance and fit-for-purpose land administration as a drivers of equitable and sustainable development, for a more dignified future for all.

Ombretta Tempra
Chief, Land, Housing and Informal Settlement Section
Global Solutions Division
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EXECUTIVE SUMMARY

The Social Tenure Domain Model (STDM) is an innovative concept, model, and information tool designed to address gaps in conventional land administration systems by recognising and documenting all people-to-land relationships, including non-formal and customary rights along the continuum of land rights. Developed by the Global Land Tool Network (GLTN), STDM aims to complement traditional systems by offering a flexible, inclusive, and affordable alternative option to collect, manage and disseminate land information. This publication examines the evolution of STDM and its growing role in addressing global challenges such as food security, housing rights for displaced populations, migration and climate resilience.

Land administration and its land administration systems are foundational to sustainable development, yet they often fail to encompass the realities of informal and customary tenure systems, leaving many communities unrecognised and vulnerable. STDM bridges this gap by providing a means to document all people-to-land relationships, contributing to poverty reduction, gender equality, and environmental sustainability. It is firmly aligned with key global frameworks supporting sustainable development such as the UN Framework for Effective Land Administration (FELA).

STDM has demonstrated its capacity to enhance land tenure security, particularly for marginalised populations such as slum dwellers, smallholder farmers, women, and displaced communities. Its application in diverse settings has shown how secure tenure is the basis of adequate housing, improves living conditions, fosters agricultural productivity, reduces land disputes, and supports sustainable land management. Furthermore, STDM has proven to be a valuable tool in post-conflict and post-disaster contexts, helping to document and restore land rights, enabling communities to rebuild their livelihoods.

The integration of STDM with the Land Administration Domain Model (LADM) has further strengthened its relevance, ensuring compatibility with an international ISO standard, and so enhancing interoperability with national land administration systems. This synergy supports broader applications of STDM, from improving food security; housing, settlement planning, land and property rights of displaced populations; addressing urbanisation challenges and promoting climate action.

The future of STDM lies in its ability to scale and sustain implementations while maintaining inclusivity and adaptability. Achieving this requires strong governance, com-

community ownership, and financial sustainability. Legal and policy frameworks must recognise and formalise STDM's contributions, and sustainable funding mechanisms must be established. Technological advancements, such as mobile integration, cloud-based systems, AI and ML, and enhanced data security, will ensure that STDM continues to meet the evolving needs of land administration.

At the heart of STDM's success are partnerships and capacity-building initiatives that empower local communities, governments, and professionals. Programs like the FIG Volunteer Community Surveyor Program (VCSP) have demonstrated the transformative impact of engaging young professionals and fostering collaboration. Advocacy and awareness efforts at both national and global levels are critical to drive global adoption and ensuring that STDM reaches those who need the concept most.

STDM has evolved into a transformative concept for inclusive and sustainable land administration. Its alignment with international frameworks and its proven adaptability across diverse contexts position STDM as a crucial enabler for all.

ABBREVIATIONS

| | |
|------------|--|
| CCO | Certificate of Customary Ownership |
| CRUD | Create, Read, Update, Delete |
| CSO | Civil Society Organisation |
| FAO | Food and Agriculture Organisation |
| FELA | Framework for Effective Land Administration |
| FIG | International Federation of Surveyors |
| GIS | Geo Information System |
| GLTN | Global Land Tool Network |
| GNU GPL | General Public Licence |
| HLP | Housing, Land and Property |
| IDP | Internally Displaced People |
| IGIF | Integrated Geospatial Information Framework |
| ISO | International Standard Organisation |
| LADM | Land Administration Domain Mode |
| LAS | Land Administration System |
| LIS | Land Information System |
| NLIS | National Land Information System |
| ODK | Open Data Kit |
| OGC | Open Geospatial Consortium |
| OICRF | International Office for Cadastre and Land Records |
| QField | Quantum Field |
| QGIS | Quantum Geographic Information System |
| SDGs | Sustainable Development Goals |
| STDM | Social Tenure Domain Model |
| UAV | Unmanned Aerial Vehicle |
| UN | United Nations |
| UN-GGIM | United Nations Committee of Experts on Global Geospatial Information Management |
| UN-Habitat | United Nations Human Settlements Programme |
| UNCBD | United Nations Convention on Biological Diversity |
| UNCCD | United Nations Convention to Combat Desertification |
| UNHCR | United Nations high Commissioner for Refugees |
| VCS | Volunteer Community Surveyor |
| VCSP | Volunteer Community Surveyor Programme |
| YSN | Young Surveyors Network (of FIG) |

1 THE EVOLVING ROLE OF STDM IN MODERN AND FUTURE LAND ADMINISTRATION

“Alone we can do so little; together we can do so much.” – Hellen Keller

The way land is accessed, used, planned, transacted, and developed has a great impact on sustainable development. With land administration being defined as the process of recording and disseminating information about the land tenure, use, value, and development and use of land and its associated resource. Customary, informal tenure, and other forms of tenure along the continuum of land rights, are often left out of conventional land administration systems. The Social Tenure Domain Model (STDM) is an approach to complement conventional approaches in land administration.

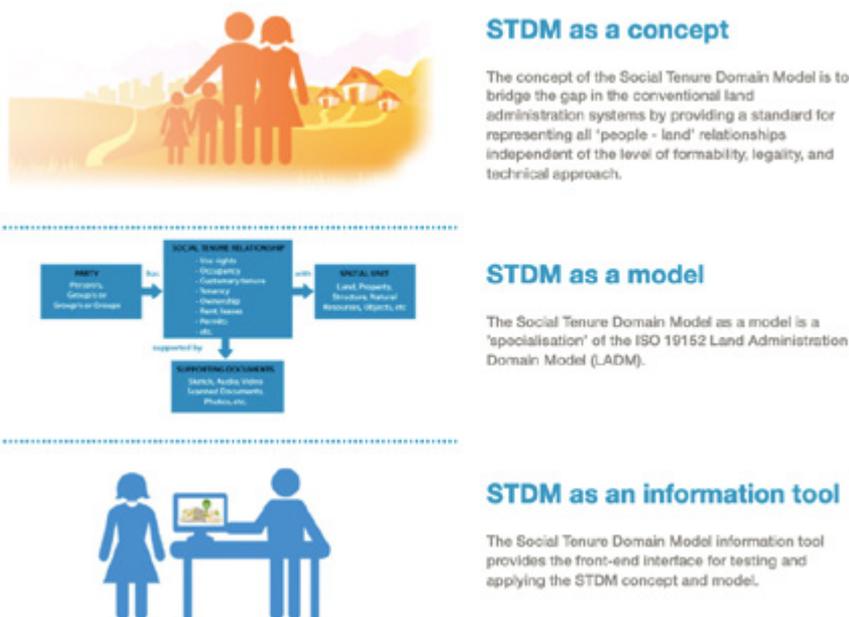


Figure 1: STDM as a concept, model and information tool.

Land Administration and its Land Administration Systems (LASs) are foundational for sustainable development, providing the necessary information for land management policies and decision-making processes. However, comprehensive LAS coverage is limited to a small fraction of developed countries globally. A key challenge in many countries that lack the coverage is the ability to consider and incorporate non-formal legitimate tenure rights, such as informal and customary tenures in their processes, a gap that the Social Tenure Domain Model (STDM) aims to bridge by recognising and facilitating the recordation of all forms of people-to-land relationships.

Throughout this publication whenever we are using the term STDM we refer to the concept, the model, and the information tool.

1.1 *STDM and the International Federation of Surveyors (FIG)*

The Social Tenure Domain Model (STDM) has been the subject of significant interest within the International Federation of Surveyors (FIG) but also within the wider global land community. Notably, various publications have created the basis of our current understanding and application of STDM, with two publications being published under the umbrella of FIG and GLTN.

- **FIG Publication No. 52 (2010):** This publication, authored by Christiaan Lemmen, marked a key moment in the conceptualisation of STDM. FIG Publication No. 52 presented STDM as an additional approach to land administration, in areas where traditional land administration systems were inadequately established. It emphasised the model's flexibility in accommodating various tenure types, from formal to informal, and its potential in supporting land rights for all, particularly in regions that do not recognise informal tenure.
- **FIG Leaflet (2014):** Building upon the FIG Publication No. 52, this leaflet further explored the practical applications and implications of STDM.

With the groundwork laid by these earlier publications and various UN-Habitat GLTN reports (available within the OICRF and GLTN Website), these publications seek to be revisited and show possibilities for expanding the concept of STDM.

This publication aims to explore the evolution and significance of STDM as a concept, a model, and an information tool (Figure 1) in the dynamic landscape of land administration. It aims to provide a comprehensive and updated perspective on STDM, reflecting its journey from an emerging approach to a robust approach for addressing diverse land administration and management issues.

1.2 *Who is this publication for?*

This publication has been prepared for FIG members, GLTN development and network partners, UN agencies, civil society organisations (CSOs), government authorities at all levels, academic institutions and land practitioners who would like to get an overview of STDM and its relation to key international frameworks and current global challenges. It specifically addresses organisations and institutions supporting national and/or local governments in their implementation of land related projects. The publication is based on focused group discussions amongst the STDM Advisory Board, various dedicated STDM sessions at FIG events and an STDM Industry Workshop and Writeshop in 2023.

2 THE ROLE OF STDM TO SUSTAINABLE DEVELOPMENT

In the context of the 2030 Agenda for Sustainable Development, adopted by UN Member States in 2015, the need for effective land administration systems is recognised. The Framework for Effective Land Administration (FELA), endorsed in 2020 by the committee of experts of the United Nations Global Geospatial Information Management (UN-GGIM), serves as a policy guide for UN Member States. 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 2030 Agenda. The 2030 Agenda’s focus on the 5Ps—People, Prosperity, Peace, Partnership, and Planet—highlights the critical role that effective land administration plays in achieving sustainable development. Figure 2 represents how effective land administration supports and demands the 5Ps is used to show the relevance of STDM.

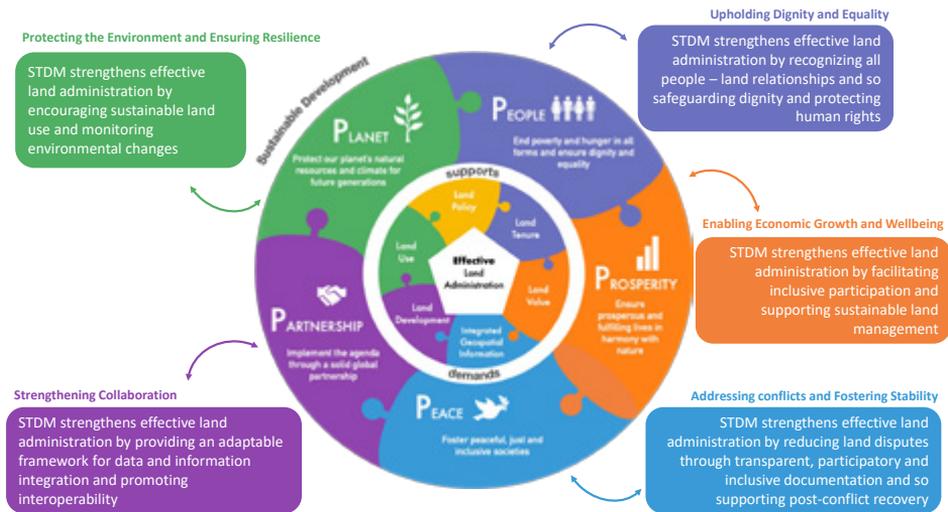


Figure 2: The 5Ps (People, Prosperity, Peace, Partnership and Planet) linked to STDM.

