WORLD BANK LAND CONFERENCE 2024

WORLD BANK GROUP

Introduction to LADM & STDM

Peter van Oosterom – Chair GIS Technology TU Delft
(on behalf of ISO TC211 and OCG co-editors/chairs: Eva-Maria Unger, Christiaan Lemmen, Abdullah Kara, Eftychia Kalogianni, Abdullah Alattas, Agung Indrajit, Chris Body, Douglas O'Brien)

13 May 2024, Washington DC, USA

TU Delft

kadaster

FIG UN-HABITAT FOR A BETTER URBAN FUTURE GLTN GLOBAL LAND TOOL NETWORK UNIVERSITY OF TWENTE. ITC ISO Open Geospatial Consortium IHO International Hydrographic Organization

Overview

- LADM
- STDM
- Revision
- OGC
- Countries
- Industry

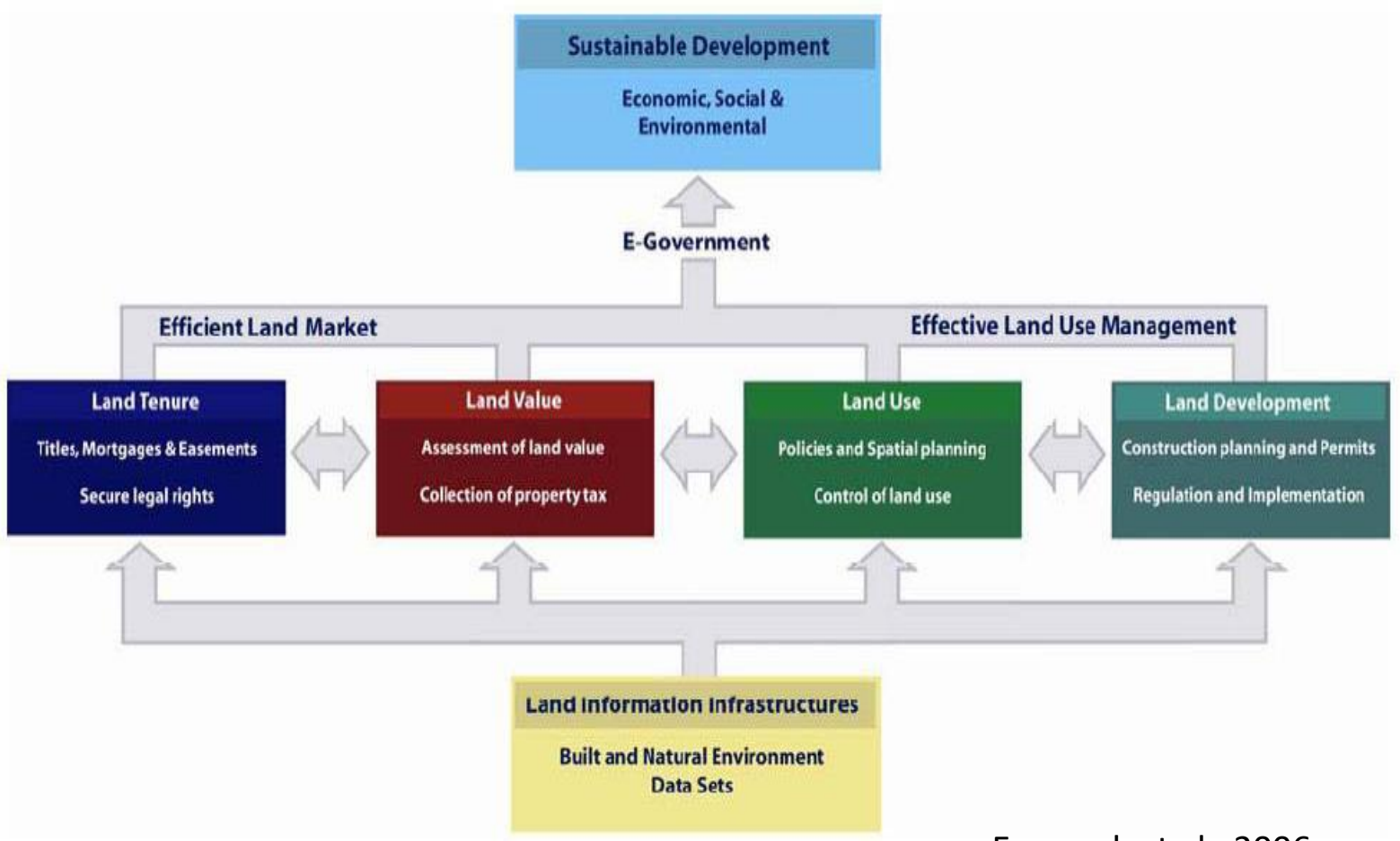
Source: Prindex - https://www.prindex.net/data/

Land Administration

process of recording and disseminating information about:

- Ownership [RRRs]
- value
- [planned] use of land and associated resources

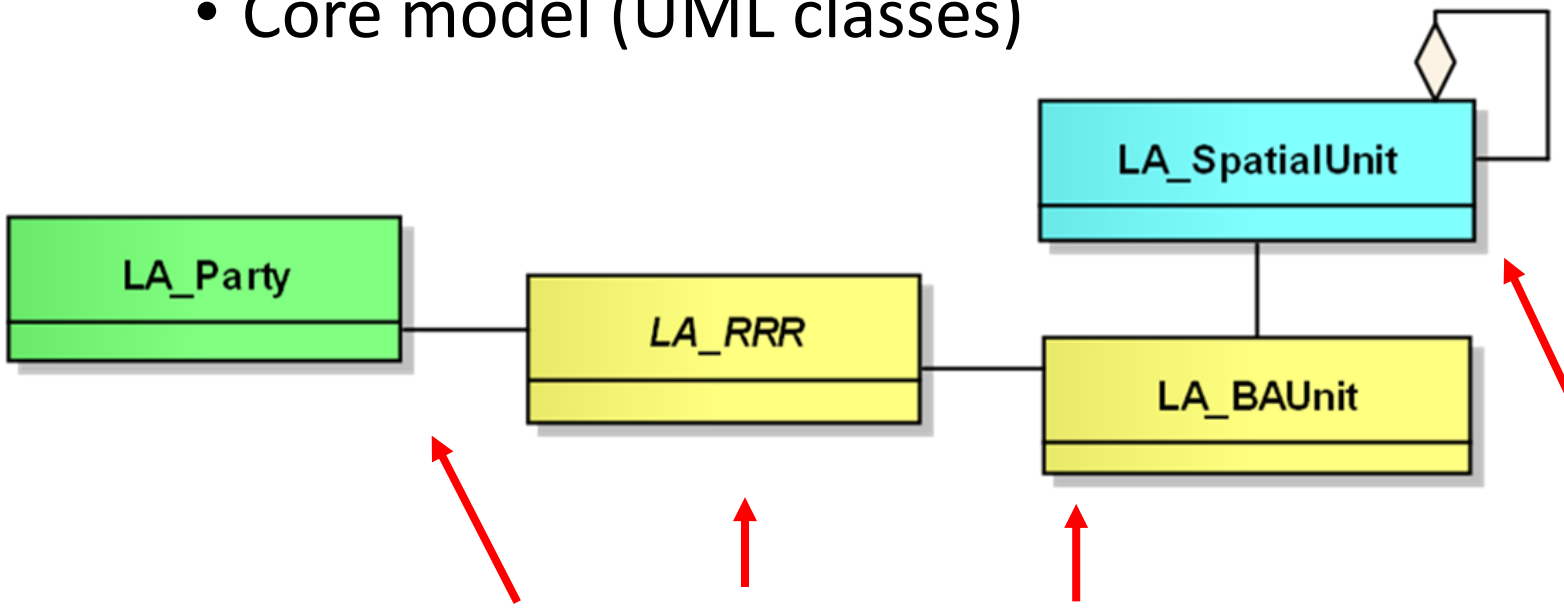
UN-ECE, 1996



Enemark et al., 2006

Land Administration Domain Model ISO 19152:2012 (LADM)

- It is an information model, at conceptual level and includes:
  - Spatial part (geometry, topology)
  - Extensible framework for legal/administrative part
- Core model (UML classes)