The Social Tenure Domain Model (STDM) aligns seamlessly with these principles, enhancing the impact of land administration systems in various ways – some are listed here.

1. People: Upholding Dignity and Equality

Effective land administration supports poverty eradication, food security, and the recognition of diverse land rights, thereby promoting dignity and equality. STDM strengthens these efforts by: **Recognising all people – land relationships:** It accommodates informal and customary tenure systems that often are not supported in conventional systems. **Safeguarding dignity and protecting human rights:** By preventing the misuse of land information, STDM ensures that the documentation process respects and protects rights, both of individuals and of communities, in line with the principles enshrined in the United Nation’s Universal Declaration of Human Rights.

2. Prosperity: Enabling Economic Growth and Wellbeing

Access to secure land tenure and efficient land markets is essential for fostering prosperity and community wellbeing. STDM contributes by: ***Supporting sustainable land management***: STDM supports the effective use of land resources, promoting long-term prosperity.

3. Peace: Addressing Conflicts and Fostering Stability

Land-related conflicts can destabilise societies, making effective land administration crucial for peace. STDM plays a vital role by: ***Reducing land disputes***: Through transparent, participatory, and inclusive documentation of (overlapping) land rights, STDM helps prevent conflicts over land ownership and usage. ***Supporting post-conflict recovery***: It provides an approach for recognising and restoring land rights in conflict-affected areas, contributing to long-term stability.

4. Partnership: Strengthening Collaboration

Effective land administration thrives on partnerships across various levels—international, national, and community. STDM enhances these collaborations by: ***Facilitating inclusive participation***: It ensures that marginalised groups, often excluded from formal markets, have their land rights recognised, allowing them to engage in land markets and contribute to economic growth. ***Providing an adaptable framework***: It integrates with existing systems and supports the sharing of knowledge, data and information, fostering collaboration among diverse stakeholders. ***Promoting interoperability***: STDM's flexibility allows it to work alongside different technologies and methodologies, enabling seamless cooperation across sectors.

5. Planet: Protecting the Environment and Ensuring Resilience

Sustainable land management is key to protecting our planet's resources and ensuring resilience against environmental challenges. STDM supports this by: ***Encouraging sustainable land use***: By securing land tenure, STDM promotes responsible land management practices that protect natural resources. ***Monitoring environmental changes***: It provides the means to document land use changes, supporting in the monitoring and protection of the environment for future generations.

STDM is a dynamic, adaptable concept, capable of addressing contemporary challenges and evolving needs. Its future development and application will be key in shaping sustainable, equitable, and efficient land administration systems worldwide, significantly contributing to global sustainable development goals.

3 LINKAGE BETWEEN LADM AND STD M: A SYNERGETIC APPROACH TO LAND ADMINISTRATION

The Land Administration Domain Model (LADM) and the Social Tenure Domain Model (STD M) are complementary and when integrated into each other, significantly enhance land administration systems.

3.1 LADM: The ISO Standard

LADM, established as ISO 19152:2012, provides an international standard for land administration. It focuses on formal land tenure systems, offering a conceptual model that includes a wide range of land-related objects and relationships. LADM's strength lies in its ability to standardise the representation of land rights, restrictions, and responsibilities (RRR), thus facilitating interoperability and data exchange between different land administration systems. Additionally, STD M, an initiative by the Global Land Tool Network (GLTN), specifically addresses the need to record non-formal land tenures along the continuum of land rights. It is designed to be flexible and inclusive, capable of documenting all people-to-land relationships (e.g. customary rights, occupancy rights, squatting, nomadic or pastoral rights, overlapping claims, disputes and shared or communal rights etc.) that are often overlooked by conventional land administration systems, with STD M's focus on social aspects of tenure relationship makes it an essential concept in regions where formal land registration systems are limited or non-existent. Within the ISO LADM standard STD M was included as informative annex in 2012. *Within the recent revision of LADM, STD M is included as a normative annex B within ISO 19152-2:2025. This closer integration of LADM and STD M offers a comprehensive approach to land tenure documentation.* While LADM provides the formal standardised structure, STD M brings in the flexibility to accommodate all people-to-land relationships.

3.2 The synergy of LADM and STD M

The synergy of having STD M closely linked to the LADM concept allows for:

Inclusivity in Land Rights Documentation: By combining LADM's structured approach with STD M's flexibility, land administration systems can document both formal and informal land rights, ensuring no land tenure types are excluded.

Enhanced Data Management: The integration facilitates interoperability through better data management and sharing capabilities. LADM's standardised conceptual model ensures consistency in data handling, while STD M's adaptability allows for the inclusion of various land tenure scenarios in a standardised way.

Support for Policy and Decision-Making: This combined approach provides policy-makers with a more comprehensive understanding of the various land tenure landscapes. It supports in the formulation of policies that are inclusive of all tenure types, thus promoting equitable land governance.

Global and Local Relevance: While LADM provides a globally recognised standard, STD M ensures local relevance by accommodating informal land tenures prevalent in many parts of the world, supporting pro-poor land policies and corresponding pro poor land recordation systems.

Capacity Building and Awareness: The integration helps in capacity building, as professionals and stakeholders get equipped with knowledge and tools to handle a spectrum of land tenure types, enhancing the overall effectiveness of land administration.

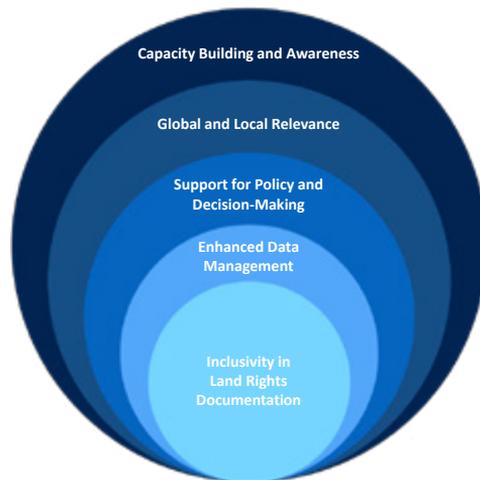


Figure 3: Synergy of LADM and STDM.

Thus, the linkage between LADM and STDM is more than a technical linkage; it represents a holistic approach to land administration that acknowledges and addresses the complexity of land tenure systems. *This integrated approach and having STDM included as a normative annex not only enhances the efficiency and effectiveness of land administration, through a possible integration of STDM data in national LAS system. This possible integration also plays a crucial role in ensuring equitable access to land, thus contributing to the broader goals of sustainable development and social justice.*

3.3 The Terminology that makes the difference between LADM and STDM

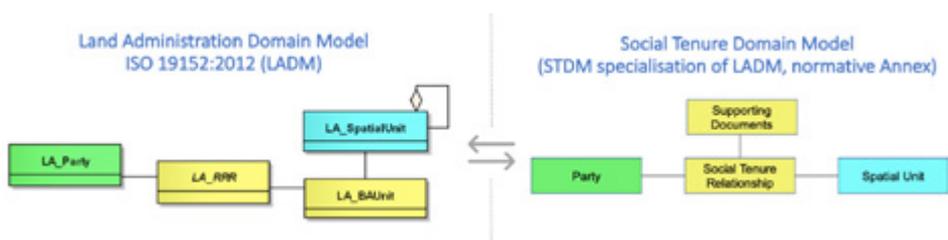


Figure 4: Semantic distinctions between LADM and STDM.

While the Land Administration Domain Model (LADM) and the Social Tenure Domain Model (STDM) share a similar conceptual foundation, there are key differences in the terminology used and the types of data recorded within each model (Figure 4). These differences are critical in understanding the distinct purposes and applications.

Party Class: LA_Party vs. Party

In both LADM and STDM, the UML class for collecting information about parties (persons or entities) involved in land administration is named similarly: LA_Party in LADM and Party in STDM. However, the types of parties recorded in each system differ. In LADM, parties are typically those who are legally recognised, often requiring formal identification such as a national ID or birth certificate or entity/company registration ID. Conversely, STDM broadens the scope to include parties who may not yet have formal recognition, such as people without national IDs, birth certificates, or other conventional forms of legal documentation, or (traditional) groups who collectively hold tenure to specific land and its resources. This inclusivity allows STDM to document relationships for a wider range of parties, both individuals, particularly those in informal or marginalised communities, indigenous communities and non-recognised groups.

People-to-Land Relationship: LA_RRR vs. SocialTenureRelationship

The class describing the relationship between people and land also differs in terminology and application. In LADM, this relationship is captured by the LA_RRR class (representing Rights, Restrictions, and Responsibilities). While LADM can theoretically record informal relationships, it is primarily designed for formal, legally recognised tenure types. On the other hand, STDM uses the SocialTenureRelationship class, which explicitly encourages the recording of all types of people-to-land relationships, including those that are informal or customary, such as occupancy, nomadic land use, and other non-formalised land uses. This approach ensures that even the most marginalised and unconventional land relationships can be documented.

Supporting Documents: Justifying Social Tenure Relationships

A distinctive feature of STDM is its emphasis on the SupportingDocuments class, which is linked to the SocialTenureRelationship. This class allows for the inclusion of various forms of evidence that justify and support the recorded people-to-land relationships. These documents can range from informal contracts and electricity bills to videos, sketches, and even voice messages. Though there is a class for Source Documents in LADM, this flexibility in documentation may contrast with LADM, where supporting evidence is typically more formalised and may not accommodate the diverse types of documents (evidence) recognised in STDM. After conversion from STDM to LADM these supporting documents can be included in LADM for historical reasons to maintain the history.

Spatial Unit: LA_SpatialUnit vs. SpatialUnit

The spatial unit, which represents the physical extent of the land, is termed LA_SpatialUnit in LADM and SpatialUnit in STDM. Although the naming is similar, the criteria for what can be recorded may be different. In LADM, spatial units generally need to have clearly defined boundaries and must meet certain formal criteria to be registered. In contrast, STDM allows for the recording of spatial units that might not meet formal standards including less strict accuracy requirements, such as those with overlapping boundaries or undefined edges, reflecting the realities of informal settlements and customary land uses.

In essence, while LADM and STDM share a similar conceptual model, their differing terminologies, and the scope of data they record reflect their distinct objectives. LADM is more aligned with formal, legally recognised land administration, whereas STDM is designed to be inclusive, capturing the full spectrum of people-to-land relationships, particularly in contexts where formal recognition may be lacking.

4 IMPLEMENTATION OF STDM

The implementation of STDM has been instrumental in bridging formal and informal land tenure, offering flexibility, inclusivity, and a pro-poor, gender-responsive approach. Its application across various global contexts in developing countries has demonstrated its effectiveness in enhancing land rights, fostering community involvement, and supporting conflict resolution and post-disaster recovery. The Volunteer Community Surveyor Program (VCSP), initiated by FIG's Young Surveyors Network (YSN), has been critical in advancing STDM. Through hands-on training, wisdom workshops and field deployments, VCSP has empowered young surveyors and the communities they were serving. Additionally, the VCSP strengthened the implementation of STDM in various developing countries, contributing to improved land governance and administration.

4.1 *Examples in Stories of Change*

STDM is specifically highlighted as a key tool developed and utilised by the Global Land Tool Network (GLTN) in various contexts documented in various country reports for interventions implemented in GLTN's Phase 3 Programme. A summary of selected cases is presented in Figure 5, with further details available in the GLTN Phase 3 report (2019 – 2023).

Bridging Formal and Informal Land Tenure

STDM is designed to bridge the gap between formally registered land and land that is not registered. This makes it especially useful in contexts where formal documentation of land rights is scarce or non-existent. In Uganda, STDM was used to map informal settlements in Mbale and Kampala, capturing data on land use and occupancy that were not recognised in the formal system, thereby bridging the gap between informal settlements and formal land tenure recognition. In 2020, a digital CCO template developed using STDM was officially approved by the Ministry of Lands, Housing and Urban Development in Uganda and subsequently gazetted by the Uganda Printing and Publishing Corporation. To strengthen partner capacity, targeted development initiatives were conducted in 2021, culminating in the establishment of a Community of Practice in January 2023 to foster knowledge exchange, coordination and integration of CCOs into the National Land Information System in Uganda.

Flexibility and Inclusivity

The tool is recognised for its flexibility and inclusiveness, as it can accommodate a variety of tenure types, ranging from formal, informal, customary, to indigenous land rights in urban, peri-urban and rural settings. In the Chamuka Chiefdom of Zambia, STDM was applied to document a variety of land tenure types within the community, accommodating both traditional landholding patterns and more formalised land rights. The Chamuka experience resulted in the enumeration of 46 villages, covering 6,223 parcels, 4,252 households, and 27,428 beneficiaries, along with the training of 73 para-surveyors. This has highlighted the significance of traditional land governance systems especially in national land policy development. In collaboration with Lusaka City Council, interventions using STDM were conducted in Kanyama settlement, in Lusaka City, where a total of 18,400 records were captured. Using this data, approximately 330 occupancy licences were issued through STDM by 2023.

Pro-Poor and Gender-Responsive

STDM is noted for its pro-poor and gender-responsive approach. This aspect ensures that the tool is sensitive to the needs of marginalised groups, including women and the poor, in land tenure documentation. In Kenya, STDM has been instrumental in recognizing non-formal rights within informal settlements and refugee camps. In informal settlements, it fostered greater community cohesion and empowerment through the issuance of Certificates of Occupancy. The establishment of Community Land Committees to oversee STDM-generated databases also enabled women to participate in decision-making processes, contributing to a more inclusive and equitable approach. STDM further supported the piloting of the Community Land Act (2016) in informal settlements, with a draft guideline document developed to capture experiences and lessons learned from its application in the Mabatini settlement, Nairobi County. In Kakuma, STDM offered valuable insights into the target population, enabling a clearer understanding of the refugees' socio-economic conditions within the settlement camp.

This approach ensured that the land rights of various marginalized groups were recognized and documented.

Participatory Approach

The implementation of STDM often involves participatory methods, where local communities actively engage in data collection about their land and land rights. This enhances community involvement and ownership of the process and data. In Nepal's post-earthquake recovery efforts, STDM was used for community-driven data collection, where the earthquake-affected residents actively participated in mapping their land parcels for reconstruction and resettlement.

Versatility in Various Contexts

Throughout the publication ('Stories of Change'), STDM is applied in diverse settings – from urban informal settlements, post conflict and disaster areas, natural resource management to rural communities. This demonstrates its adaptability to different socio-political and environmental contexts. In post-conflict Sinjar, Iraq, STDM was used to document land claims and support the resettlement of displaced Yazidi communities. Since 2018, over 15,000 Housing, Land and Property (HLP) claims have been recorded, benefiting approximately 100,000 individuals through the issuance of certificates. This underscores its relevance and effectiveness in post-conflict settings.

Supporting Land Rights Documentation

Implementation of STDM has been used effectively for documenting land rights, particularly in areas where traditional landholding patterns are prevalent, and formal land registration systems are not yet adequate.

Conflict Resolution and Post-Disaster Recovery

STDM has been instrumental in resolving land disputes and in supporting communities in post-disaster recovery efforts, like in the case of the Philippines, where after Typhoon Haiyan, STDM was used to document land rights in affected areas, aiding in the resolution of disputes and supporting recovery efforts by ensuring that land rights are clearly defined and recognised. In Eastern Democratic Republic of Congo, STDM was also used to mediate and resolve land disputes by documenting overlapping land claims and rights, thus helping to reduce conflict over land ownership.

Integration with Other Tools and Approaches

STDM is often integrated with other GLTN land tools and approaches for comprehensive land rights management and governance solutions. In Uganda, STDM was integrated with participatory mapping and enumeration tools to improve infrastructure and basic services in informal urban settlements, showing how it can be combined with other methods for comprehensive land management solutions.

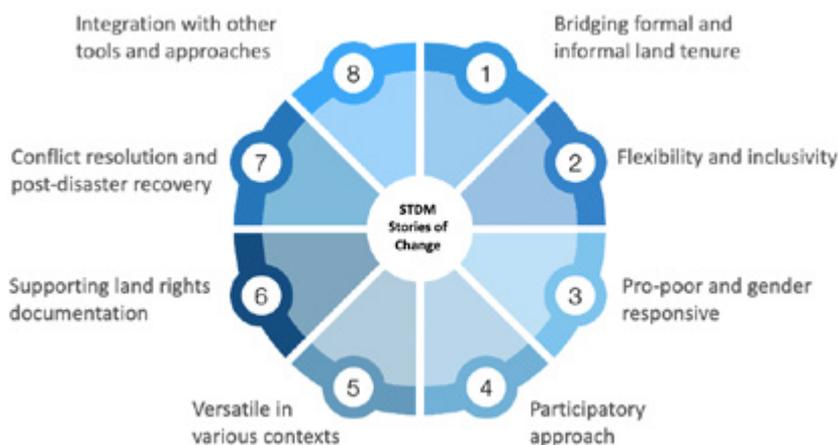


Figure 5: Eight cases and examples of STDM in the Stories of Change (GLTN 2025).

From all the cases and examples, STDM stands out for its ability to address complex land tenure issues in a manner that is inclusive, participatory, and responsive to the needs of vulnerable populations. Its application across various projects showcases its effectiveness in improving land tenure security and aiding sustainable development efforts.

4.2 Examples via Volunteer Community Surveyors

Via the STDM train-the-trainers programme in the early 2010s more than 300 young surveyors from 65 countries have been trained on the STDM concept, model and information tool via the FIG Young Surveyors Network (FIG YSN). To capitalise on this in 2017 with the support and collaboration of GLTN FIG YSN developed the Volunteer Community Surveyor Programme (VCSP) with a focus on building a foundation for GLTN country-level activities. The 2017 pilot involving 12 Volunteer Community Surveyors (VCS), 7 GLTN country implementation projects and 7 GLTN partners demonstrated the opportunities of engaging more young surveyors, which, in 2023, led another 33 young surveyors being deployed on-site as volunteers (VCS) at different STDM implementation levels linked to 9 countries and supporting 8 GLTN partners. The success stories and feedback from all involved have allowed a partnership from stakeholders within FIG and the land administration industry, by achieving the following:

1. Improved volunteers' (VCS) understanding of land laws, tenure systems, governance, and project management
2. Provided practical training in software and tools
3. Enhanced the professional credibility of VCSs, enhancing their field expertise in mapping, data collection, and community engagement

4. Encouraged involvement across diverse technical competencies, engaging more in FIG commissions
5. Highlighted the importance of addressing social, environmental and economic challenges
6. Established the Young Surveyors Networks in Sierra Leone and Namibia, fostering knowledge sharing, innovation, empowerment, and capacity building aligned with FIG goals.
7. Continued impact of the STDM country implementation has shaped the career path of some of the volunteers (VCS).

More detailed information can be found in FIG Publication No. 82 (2024).

5 STDM FOR GLOBAL CHALLENGES

STDM aims to address some of the most pressing global challenges related to land tenure, food security, climate resilience, and the protection of vulnerable people. As global issues like rapid urbanisation, climate change, and forced displacement intensify, access to secure land rights becomes crucial for sustainable development and human well-being. The following sections explore STDM's role in enhancing food security, supporting displaced people, and contributing to climate resilience.

5.1 *How STDM can contribute towards enhancing Food Security*

Food security is a pressing global challenge, with nearly 30% of the world's population facing moderate or severe food insecurity. Smallholder farmers and rural households, particularly those dependent on informal or communal land tenure, are disproportionately affected. Sub-Saharan Africa and South Asia, regions where 90% of the world's extreme poverty is concentrated, are also the areas hardest hit by food insecurity and insecure land tenure. This link between poverty, hunger, and insecure land tenure creates a complex challenge that is even becoming more evident through rapid population growth, urbanisation, and climate change.

Some critical factors that impact Food Security are:

- **Customary Rights of Smallholder Farmers:** Many smallholder farmers, especially in rural areas, operate under customary land tenure systems that are not formally recognised, leaving them vulnerable to social injustice, land disputes, evictions, and exclusion from government support or credit access.
- **Rapid Urbanisation:** Urban sprawl is encroaching on valuable agricultural land, especially in peri-urban areas, further reducing the available space for farming and threatening the livelihoods of smallholder farmers who rely on this land for food production.
- **Large-Scale Land Acquisition:** The rise of large-scale land acquisitions, often by private corporations or foreign investors, can displace local farmers, especially when customary or informal tenure rights are not recognised.
- **Gender Inequality:** Women, who represent 43% of the global agricultural workforce, only account for 15% of landowners worldwide. Without secure land rights, women struggle to make decisions about land use, hampering their ability to ensure food security for their families and communities. Securing women's access to land can significantly improve food production and reduce hunger.

The Role of STDM in Enhancing Food Security

The Social Tenure Domain Model (STDM) plays a role in addressing some of the root causes of food insecurity by improving land tenure security, especially for smallholder farmers, women, and marginalised communities. By providing tools for participatory mapping, recordation, and enumeration, STDM helps to identify and record land rights, thus ensuring that vulnerable populations have secure tenure, which is critical for improving agricultural productivity and ensuring long-term food security.

Five key contributions how STDM Supports Food Security:

1. **Strengthening Tenure Security:** STDM enables the documentation of informal and customary land rights, offering landholders greater protection from forced

evictions, land disputes, and land grabs. This security encourages investment in land and sustainable farming practices, which boosts food production.

- 2. Gender-Responsive Solutions:** By recognising and documenting women's land rights, STDM empowers women to make decisions about land use, which directly impacts food production and food security. Women-led cooperatives benefit from secure tenure, allowing them to implement climate-responsive agricultural practices and enhance the productivity of degraded land.
- 3. Mitigating the Effects of Urbanisation:** STDM helps local governments identify and manage land resources, ensuring that agricultural land is protected from encroaching urbanisation. This is crucial for maintaining food production in rapidly urbanising areas.
- 4. Supporting Customary Land Rights:** STDM is designed to respect and document customary land tenure systems, providing smallholder farmers with recognition of their land rights. This formal recognition can help farmers access credit, government support, and agricultural programs, all of which are essential for improving food security.
- 5. Promoting Sustainable Land Management:** By using spatial data collected through STDM, local governments can implement better land use planning, ensuring that land is used efficiently for food production. This data can also be used to issue Certificates of Customary Ownership or Land Ownership for informal landholders, further securing tenure and promoting sustainable land use.

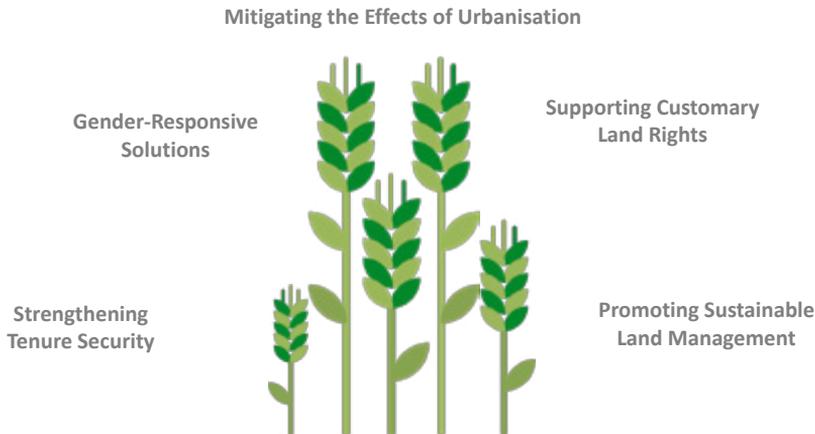


Figure 6: Five key contributions how STDM supports Food Security.