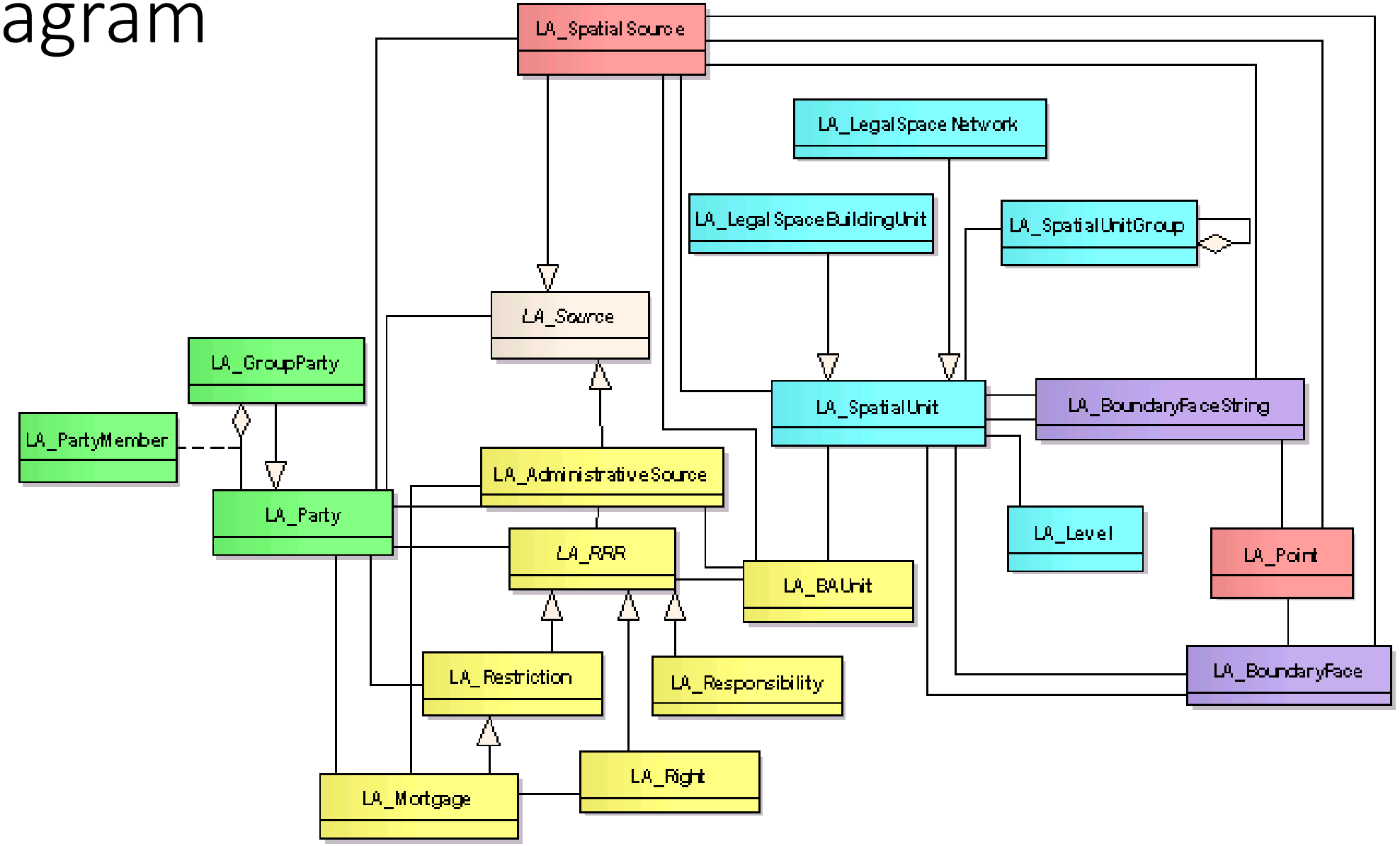


Example: Peter owns a property consisting of two parcels

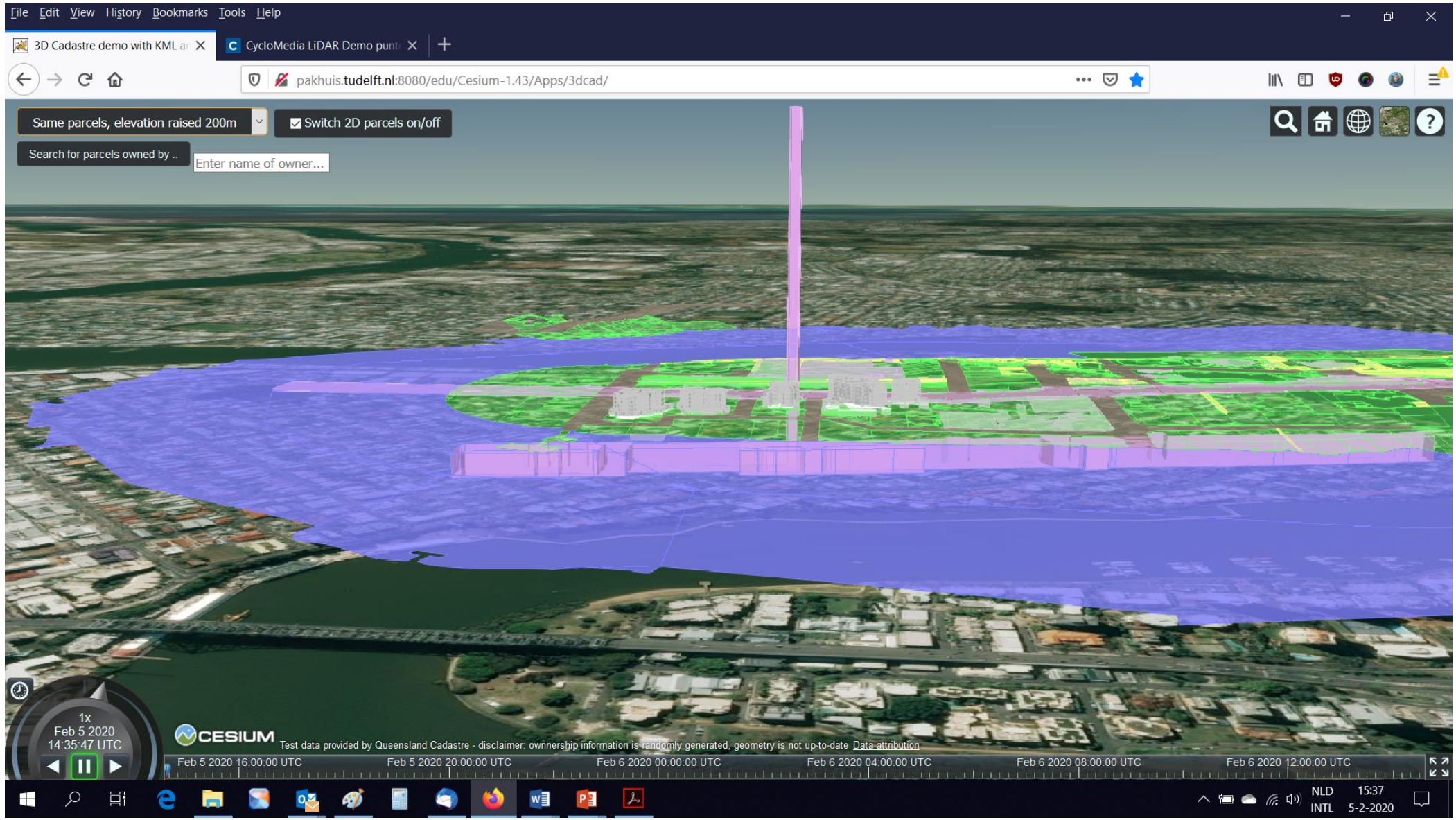
LADM Diagram

- Parties
  → green
- RRRs
  → yellow
- Spatial Units
  → blue
- Surveying
  → pink
- Mapping
  → violet