5.2 STDM's Role in Addressing Conflict-Induced Displacement and Housing, Land, and Property (HLP) Rights

As of mid 2024, there were over 122.6 million forcibly displaced people worldwide, including refugees, asylum seekers, and internally displaced persons (IDPs). This number is marking a 5% increase from the end of 2023. Nearly 90% of them were displaced in low- and middle-income countries, and displacement figures continued to rise in 2024. A significant number of displaced individuals live in urban areas, creating unique challenges in accessing housing, land, and property (HLP) rights. For these populations, displacement often leads to the destruction or loss of homes, making it difficult to re-

turn or rebuild their lives. Moreover, the legal and administrative barriers to accessing HLP rights—such as a lack of documentation or non-functioning land administration systems—further complicate their situation.

Critical Challenges to HLP Rights for Displaced Populations:

- **Loss of Homes and Documentation:** The destruction of property and loss of land documents during conflicts makes it difficult for displaced individuals to prove ownership or tenancy.
- **Urban Displacement:** The concentration of refugees and IDPs in urban areas complicates the allocation and management of land, exacerbating existing issues related to overcrowding, tenure insecurity, and service delivery.
- **Legal and Administrative Barriers:** Displaced populations often face legal and bureaucratic challenges in reclaiming their land rights, particularly in countries with non-functioning land administration systems or complex legal procedures.

Three key contributions how STDM Supports Displaced Populations and HLP Rights

The Social Tenure Domain Model (STDM) offers an approach to documenting and protecting the HLP rights of displaced populations. By enabling participatory mapping and the collection of georeferenced data, STDM plays a critical role in safeguarding the land rights of displaced individuals, improving tenure security, and facilitating their return and resettlement.

STDM's Key Contributions to Supporting Displaced Populations:

- 1. Documenting HLP Claims and Supporting Evidence:** STDM allows for the collection and georeferencing of HLP claims, even in areas with non-functioning land administration systems. In conflict-affected regions like Syria, STDM has been used to map the properties of refugees and IDPs, safeguarding evidence of ownership for future restitution or compensation processes.
- 2. Increasing Tenure Security for Returnees:** STDM helps displaced individuals secure occupancy documentation and certificates, which are essential for accessing reconstruction grants and resettlement assistance. In Iraq, for example, STDM facilitated the issuance of over 15,000 occupancy certificates to Yazidi returnees, enabling them to rebuild their homes and livelihoods.
- 3. Supporting Camp Coordination and Management:** In refugee and IDP camps, STDM helps map and manage the distribution of land and resources. In Kenya's Kakuma Camp, STDM was implemented to assess land tenure security, identify conflicts, and improve infrastructure planning, contributing to a regeneration strategy for the camp.

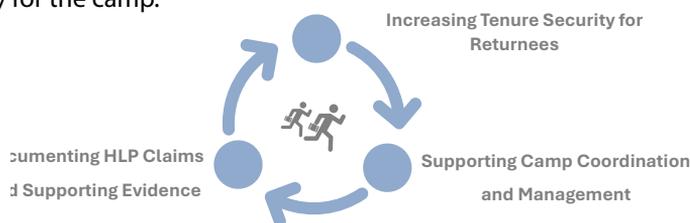


Figure 7: Three key contributions how STDM supports Displaced Populations.

A visual depiction of the process to support humanitarian and recovery activities using STDM is included below (see Figure 8). As highlighted in the diagram, particular efforts are needed to design the process in a participatory manner and closely monitor the implementation of the project, looking out for potential obstacles, vulnerabilities, and discrimination patterns.

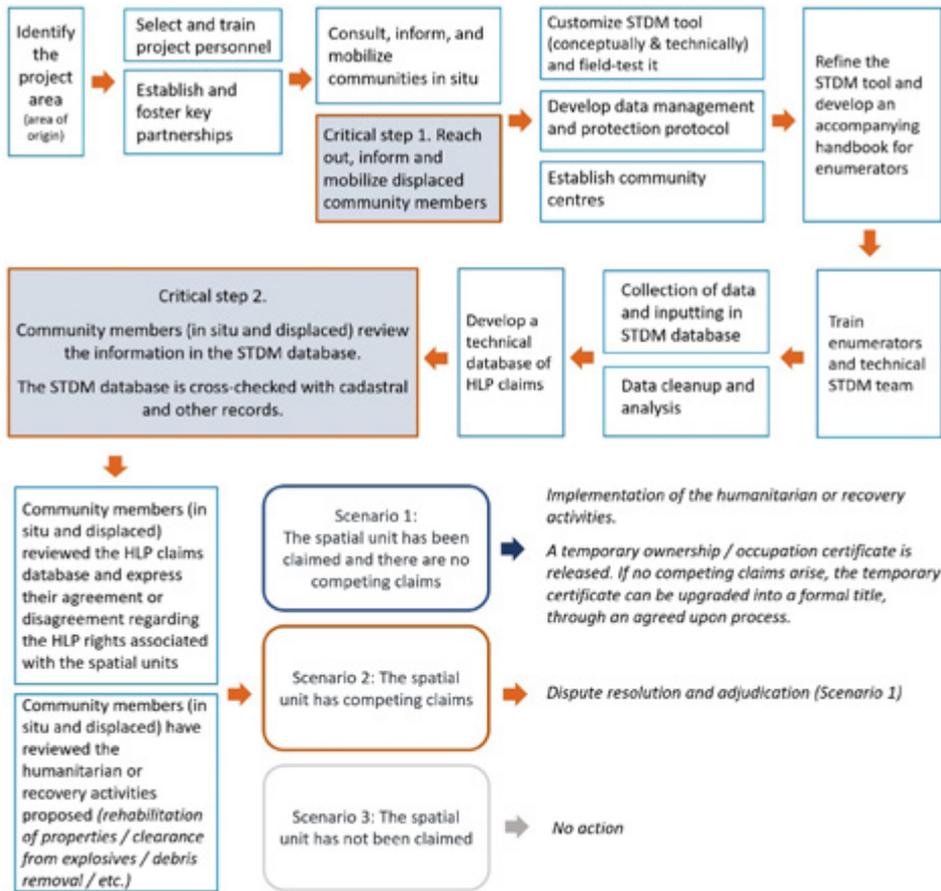


Figure 8. Simplified schematic representation of the process for the use of STDM to support humanitarian and recovery activities. Source: UN-Habitat/GLTN (2021).

5.3 Climate Change: Addressing Environmental Goals through STDM

Climate change presents one of the pressing global challenges, affecting ecosystems, economies, and communities. Climate resilience—the ability of systems to adapt and reorganise in response to environmental hazards—is crucial to mitigating these impacts. Key international frameworks, such as the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (UNCBD), and the United Nations Convention to Combat Desertification (UNCCD), highlight the close link between land use, tenure security, and environmental sustainability. Achieving climate goals, such as restoring 30% of degraded land by 2030, requires secure land tenure, especially for vulnerable groups like smallholder farmers, indigenous peoples, and communities who rely on communal lands.

Critical challenges:

- **Land Degradation and Loss of Ecosystems:** Nearly 20-40% of the world's ice-free land is degraded, contributing to biodiversity loss and reducing the capacity of land to support agriculture, forestry, and natural ecosystems. Large-scale restoration and conservation efforts are needed but can displace vulnerable communities if their land rights are not protected.
- **Deforestation and Land Use Change:** Land use changes, such as deforestation and agricultural expansion, contribute to 13-21% of global carbon emissions. This can lead to displacements, loss of informal or communal rights, environmental degradation and increased climate vulnerability thereby further exacerbating tenure insecurity, particularly for vulnerable communities.
- **Vulnerable Communities at Risk:** Climate action often requires large areas of land for restoration or conservation, which can disproportionately affect poor communities, pastoralists, and women. These groups are often excluded from formal land tenure systems, making them more vulnerable to displacement or loss of livelihood.
- **Lack of Integration in Land Administration Systems:** Existing land administration systems are not fully designed to meet the complex demands of climate resilience. Many systems do not account for overlapping land uses, informal tenure, or the need for data integration across environmental and land-use monitoring.

Five key contributions how STDM Can Support Climate Resilience

- 1. Inclusive Land Tenure Documentation:** STDM supports the recognition of both formal and informal tenure types, ensuring that vulnerable populations, such as smallholder farmers and indigenous groups, have secure tenure rights. This prevents displacement in areas designated for conservation or restoration and incentives sustainable land use.
- 2. Support for Sustainable Land Management:** By documenting diverse land rights and uses, STDM enables communities to adopt climate-smart agricultural practices, manage natural resources sustainably, and engage in reforestation or restoration projects that are essential for climate resilience.
- 3. Data for Environmental Monitoring:** STDM's ability to integrate spatial data with national and global monitoring systems makes it a valuable tool for tracking land use changes and deforestation. It can provide essential data to policymakers and scientists for better climate adaptation strategies.
- 4. Community-Based Adaptation:** STDM's participatory approach empowers local communities to manage their land in ways that enhance resilience to climate impacts such as droughts, floods, or desertification. This approach ensures that climate interventions align with local needs and contexts.
- 5. Protection of Vulnerable Groups:** STDM promotes gender equality by recognising women's land rights and encouraging their participation in land management decisions. This can improve food security and sustainable land use practices, particularly in regions where women play a key role in agriculture and natural resource management. STDM also supports the recognition of land rights for indigenous peoples, whose customary tenure systems are

often overlooked and excluded from formal land governance frameworks. By safeguarding their cultural heritage and reinforcing their role in maintaining the ecological integrity of their land, STDM contributes to protecting both their livelihoods and the environments under their custodianship.

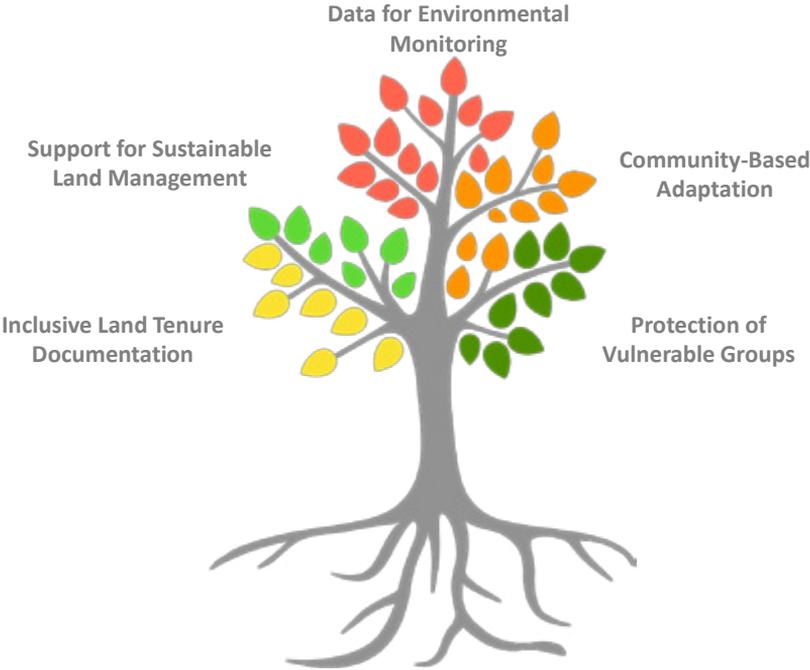


Figure 9: Five key contributions how STDM supports Climate Resilience.

6 WAY FORWARD

With STDM now recognised as a normative annex to the Land Administration Domain Model (LADM), its implementation aligns closely with the principles of effective land administration. The UN-GGIM Framework for Effective Land Administration (FELA) provides a comprehensive policy guide for UN Member States to introduce or modernise land administration and information systems. It is structured around nine pathways, each with specific goals and requirements aligned with the Integrated Geospatial Information Framework (IGIF), and organized under three thematic clusters: Governance, Technology, and People. This section presents strategic directions for advancing the implementation of STDM, structured around these three thematic clusters.

6.1 Governance in the Implementation and Scaling of STDM

The governance of STDM is multi-faceted, requiring attention to themes such as scaling, sustaining, integrating, broadening, and global application. Each of these areas presents specific challenges and opportunities for governance, legal/policy development, and financial resourcing. STDM's governance is about managing the tool and its concept, navigating the complex institutional, financial, and legal aspects that are critical for the long-term success of STDM initiatives.

Sustaining STDM Implementations

Sustaining STDM projects beyond their pilot phase is critical to ensuring they evolve into permanent, community-managed systems. While numerous STDM implementations have demonstrated success, the long-term sustainability of these efforts is still a key challenge. The sustainability of STDM depends on strong community engagement, where local actors take ownership of the process including the use of the tool. To achieve this, governments and local authorities, land professionals as well as key private sector actors must commit to the long-term support and empowerment of communities in managing land tenure systems. At the same time, legal frameworks need to start recognising the legitimacy of STDM implementations, allowing for formal recognition and integration into national land administration processes. **Financial sustainability is equally important, and securing sustainable budget lines, by both state and non-state actors, for the continued operation of STDM is crucial.** Beyond traditional funding mechanisms, it is worth exploring additional revenue streams, such as using STDM-generated data to support socioeconomic programs and attract further investment. Sustainable financing models that rely on local, regional, or professional communities of practice can ensure that STDM continues to grow and evolve.

Scaling STDM for Broader Use

Scaling STDM from community-based applications to broader national or sub-national levels presents its own set of governance challenges. **As STDM applications grow, from registering hundreds of parcels to managing millions, the complexity of logistics, accountability, and resource allocation becomes more pronounced. To scale effectively, institutional support is needed to ensure the capacity to manage larger datasets and maintain quality control.** Policy, institutional and legislative reforms are necessary to facilitate this scaling, ensuring that STDM aligns with national land governance strat-

egies. Additionally, financial resources must be prioritised to support the expansion of STDM, with coordinated efforts between national governments, donors, and other stakeholders to provide the necessary funding and capacity-building support.

Integrating STDM into National Systems

Integrating STDM with existing national land information systems (LIS) is another key governance consideration. Initially designed as a tool for areas where national LIS were either inaccessible or unaffordable, STDM has since gained legitimacy and recognition in many contexts. *As a result, there is a growing need to support the integration of STDM into national land governance structures. This can be achieved through the established link between LADM and STDM which aims to facilitate the integration and interoperability for seamless data exchange.* This requires sustained dialogue between different levels of government and stakeholders to ensure alignment with broader national goals. In terms of legal frameworks, legislative reforms may be needed to formalise the role of STDM in national land administration. Financial support for integration efforts must be planned from the outset, ensuring that the necessary infrastructure is in place to support long-term success. Additionally through the integration of STDM into National Systems an additional revenue stream could be generated.

Broadening the Application of STDM

While STDM has primarily focused on land tenure recognition and documentation, its potential applications extend far beyond these areas. *The tool can play a critical role in addressing global challenges such as food security, supporting displaced people, contributing to climate resilience, improving land-based own source revenue and sustainable land management.* To broaden the scope of STDM, partnerships with institutions involved in cross-cutting issues. Legal frameworks governing these issues should be analysed to e.g. identify how STDM can be integrated into broader land use planning and environmental monitoring efforts. In terms of financing, the 2030 Agenda provide an opportunity to secure funding for expanding STDM's role in addressing these global challenges, helping to ensure that the tool remains relevant and impactful.

Global application of STDM

As the STDM concept continues to evolve, it has gained traction beyond its original contexts and is increasingly recognised on a global scale. To further enhance the global application of STDM, a community of practice should be established, bringing together stakeholders from across the surveying, geospatial, and land governance sectors. Knowledge transfer and capacity-building efforts can help extend STDM's reach and ensure that it is adapted to the unique needs of different countries and regions. In terms of legal considerations, international frameworks such as the Framework for Effective Land Administration (FELA) already align well with the principles of STDM. *Continued collaboration with international organisations, governments, and donors will help ensure that STDM is recognised as a legitimate and valuable tool for land administration globally.*

6.2 Technology in the Implementation and Scaling of STDM

The Social Tenure Domain Model (STDM) its design and technological choices are part of why it is particularly suited for working in various contexts. It brings together mature

and stable open-source software through a consistent, easy-to-use interface, which allows non-specialised users to define and manage tenure information, visualise spatial units as well as support the creation of reports. It is also important to note that the implementation of STDM is not just about the technology, information tool or software itself; it includes processes, institutional arrangements, and contractual mechanisms needed to ensure successful implementation. This section outlines key technological aspects of STDM, including its interoperability with LADM, its functionality, and future developments. That STDM is a normative annex of the Land Administration Domain Model (LADM), ensures the interoperability in how land tenure information is captured, processed, and analysed. These technical features enable STDM to function as a tool for local and national decision-making, providing evidence of land rights and supporting broader land administration efforts.

Enhancing technical functionality, architecture, and deployment

STDM's functionality is designed to facilitate data management and analysis through a user-friendly interface, which is integrated with GIS tools. This integration with tools such as QGIS underpins STDM's spatial analysis and provides the foundation for interoperability with other open-source tools, ensuring that communities and institutions can build sustainable geospatial workflows around familiar software. It further allows for the handling of spatial data, linking the physical aspects of land tenure with its social dimensions. STDM supports multi-user environments through its PostgreSQL database server, enabling institutions to share and centralise databases, thus enhancing collaboration and reducing data duplication.

One of the strengths of STDM is its capacity to manage a wide range of data types, from basic land tenure information to linked supporting documents such as images, videos, legal papers or any other supporting documents. This flexibility extends to its integration with mobile data collection tools like ODK (Open Data Kit), which supports field data collection. In addition, future integration with GIS applications such as QField or others allow direct spatial data capture in the field, further strengthening STDM's participatory approach. STDM's ability to auto-generate data forms and manage CRUD functions (create, read, update, delete) makes it an efficient tool for data entry and management, while its relational data model allows for linking different entities to create a coherent land administration system.

The system architecture of STDM is structured into four layers: data collection, STDM core functionality, GIS integration, and the database layer. ***These layers work together to ensure that the tool can be deployed in various environments, from small-scale community projects to larger (national) systems.*** The multi-layered architecture supports scalability and integration, allowing STDM to adapt to different project sizes and requirements.

Defining innovation in STDM as ongoing process

As land administration continues to evolve, so must STDM. ***Future developments in STDM will focus on enhancing its data security, expanding its functionality, and ensuring that it adheres to global standards in land administration.*** Data security is a key concern, especially as projects scale up and involve larger datasets. Proper data protection mechanisms, including compliance with national and international regulations on data privacy, will be critical in gaining official recognition of STDM-generated data.

Innovation in STDM is an ongoing process, driven by the needs of user projects and changing regulatory environments. Future developments may include enhanced mobile integration, seamless document management, the seamless conversion of STDM to LADM, and the use of web services and cloud-based APIs to improve data handling and sharing capabilities. Building on its strong integration with QGIS, STDM will continue to benefit from the innovation of the wider QGIS ecosystem, including desktop, web, and mobile extensions such as QField. ***Innovation also requires collaboration with academia, private sector in the tech industry and other partners, ensuring that the tool remains responsive to user needs while fostering new ideas and improvements.*** This includes exploring more advanced models for representing customary land tenure and using emerging people-centred technologies to simplify spatial data acquisition and management.

Incorporate standards and enhance interoperability

STDM's alignment with global standards is a critical aspect of its ongoing development. As a tool based on LADM, STDM must continue to evolve with the latest versions of the standard. ***The inclusion of STDM as a normative annex in the revised LADM version ensures that the two models remain compatible, and lessons learned from STDM implementations can inform future LADM developments.*** STDM's use of Open Geospatial Consortium (OGC) standards ensures that it remains interoperable with other land information systems and geospatial tools.

The move towards 3D geospatial data and other advanced land administration technologies will require updates to STDM's functionality. Standards such as CityGML for 3D geospatial data will be incorporated into STDM, ensuring that the tool can support more complex land administration needs, such as urban planning and the management of vertical properties, which are increasingly needed in informal settlements.

Participative software development and community contributions

STDM is an open-source software tool, licensed under the GNU General Public License version 2 (GPL v2). ***This open-source nature encourages contributions from the global community of developers, land administrators, and users.*** The STDM community together with the open-source community around QGIS and QField plays a crucial role in the tool's continuous improvement, with users encouraged to report issues and provide feedback to guide future developments in extending and scaling STDM in diverse contexts.

The collaborative nature of STDM's development ensures that it remains responsive to the needs of its users while fostering innovation through community involvement. With a growing user base and increasing international recognition, STDM is well-positioned to continue evolving as a leading tool in the field of land administration.

6.3 People in the Implementation and Scaling of STDM

Building Strategic Partnerships

Strong partnerships are critical for promoting knowledge sharing, resource mobilisation, and capacity building in land administration. Local, national, and international stakeholders have successfully utilised STDM to secure land tenure through meaningful partnerships tailored to specific country contexts. These partnerships promote the

dissemination of innovative tools and ensure that land administration processes are informed by local realities, including customary and communal land tenure systems.

Partnerships with a wide range of stakeholders—local governments, communities, professionals, the private sector, and academia—are vital for advancing land rights documentation and management. *Existing partnerships with key global partners such as OGC, ISO, FIG, and UN-GGIM need to be maintained and for the future of STDM even be enhanced.* Engaging emerging tech start-ups and academic institutions enables continuous innovation and adaptation of STDM to meet evolving needs, particularly in areas where formal land registration systems are inadequate.

Advocacy and Awareness at National and Global Levels

National-level advocacy and awareness-raising efforts are essential to create an enabling environment for the widespread adoption of STDM. Policymakers, local governments, and land administration agencies must be well-informed about the benefits of adopting STDM for improving tenure security and land governance. Legal reforms and media campaigns can help raise awareness, ensuring that STDM is seen as a viable, cost-effective tool for land administration, disaster management, and humanitarian efforts.

One aspect is national awareness and capacity, another aspect is sharing the lessons learned and success stories from STDM implementations at the regional and global level. This knowledge-sharing enables the replication of best practices and informs global policy discussions on land tenure security, gender equality, and sustainable land use.

Capacity Building: Beyond Technology

Capacity building for the implementation of STDM is not limited to technology training. It encompasses a broader understanding of land governance, gender/youth-responsive land rights, innovative land surveying methods, conflict/dispute management, and soft skills such as negotiations and change management. Local communities, land administrators/surveyors, and government officials require training not only in using the technology but also in understanding the complexities and different realities of land tenure relationships and governance structures. This comprehensive approach ensures that STDM maintains to be integrated into the broader land administration ecosystem, benefiting marginalised communities, especially those in customary or informal settlements.