RRR supports
all land rights

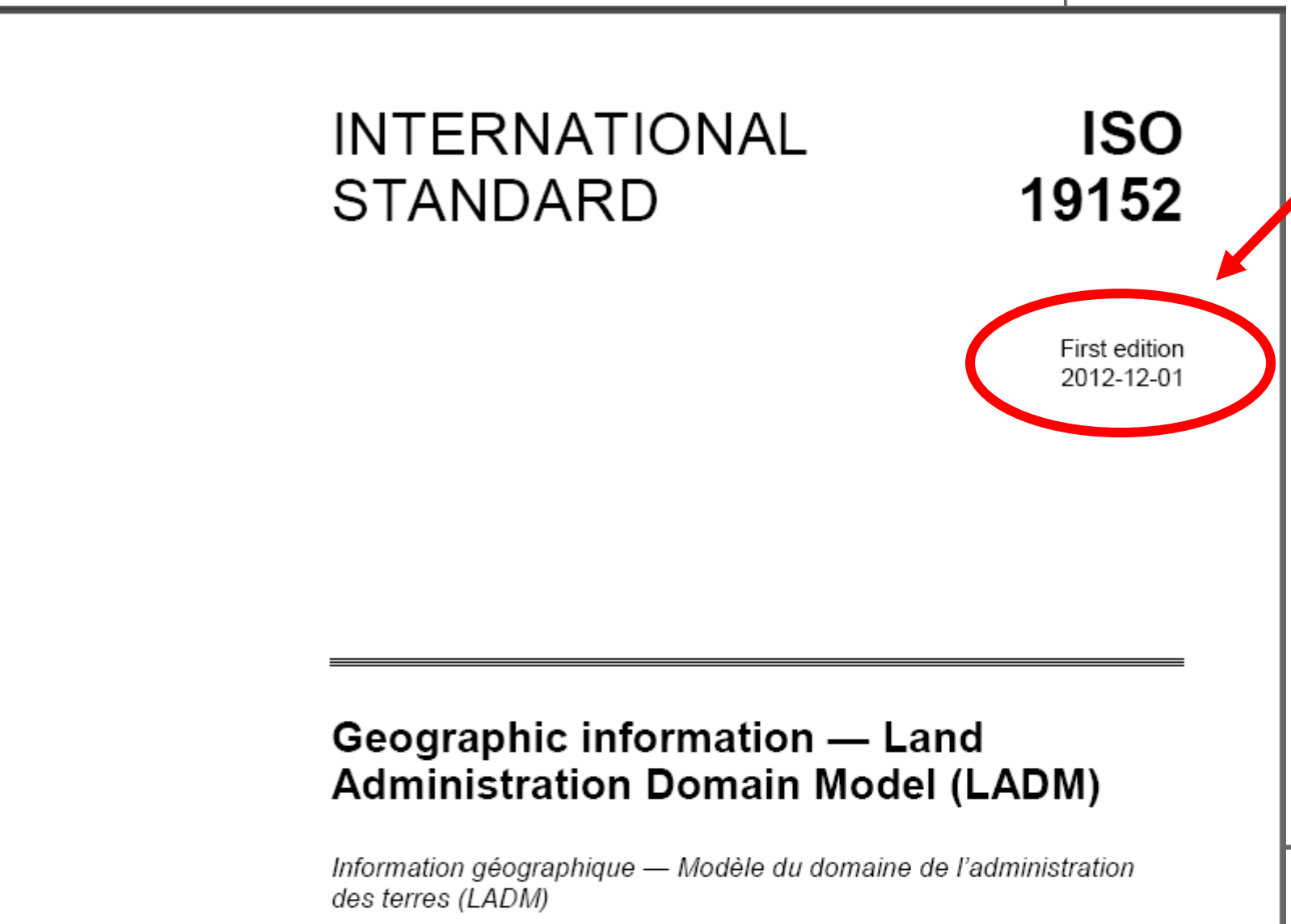


3D Land Administration, prototype QLD



http://pakhuis.tudelft.nl:8080/edu/Cesium-1.43/Apps/3dcad/

Published on 1 December 2012..

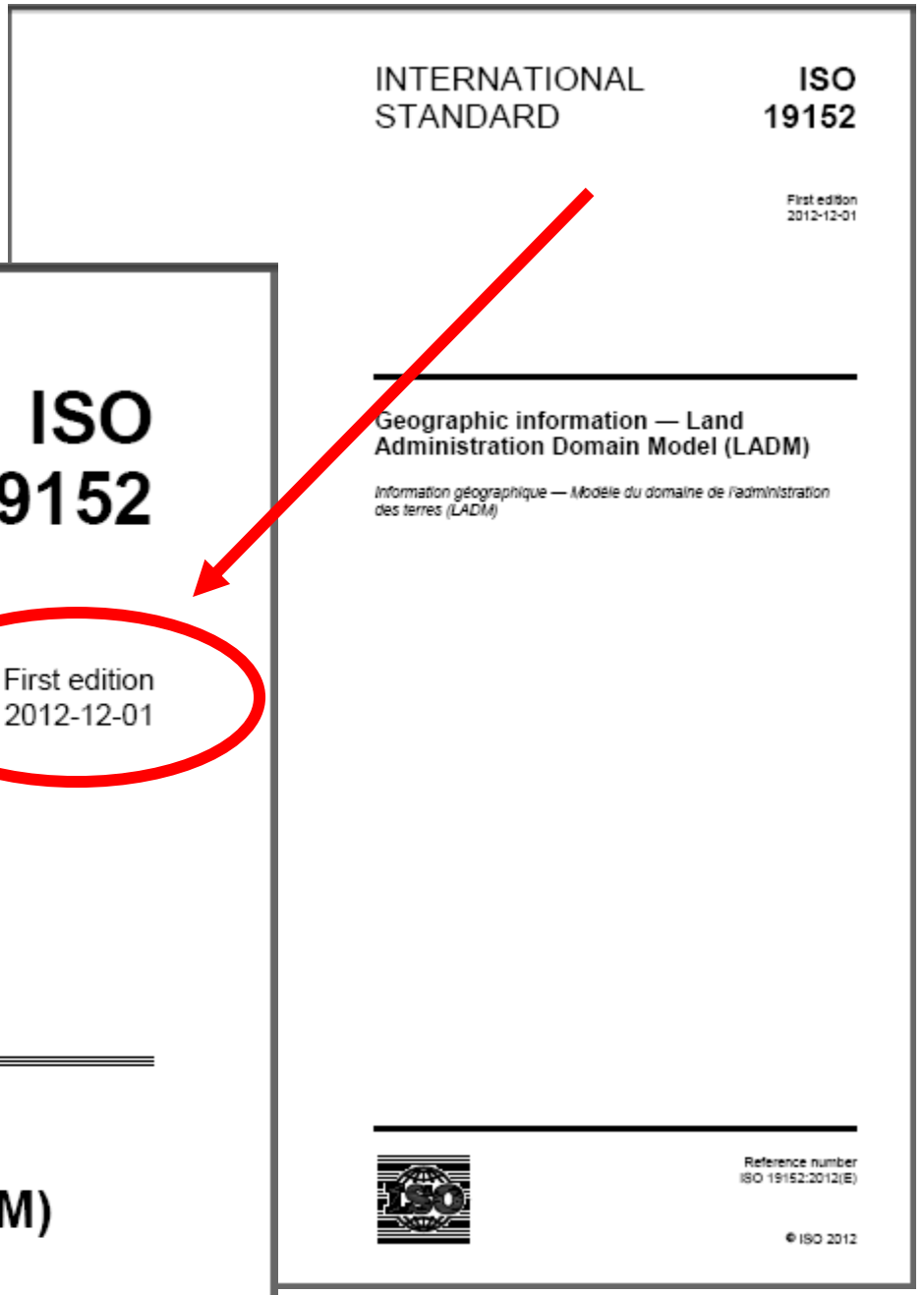

INTERNATIONAL STANDARD

ISO 19152

First edition 2012-12-01

Geographic information — Land Administration Domain Model (LADM)

Information géographique — Modèle du domaine de l'administration des terres (LADM)


INTERNATIONAL STANDARD

ISO 19152

First edition 2012-12-01

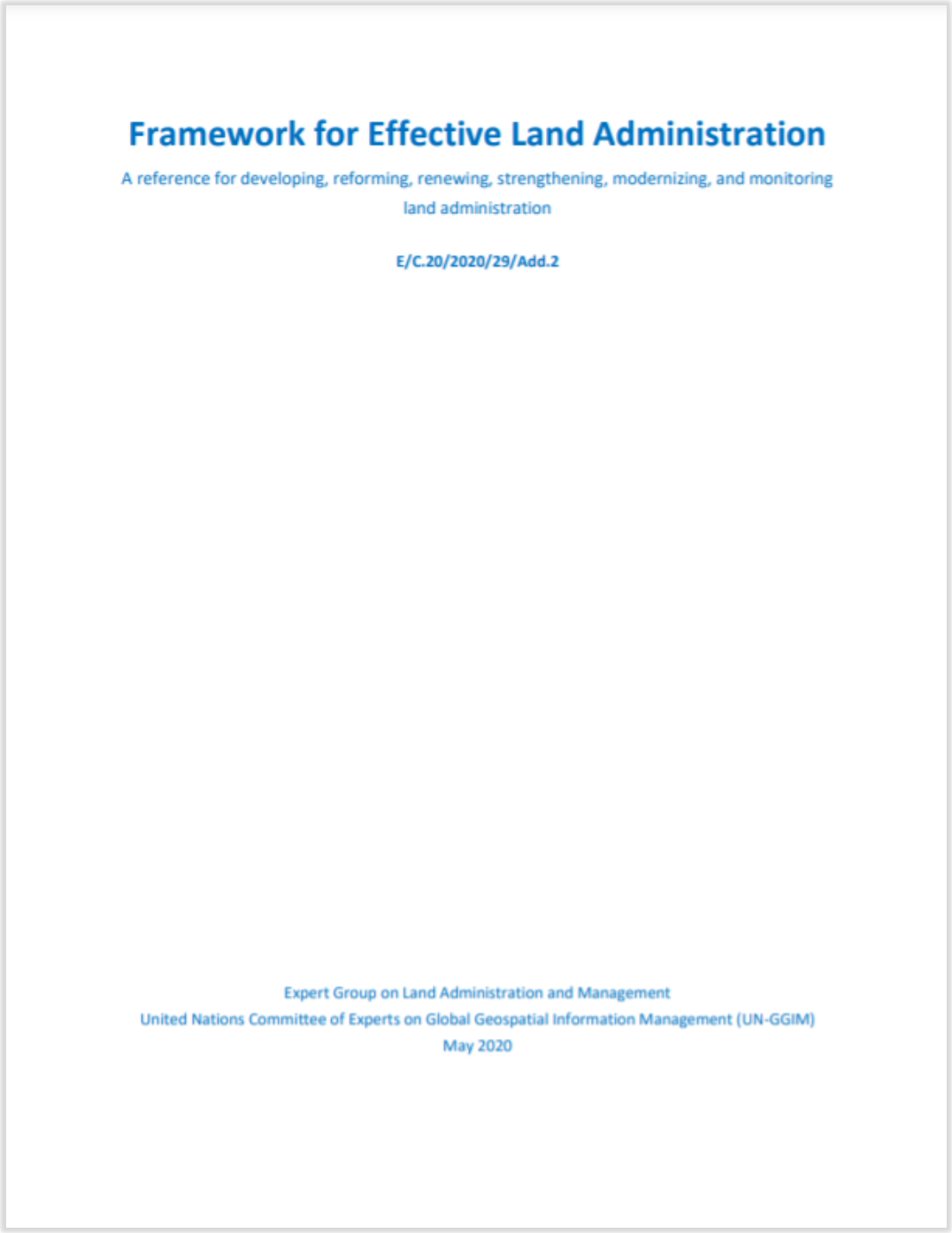
Geographic information — Land Administration Domain Model (LADM)

Information géographique — Modèle du domaine de l'administration des terres (LADM)

Reference number ISO 19152:2012(E)

© ISO 2012

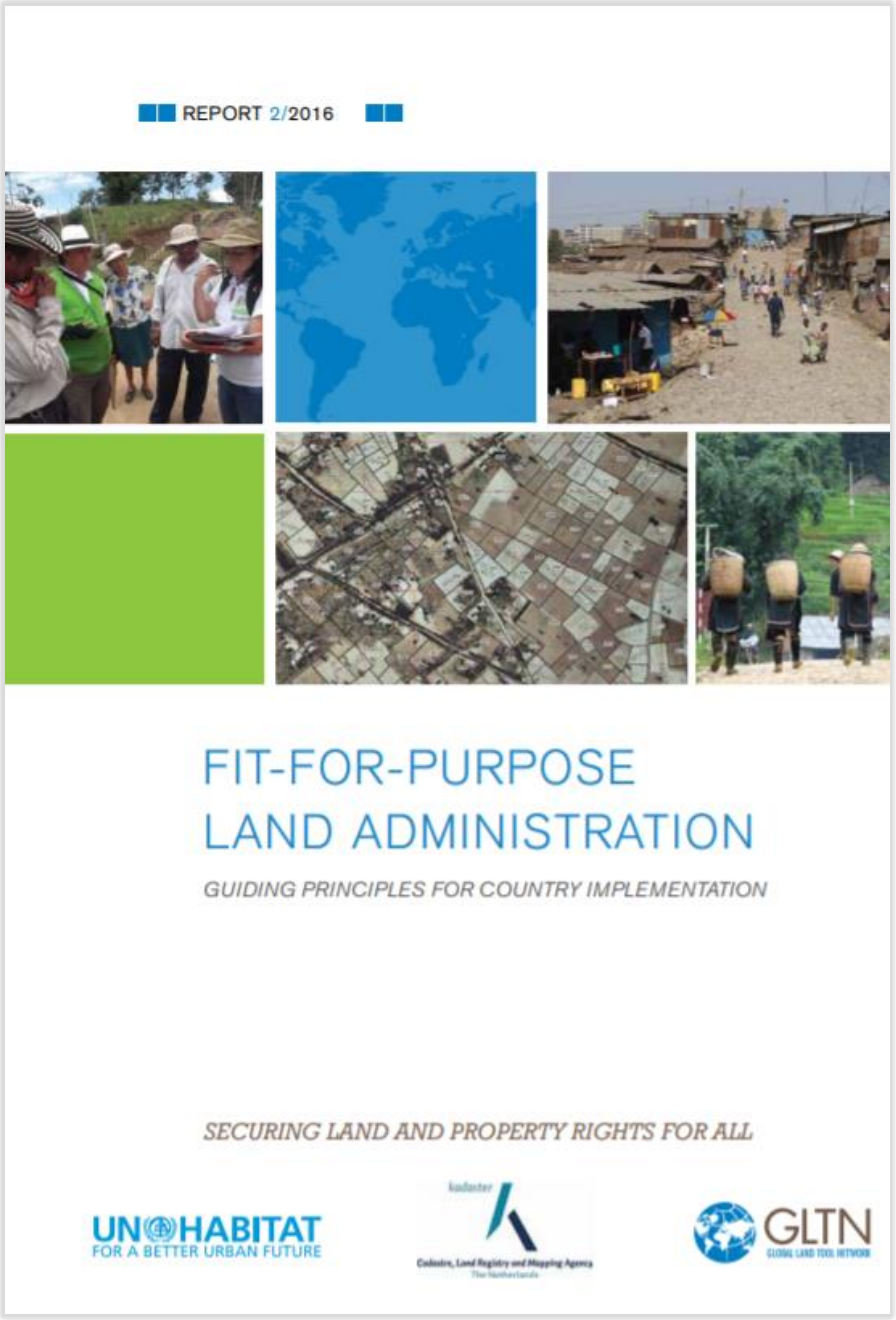
Revision has started…



UN-GGIM's FELA:

'Availability, accessibility, and interoperability of the land data are also necessities for effective land administration. LADM ISO 19152 (Land Administration Domain Model) and IHO S-121 (Maritime Limits and Boundaries) provide starting points for creating these qualities'

Note in the revision of LADM, IHO S1-12 is based on LADM

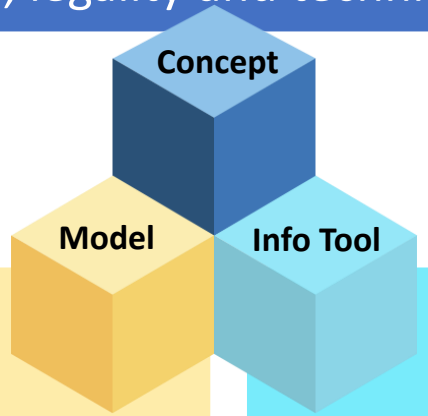


UN-HABITAT/GLTN and Kadaster's FFP LA:

'In order to assure an easy and adaptable interoperability layer with other stakeholders, the data model chosen for the FFP Land Administration system should be based on (ISO 19152:2012) - Land Administration Domain Model (LADM) and the derived Social Tenure Domain Model (STDM)'

Social Tenure Domain Model (STDM)

Bridging the gap to represent all people-to-land relationships independent of the level of formality, legality and technical accuracy.

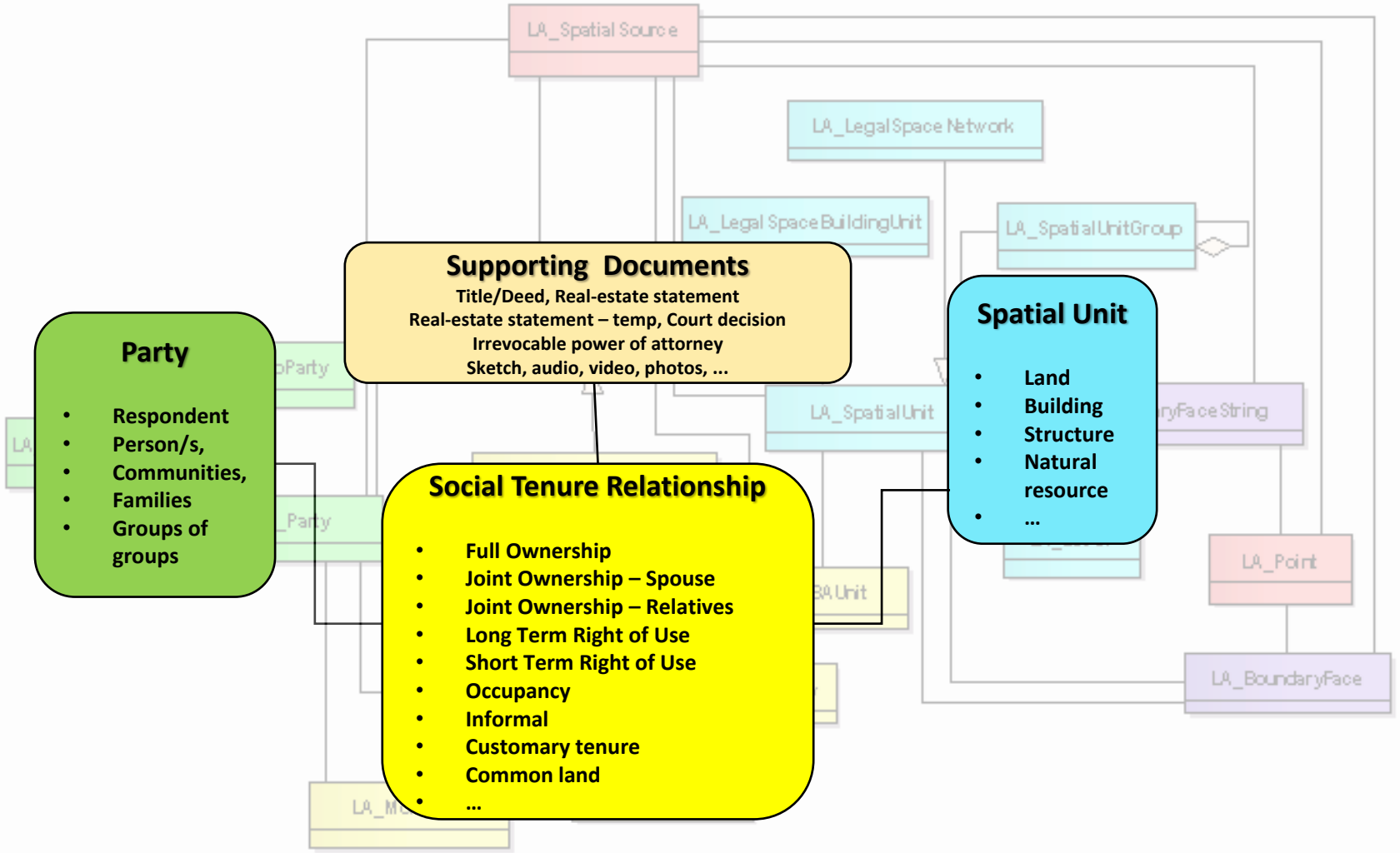


It is a 'specialisation' of the ISO 19152 Land Administration Domain Model (LADM)