Academic institutions play a crucial role in advancing the development of STDM by serving as research hubs and testing/piloting grounds. Their involvement helps identify gaps and explore improvements in STDM, ensuring that it remains relevant. Additionally, strategic partnerships with the open-source software developers, private sector and geospatial professionals foster the continuous development of STDM, integrating advanced technologies such as Unmanned Aerial Vehicles (UAVs) and machine learning for enhanced land surveying and data collection.

Engaging Local Communities and Governments

The successful implementation of STDM depends on the active involvement of local communities, leaders, and government agencies. Engaging these stakeholders ensures that the benefits of STDM are widely understood and that the concept is tailored to local needs. Community-based participatory mapping, enumeration, and GIS processes

empower local populations to take ownership of the land tenure documentation process. ***This grassroots engagement fosters trust and ensures that land rights are recognised and protected at the local level.*** By embedding STDM within local governance structures, land tenure systems can be more effectively managed and secured. This also supports the long-term sustainability of STDM implementations, as local governments become advocates for the tool and its potential to improve land administration processes.

Expanding Educational Opportunities and Enhancing Awareness

Continued capacity building is essential to scale up the implementation of STDM. ***The inclusion of STDM in educational initiatives, such as developing comprehensive curricula for land administrators, lawyers, and surveyors, can ensure that STDM becomes a core part of national land governance educational programs.*** Additionally, expanding initiatives like the ***Volunteer Community Surveyor Program (VCSP)*** offers young professionals the opportunity to gain hands-on experience in land administration projects, contributing to their professional development and strengthening local land governance capacities.

To ensure the successful adoption of STDM, it is essential to engage with modern communication channels and media platforms to disseminate information. Creating tailored content for social media platforms, and other digital media can increase the awareness, also among tech-savvy audiences and encourage broader adoption of STDM.

| Theme | Key Focus Areas | Action Points | FELA Governance | FELA Technology | FELA People |
|------------------------|---|---|---|--|---|
| Sustaining STDM | Ensuring long-term sustainability of STDM implementations | <ul style="list-style-type: none"> Strengthen community ownership; formalise legal recognition through system integration; secure long-term funding (revenue streams and/or development aid) | <ul style="list-style-type: none"> Ensure formal legal frameworks recognising STDM Empower communities to manage STDM themselves to generate revenues to sustain the system | <ul style="list-style-type: none"> Continuous data collection, management, and integration for ongoing maintenance Ensure data security and management system remain robust for long-term sustainability | <ul style="list-style-type: none"> Train local communities to manage and use STDM independently; encourage community-driven sustainability efforts |
| | Enhancing STDM's functionality and ensuring it meets evolving land administration needs | <ul style="list-style-type: none"> Focus on innovations such as mobile platforms, web services, and enhanced data management | <ul style="list-style-type: none"> Establish policies to ensure data security, privacy and legal compliance | <ul style="list-style-type: none"> Enhance mobile applications and cloud data collection possibilities | <ul style="list-style-type: none"> Collaborate with academia and private sector to drive innovation and encourage user feedback for continuous improvement |
| Scaling STDM | Scaling STDM to broader national and sub-national levels | <ul style="list-style-type: none"> Develop scalable logistics (IT), accountability and security frameworks, and resource allocation | <ul style="list-style-type: none"> Implement policies to support the scaling of STDM to a national level, prioritise interventions between governments | <ul style="list-style-type: none"> Build technical capacity to manage larger datasets and scale existing infrastructure | <ul style="list-style-type: none"> Build institutional capacity to manage large-scale STDM implementations and ensure community inclusion at all levels |
| | Integrating STDM with national land information systems (LIS) | <ul style="list-style-type: none"> Develop integration strategies Ensure technical and institutional readiness for integration | <ul style="list-style-type: none"> Support dialogue between local, national, and regional institutions to align governance strategies | <ul style="list-style-type: none"> Align STDM with national LIS and ensure system interoperability; Use integration tools with existing systems | <ul style="list-style-type: none"> Train local actors on integrated system functionalities; Train government officials and local actors on the integration process |
| Broadening STDM | Expanding STDM's application to food security, displaced populations and climate action | <ul style="list-style-type: none"> Partner with institutions handling cross-cutting issues; Explore other funding opportunities linked to sustainable development | <ul style="list-style-type: none"> Collaborate with institutions involved in food security, displaced populations, and climate action to integrate and use STDM | <ul style="list-style-type: none"> Enhance STDM to manage e.g. environmental monitoring data, managing HLP Claims for returnees and support sustainable development | <ul style="list-style-type: none"> Train local communities and institutions in using STDM to manage resources and monitor e.g. environmental impacts; HLP claims of returnees etc. |

Table 1: How to sustain, scale and broaden STDM – overview using FELA

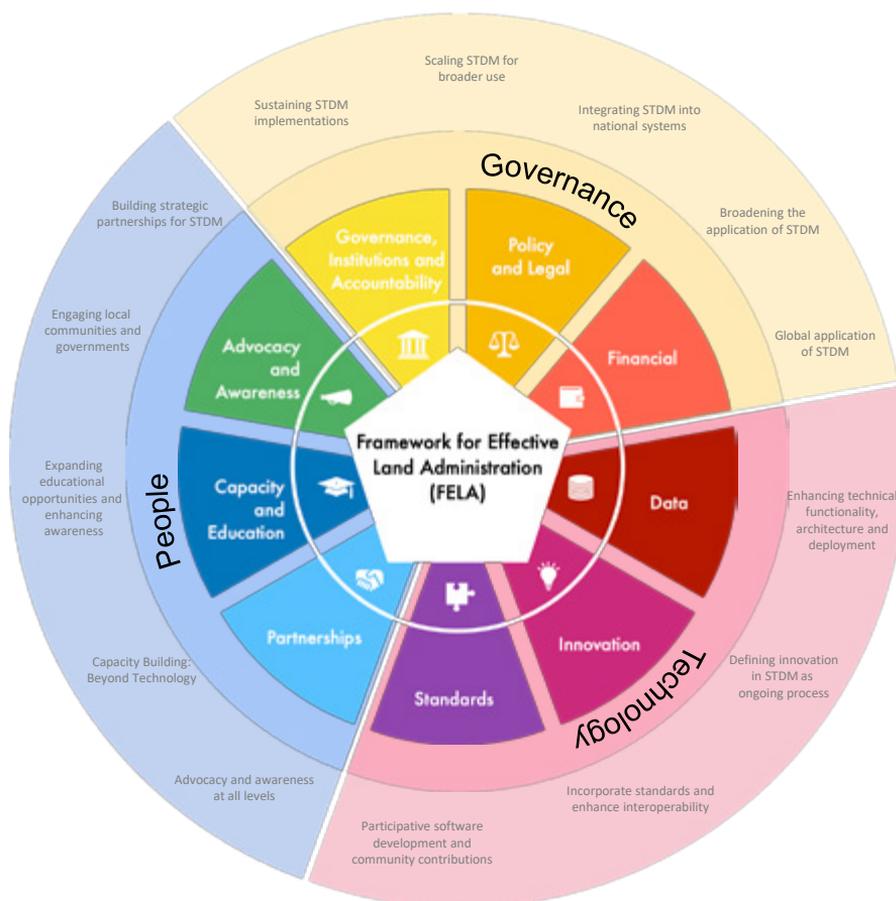


Figure 10: Possible ways forward for STDM using the UN-GGIM FELA.

7 STDM: A TRANSFORMATIVE APPROACH FOR INCLUSIVE LAND TENURE DOCUMENTATION

Launched over 15 years ago, STDM has continued to develop and impact the lives of people, especially those in marginalized communities. Although we consider STDM to be a concept, a model and an information tool, it has also become a ‘brand’ of inclusive land tenure rights and their documentation. Some people use the term for the whole process around it, including the processes of getting recognition, setting up workflows to capture land information in a participatory manner, storing this land information and generating land documents from this.

STDM started as one of the first, and most successful, tools of GLTN; demonstrating that documenting non-formal, yet legitimate, land tenure rights was possible in both aspects – technical and practical. Since then the many implementations in different context have not only reiterated that but have also shown the transformative power of the implementation processes as such; with the information in STDM the conversation with (local or national) government changes, or sometimes even starts. With the increased status of the STDM model in LADM, the land tenure rights documented can

also be easier integrated in more formal land administration systems once the policies and laws are adapted.

Regardless of the successes and impacts of STDM since 2010, the need to upscale the implementation of documenting all forms of land tenure rights remains huge. Funding for both maintaining STDM as a robust and modern land information tool and for implementation projects and more formal recognition – including integration of STDM into the NLIS is constantly asking for attention. Capacity development, especially training, also continues to be needed, although a good base has been laid in the 2010s. Next to the (online) publications linked to STDM there is also an increasing body of research work published linked to STDM.

The flexibility of STDM allows for its very diverse implementations, and -as shown above- can contribute to tackling many of the global challenges. *We are confident that it will continue to do so, even if other global challenges will emerge in the post 2030 world.*

ACKNOWLEDGEMENTS

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Together, these contributions are helping to create first of all this publication but broader a more inclusive and just land administration system for all. Thank you for all the commitment and ongoing collaboration.

REFERENCES

- Augustinus, C. and Tempura O. (2021). Fit-for-Purpose Land Administration in Violent Conflict Settings.
- Augustinus, Clarissa (2010): Social tenure domain model: what it can mean for the land industry and for the poor. XXIV FIG International Congress: facing the challenges, building the capacity, April 2010, Sydney, Australia.
- Augustinus, Clarissa, Christiaan Lemmen and Peter van Oosterom (2006): Social tenure domain model: requirements from the perspective of pro-poor land management. 5th FIG regional conference: promoting land administration and good governance, March 2006, Accra, Ghana.
- De Soto, Hernando (2003): The mystery of capital: why capitalism triumphs in the west and fails everywhere else. New York, NY, US. Basic Books.
- Expert group on refugee and internally displaced persons statistic (EGRIS) (2020). International recommendations on internally displaced persons statistics (IRIS).
- FAO (2012), Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of Food Security
- FAO, (2022). Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security. First revision. Rome <https://doi.org/10.4060/i2801e>
- FAO, UN and FIG, (2022). Digital transformation and land administration – Sustainable practices from the UNECE region and beyond. FIG Publication No. 80 <https://openknowledge.fao.org/handle/20.500.14283/cc1908en>
- FIG, (2014b). Proceedings of the 4th International FIG 3D Cadastre Workshop, Dubai, United Arab Emirates. Editors: Peter Van Oosterom and Elfriede Fendel. International Federation of Surveyors (FIG). Copenhagen, Denmark. <https://doi.org/10.4233/uuid:f4bea59f-0343-4336-b31e-aeacd3a411a3>
- FIG, (2016). Proceedings of the 5th International FIG Workshop on 3D Cadastres, 18–20 October 2016, Athens, Greece. International Federation of Surveyors (FIG). Copenhagen, Denmark. <https://www.gdmc.nl/3DCadastres/workshop2016/programme/>
- FIG, (2018b). Proceedings of the 6th International FIG Workshop on 3D Cadastres, 2–4 October 2018, Delft, the Netherlands. International Federation of Surveyors (FIG). Copenhagen, Denmark. <https://www.gdmc.nl/3DCadastres/workshop2018/programme/>
- FIG, (2021a). Proceedings of the 9th FIG Workshop on the Land Administration Domain Model / 3D Land Administration. 24 June 2021, part of the FIG Working Week 2021, <https://isoladm.org/LADM2021Workshop>
- FIG, (2021b). Proceedings of the 7th International FIG Workshop on 3D Cadastres, 11–13 October 2021, New York, USA. International Federation of Surveyors (FIG). Copenhagen, Denmark. <https://www.gdmc.nl/3DCadastres/workshop2021/>
- FIG, (2022). Proceedings 10th Land Administration Domain Model Workshop, 31 March – 2 April 2022, Dubrovnik, Croatia (with 7th Croatian Congress on Cadastre), <https://doi.org/10.4233/uuid:446ad684-b9e0-48c2-81d9-85fc22537ddc>