It provides the front-end interface for applying the STDM Concept and Model

Source: Eva-Maria Unger, Kadaster, the Netherlands
John Gitau, UN-Habitat, Global Land Tool Network

STDM Model



Source: Eva-Maria Unger, Kadaster, the Netherlands
John Gitau, UN-Habitat, Global Land Tool Network

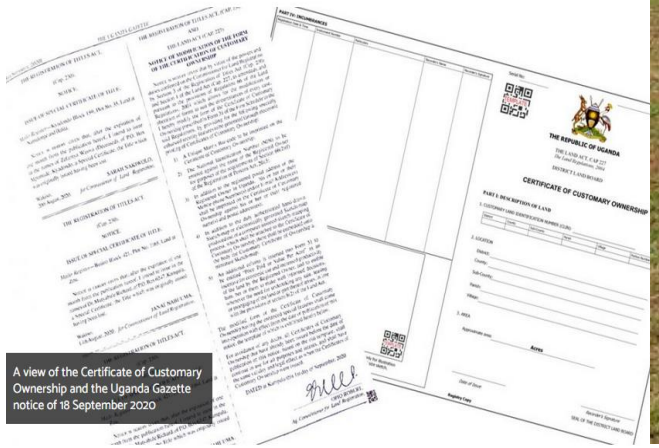
What does that actually mean?

FEATURED • NEWS

Uganda Moves to Digital Certificates of Customary Ownership to secure land rights and improve land use

2,245 Views 3 Min Read

s and Mrs. Nyesigire Sarah from Kabale District
ate of Customary Ownership issued under the
ded by the Netherlands Government



A view of the Certificate of Customary Ownership and the Uganda Gazette notice of 18 September 2020

- Source: THE APPLICATION OF SOCIAL DOMAIN MODEL TOOL (STDM) IN DOCUMENTING CUSTOMARY LAND RIGHTS IN UGANDA, UN-Habitat, 3rd May 2023

Framework for Effective Land Administration

Sustainable development demands effective land administration

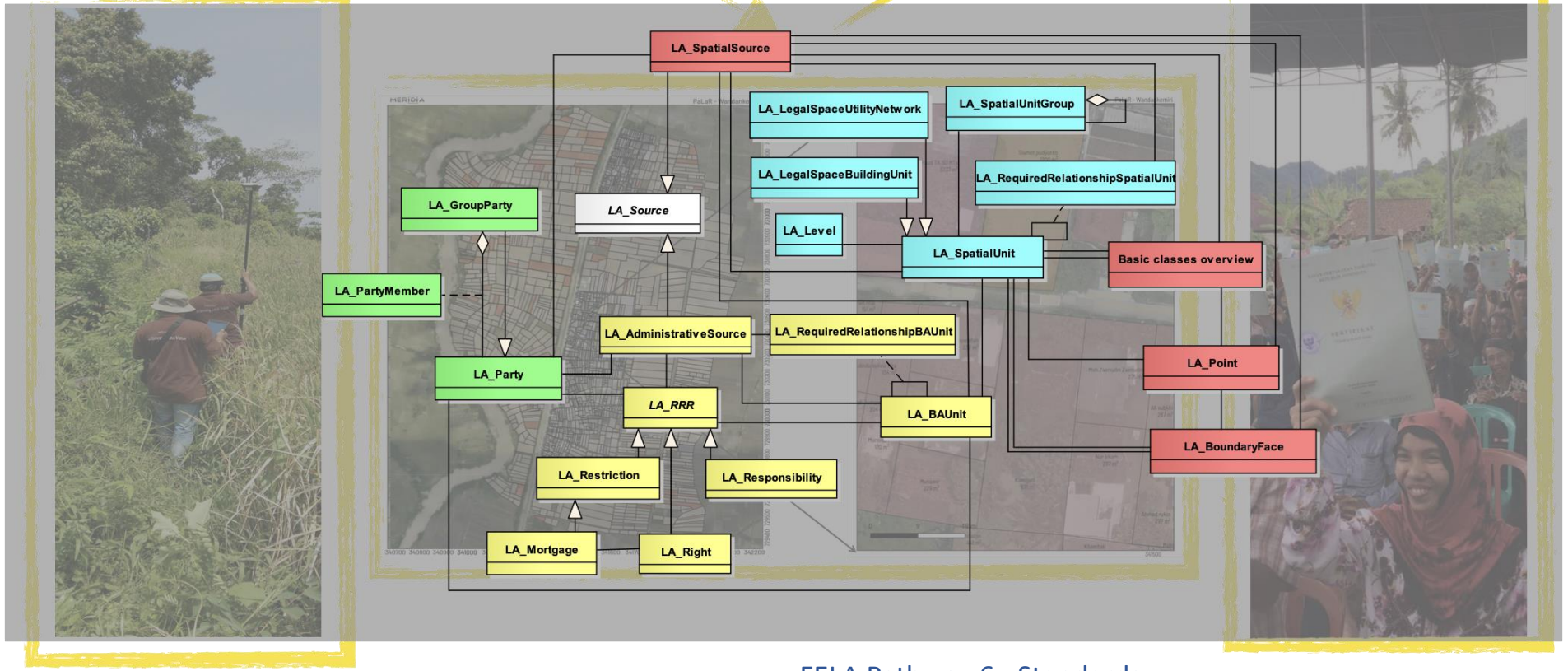
How do we get from the data collection in the field - to a map - to a system - to a title which is registered?

FELA Pathway 6 - Standards
Presented by: Dr. Eva-Maria Unger, Kadaster, the Netherlands at CONFCAT2022

Framework for Effective Land Administration

Sustainable development demands effective land administration

How do we get from the data collection in the field - to a map - to a system - to a title which is registered?

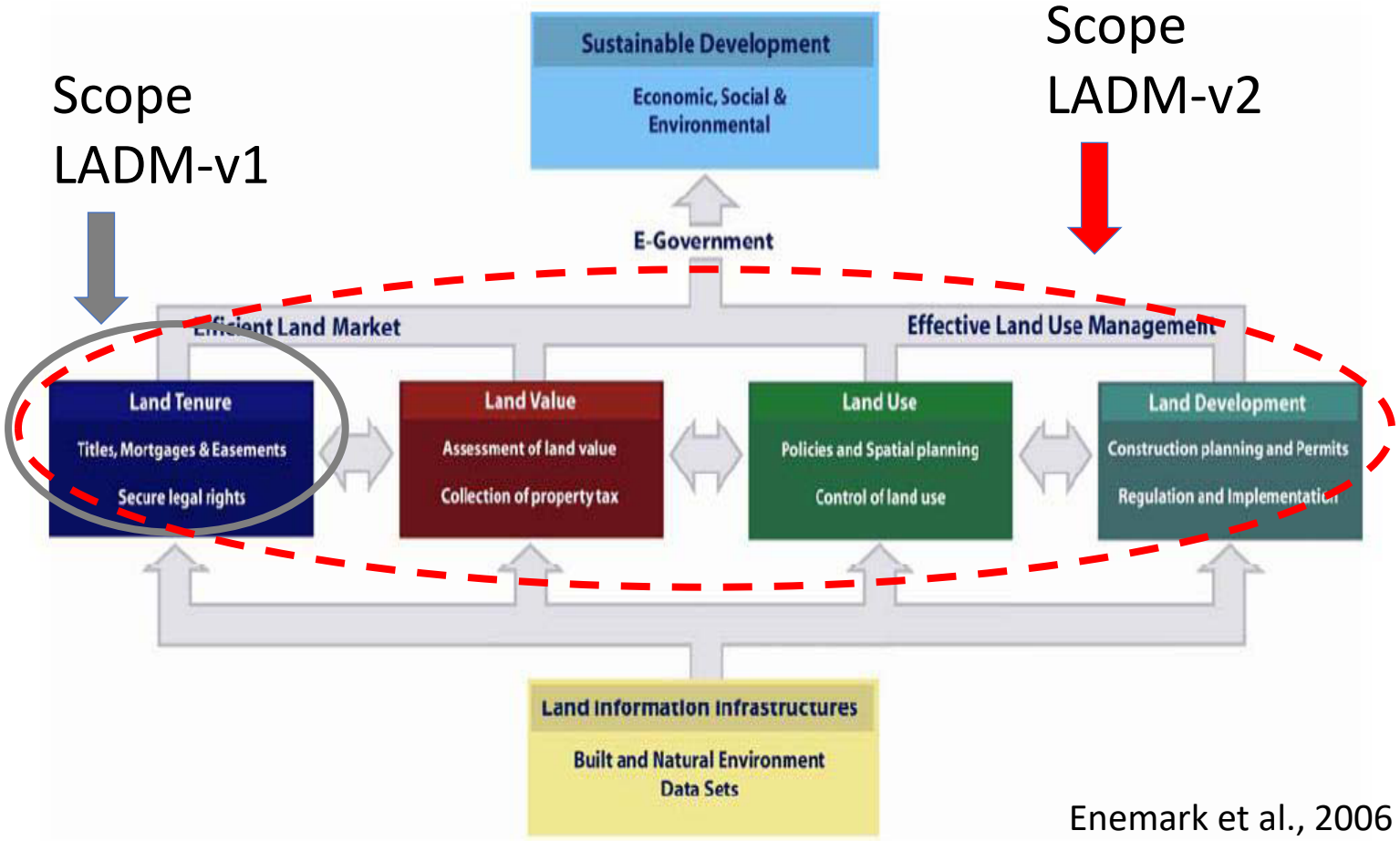


Land Administration, all functions covered?

process of recording and disseminating information about:

- Ownership [RRRs]
- value
- [planned] use of land and associated resources

UN-ECE, 1996



Enemark et al., 2006

LADM Edition II is a multi part

ISO standards periodically revised (based on member state requirements)

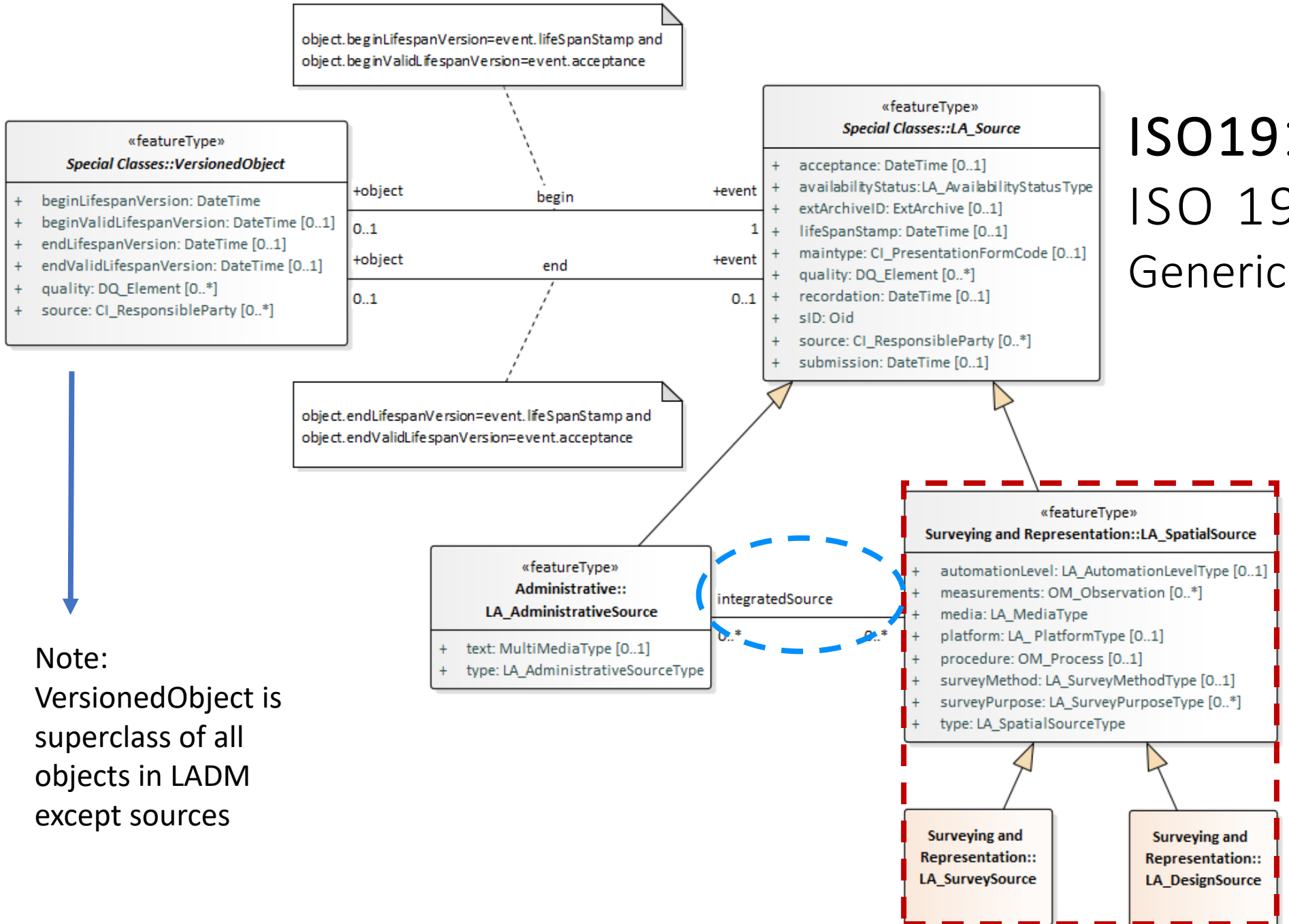
- Part 1 – Generic Conceptual Model
- Part 2 – Land Registration
- Part 3 – Marine Georegulation (IHO S-121)
- Part 4 – Valuation Information
- Part 5 – Spatial Plan Information
- Part 6 – Implementation Aspects

Scope current version LADM 2012

Work in progress ISO TC211

→ OGC first, sync with ISO TC211

ISO19152 Part 1
ISO 19152 LADM
Generic Conceptual Model



Note:
VersionedObject is superclass of all objects in LADM except sources

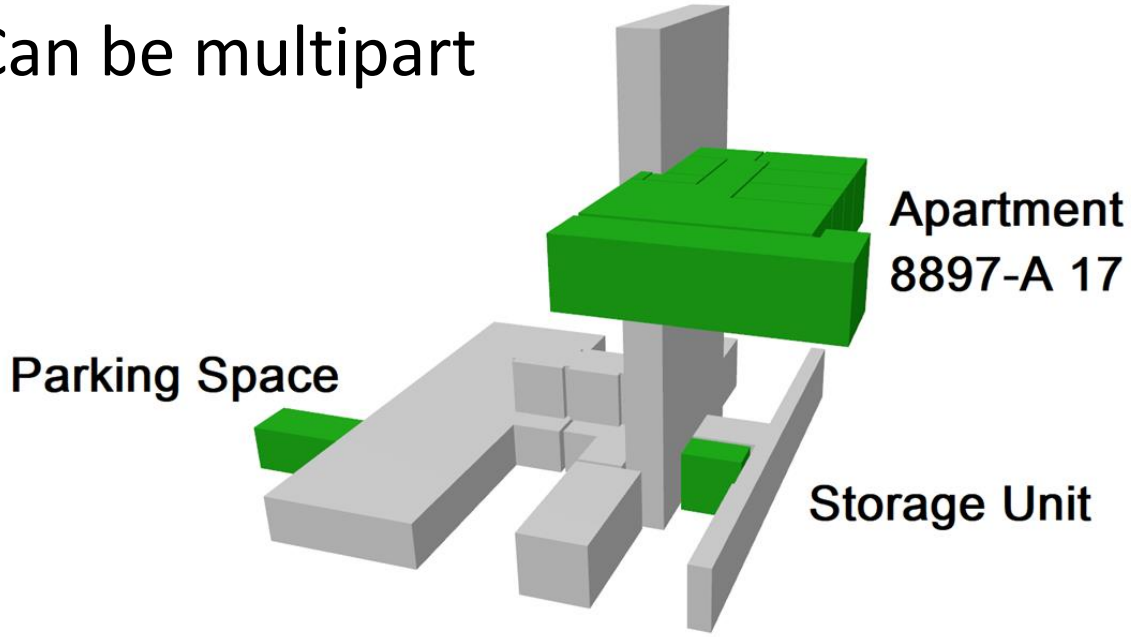
Bi-temporal model introduced:
- Real world (valid)
- System time