- FIG, (2023). Proceedings 11th International Workshop on the Land Administration Domain Model and 3D Land Administration, 11–13 October 2023, Gävle, Sweden. International Federation of Surveyors (FIG). Copenhagen, Denmark. https://www.gdmc.nl/3DCadastres/workshop2024/programme/ProceedingsLADM_3DLA_2024.pdf
- FIG, (2024). Proceedings of the 12th International FIG Workshop on the Land Administration Domain Model & 3D Land Administration. 24–26 September 2024, Kuching, Malaysia. International Federation of Surveyors (FIG). Copenhagen, Denmark. https://www.gdmc.nl/3DCadastres/workshop2024/programme/ProceedingsLADM_3DLA_2024.pdf
- FIG, UN-HABITAT and GLTN, (2014). A Review of the Social Tenure Domain Model (STDM) Phase II Summary Report. FIG Leaflet, International Federation of Surveyors, Copenhagen Denmark, March 2014. https://www.fig.net/resources/publications/figpub/stdm_review/STDM_screen.pdf
- IFRC (2016). Applying Better Programming Initiative – DO NO HARM.
- ISO 19152-1:2024. Geographic information – Land Administration Domain Model (LADM) – Part 1: Generic conceptual model
- ISO 19152-2 Geographic information – Land Administration Domain Model (LADM) – Part 2: Land registration. Under development, approval phase (schedule for release in 2025).
- ISO 19152-3:2024 Geographic information – Land Administration Domain Model (LADM) – Part 3: Marine georegulation
- ISO 19152-4 Geographic information – Land Administration Domain Model (LADM) – Part 4: Valuation information.
- ISO 19152-5 Geographic information – Land Administration Domain Model (LADM) – Part 5: Spatial plan information.
- ISO 19152:2012 Geographic information – Land Administration Domain Model (LADM)
- Kara, A., Lemmen, C.H.J., Kalogianni, E. and Van Oosterom, (2023a). Requirements Based Design of the LADM Edition II. LADM & 3D Workshop, Gävle, Sweden. https://gdmc.nl/3DCadastres/workshop2023/programme/3DLA2023_paper_L.pdf
- Lemmen, C.H.J., (2010). The Social Tenure Domain Model – A Pro-Poor Land Tool. Author Christiaan Lemmen. International Federation of Surveyors, Global Land 37 Tool Network and United Nations Human Settlements Programme (UN-HABITAT), March 2010. FIG Publication No. 52, Copenhagen, Denmark. <https://www.fig.net/resources/publications/figpub/pub52/figpub52.pdf>
- Lemmen, C.H.J., (2012). A Domain Model for Land Administration, PhD thesis, Delft University of Technology https://gdmc.nl/publications/2012/Domain_Model_for_Land_Administration.pdf
- Lemmen, C.H.J., Augustinus, C., Van Oosterom, P.J.M. and Van der Molen, P., (2007). The Social Tenure Domain Model – Specifications of a First Draft Model. FIG Working Week 2007 Hong Kong SAR, China, 13–17 May 2007. https://www.fig.net/resources/proceedings/fig_proceedings/fig2007/papers/ts_1a/TS01A_01_lemmen_augustinus_oosterom_molen_1373.pdf

- Lemmen, C.H.J., Van Oosterom, P.J.M. and Bennett, R.M., (2015). The Land Administration Domain Model. *Land Use Policy*, Volume 49, December 2015 <https://doi.org/10.1016/j.landusepol.2015.01.014>
- Lemmen, Christiaan, Clarissa Augustinus, Peter van Oosterom, and Paul van der Molen (2007): The social tenure domain model: design of a first draft model. FIG Working Week 2007: strategic integration of surveying services, May 2007, Hong Kong SAR, China.
- RICS, (2011). Crowdsourcing Support of Land Administration. A new, collaborative partnership between citizens and land professionals. Report written by Robin McLaren. Royal Institute of Chartered Surveyors, RICS, London, United Kingdom https://fig.net/resources/monthly_articles/2011/december_2011/Robin%20McLaren%20Paper%20Cadastre%20%20%20Innsbruck%20Conference%2002092011%20v3.pdf
- UN Sub-Commission on the Promotion and Protection of Human Rights (2005). Principles on Housing and Property Restitution for Refugees and Displaced Persons (the Pinheiro Principles).
- UN-GGIM (2020). Framework for Effective Land Administration, August 2020, New York, United States.
- UN-GGIM, (2020). Framework for Effective Land Administration, August 2020, New York, United States. Available online: https://ggim.un.org/meetings/GGIMcommittee/10th-Session/documents/E-C.20-2020-29-Add_2-Framework-for-Effective-Land-Administration.pdf
- UN-GGIM, (2022). Future Trends in Geospatial Information Management: the five to ten year vision. UN Committee of Experts on Global Geospatial Information Management, Third Edition (2022) https://ggim.un.org/meetings/GGIM-committee/10th-Session/documents/Future_Trends_Report_THIRD_EDITION_digital_accessible.pdf
- UN-Habitat (2021). The Land Administration in Syria: Analysis and Recommendations (unpublished).
- UN-Habitat (2022). Due Diligence for Land-Based Programming Technical Guidance Notes
- UN-Habitat / GLTN (2018b). Land and Conflict: Lessons from the Field.
- UN-HABITAT, (2008). Secure Land Rights for All. United Nations Human Settlements Programme (UN-HABITAT). Nairobi, Kenya. <https://unhabitat.org/sites/default/files/download-manager-files/Secure%20Land%20Rights%20for%20All.pdf>
- UN-Habitat/GLTN (2019). Stories of Change. Global Land Tool Network Phase 2.
- UN-Habitat/GLTN (2021). Guidance Note on the Application of the Social Tenure Domain Model in Syria.
- UN-Habitat/GTLN (2018a). How to do a Root Cause Analysis of Land and Conflict for Peace Building.

- UN-Habitat/UNHCR (2020). Guidance for responding to displacement in urban areas.
- UN, (2012). Realizing the Future We Want for All: Report to the Secretary-General. UN System Task Team on the UN Development Agenda, New York, US (2012). http://www.un.org/millenniumgoals/pdf/Post_2015_UNTTreport.pdf
- UN, (2015). Transforming our World: the 2030 Agenda for Sustainable Development, A/RES/70/1. United Nations <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
- Unger, E-M, Kara, A. and Gitau, J., (2024). STDM Valuation of Unregistered Land. Paper to the FIG Working Week 2024, Accra, Ghana, May 2024. https://www.fig.net/resources/proceedings/fig_proceedings/fig2024/ppt/ts11h/TS11H_STDM_ValuationofUnregisteredLand_FIG_Long.pdf
- Unger, E-M, Lemmen, C.H.J., Bennett R.M., (2023). Women's access to land and the Land Administration Domain Model (LADM): Requirements, modelling and assessment. Land use policy 126, 106538 <https://www.sciencedirect.com/science/article/pii/S0264837723000042>
- UNHCR (2005). Housing, Land and Property Rights in Post-Conflict Societies: Proposals for a New United Nations Institutional and Policy Framework.
- UNHCR (2022). Global Trends: Forced Displacement in 2022.
- UNHCR (2023). Operational Data Portal. Kenya. <https://data.unhcr.org/en/country/ken/796>
- United Nation (2019). Guidance Note of the Secretary General: The United Nations and Land and Conflict.
- Van Oosterom, P.J.M and Lemmen, C.H.J., (2015). The Land Administration Domain Model (LADM): Motivation, standardisation, application and further development. Land Use Policy, Volume 49, December 2015, Pages 527–534. <https://www.sciencedirect.com/special-issue/10CVHWV3CJX> and <https://www.sciencedirect.com/science/article/abs/pii/S0264837715003208>
- Van Oosterom, P.J.M. and Lemmen, C.H.J., (2002). Impact Analysis of Recent Geo-ICT Developments on Cadastral Systems, FIG Congress, Washington USA https://www.fig.net/resources/proceedings/fig_proceedings/fig_2002/Js13/JS13_vanoosterom_lemmen.pdf
- Van Oosterom, P.J.M., Unger E-M and Lemmen C.H.J., (2022). The second themed article collection on the land administration domain model (LADM). Land Use Policy, Volume 120, September 2022, 106287. <https://doi.org/10.1016/j.landusepol.2022.106287>
- Williamson, Enemark, Wallace, and Rajabifard (2010): Land Administration for Sustainable Development. ESRI Press Academic. Redlands, California, US.
- Zevenbergen, Jaap and Solomon Haile (2010): Institutional aspects of implementing inclusive land information systems like STDM. XXIV FIG International Congress: facing the challenges, building the capacity, April 2010, Sydney, Australia.

ANNEX: CASE STUDIES

Case study 1 – Collecting and referencing the HLP claims of Syrian refugees in Lebanon and Iraq

Through a pilot project, UN-Habitat and the Global Land Tool Network have implemented STDM to safeguard the HLP evidentiary documentation of Syrian refugees, currently in Lebanon and Iraq, by mapping and recording the HLP claims to their residential and non-residential properties in Syria, and by georeferencing a wide variety of forms of HLP and civil evidence to sustain the claims in possible future restitution and compensation processes. Between 2021 and 2023, the project reached over 18,000 Syrian refugees households and registered over 17,000 HLP claims.

STDM has been implemented through a participatory and voluntary enumeration process, at no fee for the beneficiaries, applying a rigorous do-no-harm approach. The enumeration activities have been preceded by capacity development activities for UN-Habitat staff and implementing partners, and outreach activities for beneficiaries. The targeted refugee households have been informed about the scope of the project, data collection modalities, handling and storage according to the data protection protocol developed for this project. Enumerators conducted interviews with Syrian refugee households and filled in the STDM questionnaire using mobile tablets. The rights claimed include full ownership, joint ownership, long- and short-term use rights. A wide range of supporting HLP evidence (46 types of evidence) have accepted and safeguarded as well as along with supporting personal documentation – all in the form of a digital copy. All beneficiaries could record his/her housing, land and property rights and claims to their properties in Syria – either individually, or as member of a household.

Over 17,000 Certificates of Collection and Safeguarding of Tenure Relationship Documents were issued by UN-Habitat and distributed to beneficiaries. There was no verification of the HLP claimed undertaken.

For more information on the implementation of STDM for collecting HLP claims of Syrian refugees, refer to the [Guidance Note on the Application of the Social Tenure Domain Model in Syria](#) developed by UN-Habitat and the Global Land Tool Network.

Case study 2 – Supporting the Regeneration Strategy of Kakuma Camp 1, Kenya

Within the framework of the European Union Trust Fund for Africa and Kenya programme, “Enhancing Self Reliance for Refugees and Host Communities in Kenya”, in 2021, STDM was piloted in Kakuma 1 with the aim of improving the management of land services and structure allocation in the camp. Established in 1992, Kakuma refugee camp is the second largest refugee camp in Kenya. Home to refugees from Somalia, Ethiopia, Burundi, Rwanda and Democratic Republic of Congo counts a population of about 200,000 people (UNHCR, 2023).

As part of the pilot project, a total of 1,781 households were enumerated in the 7 blocks spread across two zones in Kakuma 1 camp. STDM was implemented to collect spatial, and non-spatial data, mapping settlement, resettlement and return intentions of people in the camp, their perception of land tenure security, trends on land-related conflicts and available resolution mechanism, adequacy and quality of housing, basic services and infrastructure within the camp – including access to safe drinking water, health, sanitation and waste management and education. UNHCR provided the infrastructure for hosting the collected data in their server.