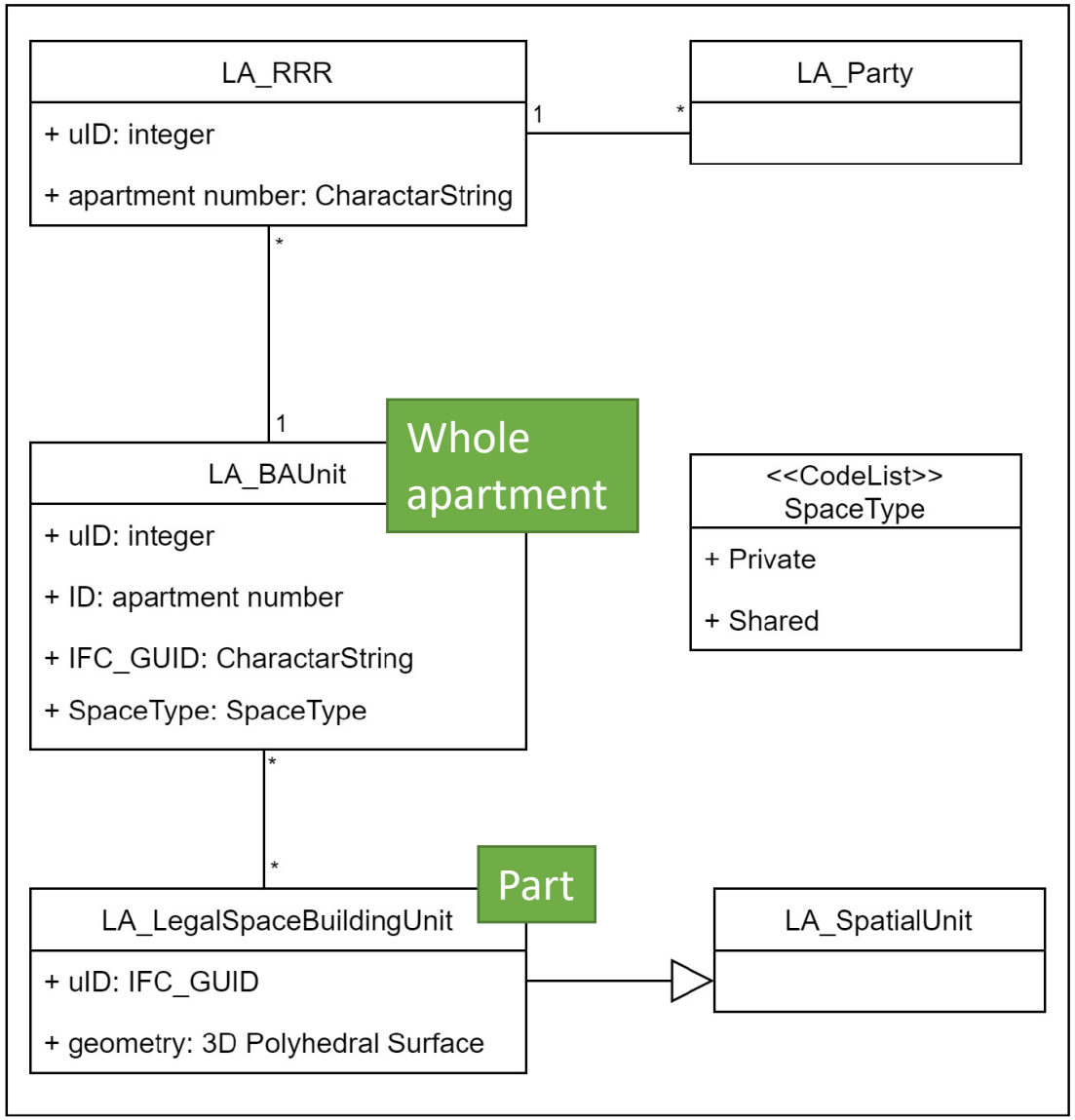
Option to integrate Administrative and Spatial sources

Survey and design spatial sources

LADM Part 2 Extraction of Legal Spaces from building designs

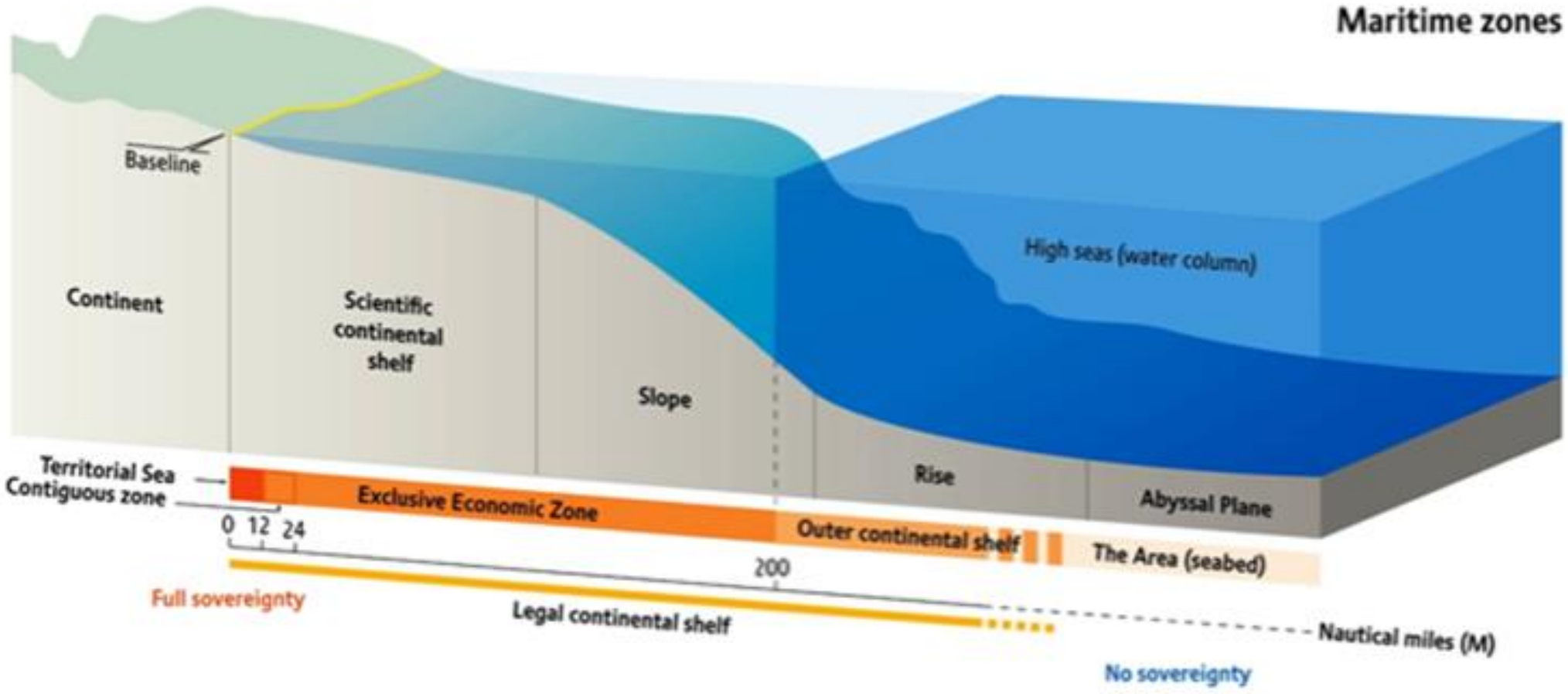
- Map BIM/IFC (Building Information Models/Industry Foundation Class) ISO 16739-1:2024 to LADM
- Can be multipart