The resultant validated data was packaged into a project brief which was shared during the land forum in Turkana County in which the county government and other stakeholders participated. The findings from the data informed the development of the regeneration strategy for Kakuma 1, including a responsive approach to land and housing tenure, and facilitated the development of a social and economic model that promotes sustainable and improved livelihood for the refugees and host communities across the Kakuma-Kalobeyi municipality. This approach can be upscaled in the future to cover the whole of Kakuma camp to collect the data needed for planning and upgrading of the camp.

Reference: <https://gltn.net/blog/good-land-governance-strategic-development-kakuma-regeneration-strategy-kenya>

Case study 3 – Housing rehabilitation and land tenure security of Yazidi minority in Iraq

After the ISIL/Da'ish offensive in the Sinjar district starting in August 2014, more than 275,000 individuals, predominantly Yazidis, were forcibly displaced from the Mount Sinjar region. Abandoned Yazidi settlements were subject to systematic destruction or occupation by ISIL fighters. It is estimated that over 3,000 houses were either razed to the ground or set on fire in the Sinuni sub-district alone. In 2017, as part of the UN-Habitat's Urban Recovery Programme, in partnership with the Nineveh Governorate, UN-Habitat launched a Housing Rehabilitation pilot project in Sinuni, which facilitated the return of approximately 9,000 individuals and the rehabilitation of 1,500 houses. Further, STDM was implemented to promote sustainable and safe return, by registering the HLP claims of the Yazidis. Since 2018, more about 15,000 HLP claims have been registered using STDM, benefiting more than 100,000 individuals. As of September 2023, 11 collective townships were covered by the intervention, over 15,500 occupancy certificates endorsed by local authorities were issued and distributed to returnee families, and more than 3,000 houses were rehabilitated in Sinjar. Occupancy certificates not only increased their tenure security of the Yazidis but also made them eligible for housing rehabilitation.

On 27 December 2022, the Iraqi government, led by its Prime Minister Mr. Mohammed S. Al-Sudani, issued a decree to formalize the recognition of the occupancy records issued by UN-Habitat as full property titles. This underscores the significant impact that the development and implementation of inclusive and gender responsive land tools, such as the STDM, can have in facilitating policy reform and ensuring security of tenure for all people.

Reference: <https://gltn.net/blog/iraqi-authorities-officially-recognize-housing-land-and-property-rights-yazidi-minority>

Case study 4 – Mapping return villages in Darfur, Sudan

In Sudan, UN-Habitat, UNDP and FAO - with the support of the UN Darfur Fund and Qatar - worked with the Darfur Land Commission and the Voluntary Return and Resettlement Commission of the Darfur Regional Authority to capacitate land institutions, such as the native administration and the State Ministries of Physical Planning and Agriculture, to improve Darfur's land management and land disputes mechanism by providing technical recommendations to and developing the capacities of the competent authorities on necessary land reform, policies and legislation.

The project, rolled out between 2015-2018, targeted 50 return villages. Among the key interventions, a fit-for-purpose land registration approach was implemented to identify suitable land for the future extension of the return villages, in a way that prevent the emergence of conflict between returnees and families already residing in the return villages. This process was led by the State Ministries, with the technical support of UN-Habitat, and it was carried out through a participatory planning approach involving local communities: the paper-based plans were developed in the field with the communities and then digitized through the use of STDM.

The plans, developed for 34 localities, marked the boundaries of 50 existing villages and possible directions for the settlements future expansion considering buffer zones and land for livelihood. Nine nomadic corridors were screened and a gender-sensitive monitoring system was established along 5 livestock migratory routes to prevent conflicts between farmers and pastoralists.

Reference: <https://gltn.net/blog/strengthening-land-management-peaceful-co-existence-darfur-sudan>

ANNEX: STDM AS A NORMATIVE ANNEX IN LADM

Annex B (normative)

Social Tenure Domain Model (STDM)

The Social Tenure Domain Model (STDM) is an initiative of UN-HABITAT to support pro-poor land administration.^[77] STDM is intended specifically for developing countries with very little cadastral coverage in urban or rural areas. It is also meant for post-conflict areas, areas with large-scale informal settlements, or large-scale customary areas. The focus of STDM has been on the relationships between people and land, independently from the level of formalization, or legality of those relationships. It is a search for a model that will support all forms of land rights, social tenure relations, and overlapping claims to land.^{[82][34][43]} The STDM is a conceptual model and not an application model. Both STDM and LADM are descriptive and not prescriptive. They provide formal languages for describing the many aspects of social tenure, so that the similarities and differences between the different LA systems can be better understood. The purpose is that the LADM will contribute to a better understanding of the many aspects of social tenure.

Table B.1 – The LADM class names with their aliases in STDM

| LADM class name | STDM alias |
|---------------------------------|-----------------------|
| AdministrativeSource | SocialTenureInventory |
| LegalSpaceBuildingUnit | Unit |
| BoundaryFace | BoundaryFace |
| BoundaryFaceString | BoundaryFaceString |
| GroupParty | GroupParty |
| BAUnit | n.a. |
| Level | n.a. |
| Mortgage | Collateral |
| LegalSpaceUtilityNetwork | UtilityNetwork |
| Party | Party |
| PartyMember | PartyMember |
| Responsibility | Responsibility |
| Restriction | Restriction |
| RequiredRelationshipBAUnit | n.a. |
| RequiredRelationshipSpatialUnit | n.a. |
| Right | STDM_Relationship |
| RRR Social | TenureRelationship |
| Source | Source |
| Point | SurveyPoint |
| SpatialSource | SpatialUnitInventory |
| SpatialUnit | SpatialUnit |
| SpatialUnitGroup | AdminSpatialUnit |
| VersionedObject | VersionedObject |

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She holds an MSc in Geodesy and Geoinformation and a PhD in Land Administration, and lectures at KU Leuven's Public Governance Institute and BOKU University. Eva-Maria served as Chair of the FIG Young Surveyors Network and initiated the Volunteer Community Surveyors Program (VCSP) supporting UN-Habitat GLTN. She is Director of OICRF and chairs the UN-Habitat GLTN STDM Advisory Board. In her work she is also collaborating closely with UN-GGIM, the World Bank, FAO, ISO, and OGC.



Dr. **Jaap Zevenbergen**, MSc, LL.M. is a professor in land administration and management and vice-dean education at the University of Twente, Faculty ITC. He teaches, supervises, studies, consults and publishes on the interlink between institutional and technological elements of land administration and spatial data infrastructures. He served among others on the boards of GLTN, Cadasta and Land Portal, and currently is vice chair of the Netherlands Commission for Geodesy and Geoinformatics.



John Gitau is a Programme Management Officer at UN-Habitat's Land, Housing and Informal Settlement Section, where he supports the development and implementation of inclusive, pro-poor and gender-responsive land tools into global and national programmes. A land governance and geospatial information specialist with over 17 years of experience, he has delivered innovative land administration solutions across Africa, Asia-Pacific and the Arab States. John has advanced fit-for-purpose land administration and tenure security initiatives collaborating with governments and expert groups such as UN-GGIM, GEOSS and OSGeo. He is also an author of technical guides shaping global and national land governance and geospatial practices.

FIG PUBLICATIONS

The FIG publications are divided into four categories. This should assist members and other users to identify the profile and purpose of the various publications.

FIG Policy Statements

FIG Policy Statements include political declarations and recommendations endorsed by the FIG General Assembly. They are prepared to explain FIG policies on important topics to politicians, government agencies and other decision makers, as well as surveyors and other professionals.

FIG Guides

FIG Guides are technical or managerial guidelines endorsed by the Council and recorded by the General Assembly. They are prepared to deal with topical professional issues and provide guidance for the surveying profession and relevant partners.

FIG Reports

FIG Reports are technical reports representing the outcomes from scientific meetings and Commission working groups. The reports are approved by the Council and include valuable information on specific topics of relevance to the profession, members and individual surveyors.

FIG Regulations

FIG Regulations include statutes, internal rules and work plans adopted by the FIG organisation.

List of FIG Publications

For an up-to-date list of publications, please visit www.fig.net/pub/figpub

ABOUT FIG



International Federation of Surveyors is the premier international organisation representing the interests of surveyors worldwide. It is a federation of the national member associations and covers the whole range of professional fields within the global surveying community. It provides an international forum for discussion and development aiming to promote professional practice and standards.

FIG was founded in 1878 in Paris and was first known as the Fédération Internationale des Géomètres (FIG). This has become anglicised to the International Federation of Surveyors (FIG). It is a United Nations and World Bank Group recognised non-government organisation (NGO), representing a membership from 120 plus countries throughout the world, and its aim is to ensure that the disciplines of surveying and all who practise them meet the needs of the markets and communities that they serve.

ABOUT UN-HABITAT



UN-HABITAT

UN-Habitat helps the urban poor by transforming cities into safer, healthier, greener places with better opportunities where everyone can live in dignity. UN-Habitat works with organizations at every level, including all spheres of government, civil society and the private sector to help build, manage, plan and finance sustainable urban development. Our mission is to promote socially and environmentally sustainable human settlements development and the achievement of adequate shelter for all. For more information, visit the UN-Habitat web site at <https://www.unhabitat.org>.

ABOUT GLTN



GLTN is an alliance of international partners committed to increasing access to land and tenure security for all, with special focus on the poor and women. The Network has an established global land partnership, drawn from international civil society organizations, international finance institutions, international research and training institutions, donors and professional bodies. GLTN develops, disseminates and implements pro-poor and gender-responsive land tools. These tools and approaches contribute to land reform, good land governance, inclusive land administration, sustainable land management and functional land sector coordination. For more information, visit the GLTN website at <https://www.glt.net>.

ABOUT KADASTER



The Netherlands Cadastre, Land Registry and Mapping Agency – Kadaster – is a non-departmental public body under the political responsibility of the Minister of the Interior and Kingdom Relations. Since 1832, Kadaster has been collecting and registering administrative and spatial data on property and related rights in the Netherlands. Kadaster is responsible for national mapping and maintenance of the national reference coordinate system and acts as an advisory body for land use issues and national spatial data infrastructures. Kadaster International focuses on maintaining strong international relationships, providing critical information and education, and promoting knowledge sharing and capacity building. By providing expert advice and support, Kadaster International supports countries develop efficient and effective land administration systems. For more information, visit <https://www.kadaster.com/>.



The Social Tenure Domain Model (STDM) is an innovative concept, model, and information tool designed to address gaps in conventional land administration systems by recognising and documenting all people-to-land relationships, including non-formal and customary rights along the continuum of land rights. This publication examines the evolution of STDM and its growing role in addressing global challenges such as food security; Housing, Land and Property (HLP) rights for displaced populations, migration and climate resilience.

STDM has demonstrated its capacity to enhance land tenure security, particularly for marginalised populations such as slum dwellers, smallholder farmers, women, and displaced communities. Its application in diverse settings has shown how secure tenure is the basis of adequate housing, improves living conditions, fosters agricultural productivity, reduces land disputes, strengthens land-based revenue and supports sustainable land management. Furthermore, STDM has proven to be a valuable tool in post-conflict and post-disaster contexts, helping to document and restore land rights, enabling communities to rebuild their livelihoods.

STDM as part of the Land Administration Domain Model (LADM) has further strengthened its relevance, ensuring compatibility with an international ISO standard, and so enhancing interoperability with national land administration systems.

STDM has evolved into a transformative concept for inclusive and sustainable land administration. Its alignment with international frameworks and its proven adaptability across diverse contexts position STDM as a crucial enabler for all