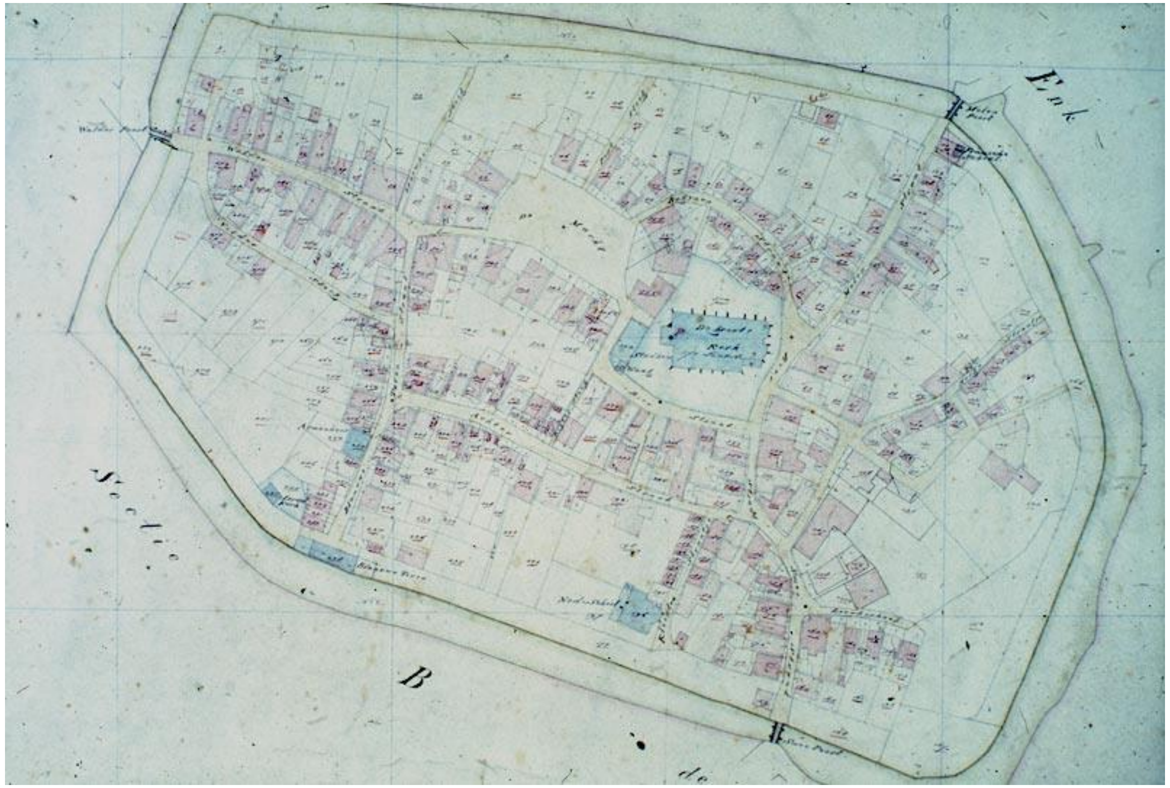


http://pakhuis.tudelft.nl:8080/edu/cesium/apps/bimlegal/

LADM part 3 and IHO S-121 (International Hydrographic Office)

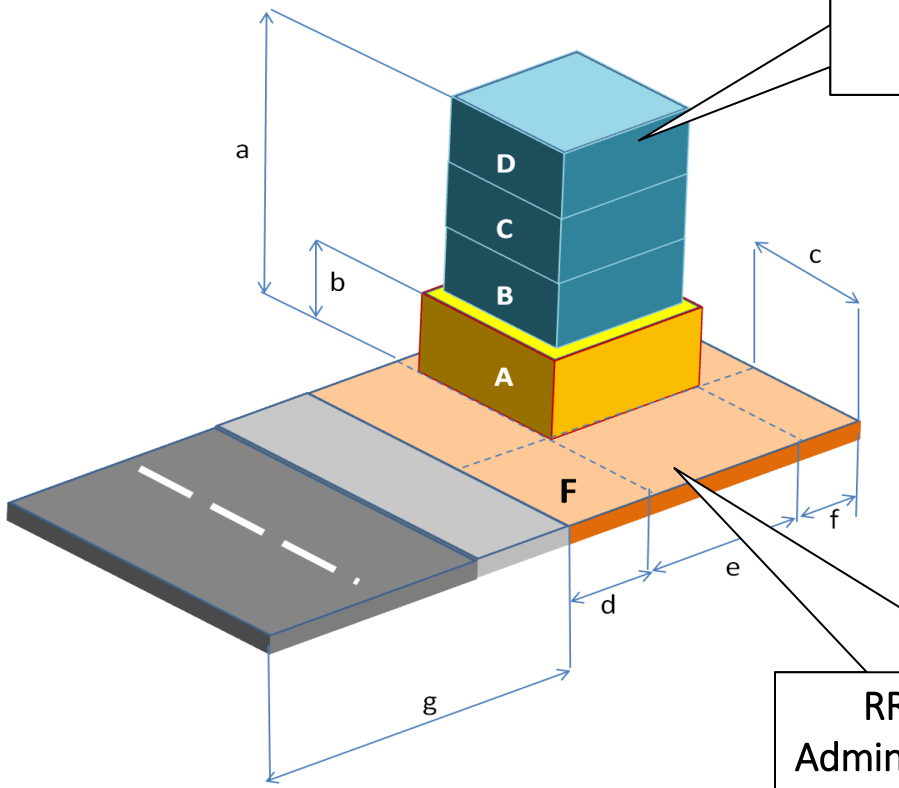


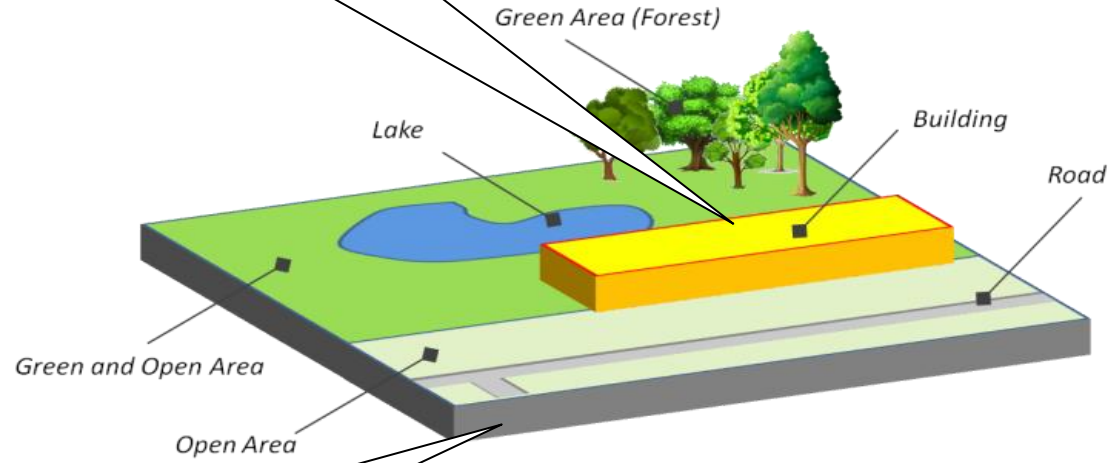
LADM part 4 Valuation Information
(for Taxation and other purposes)



LADM Part 5 Spatial plan information
(as part of complete land administration)

RRR governed by Spatial Planning Regulation and Policy





RRR governed by Land Administration Regulation and Policy

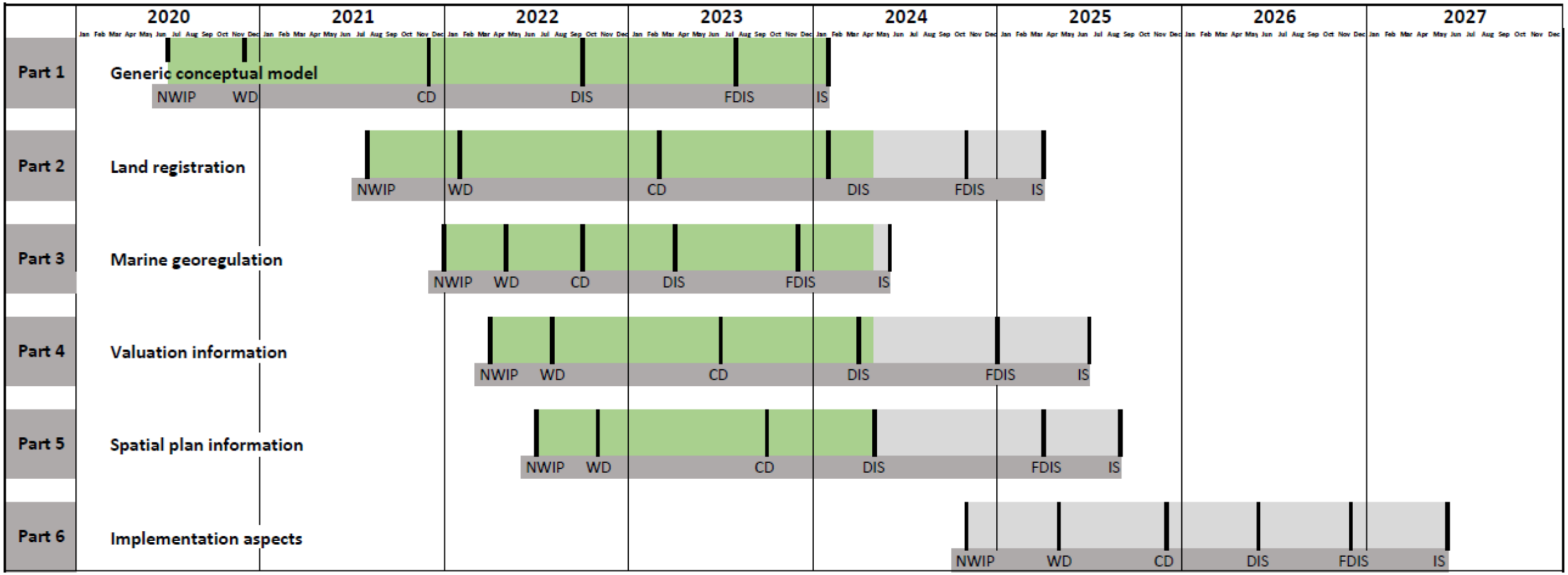
Spatial planning regulates total height of a building on a parcel

Spatial planning regulates ratio of the land use over an area

Source: Agung Indrajit

LADM Edition II – Current Status at ISO

(as of May 2024)



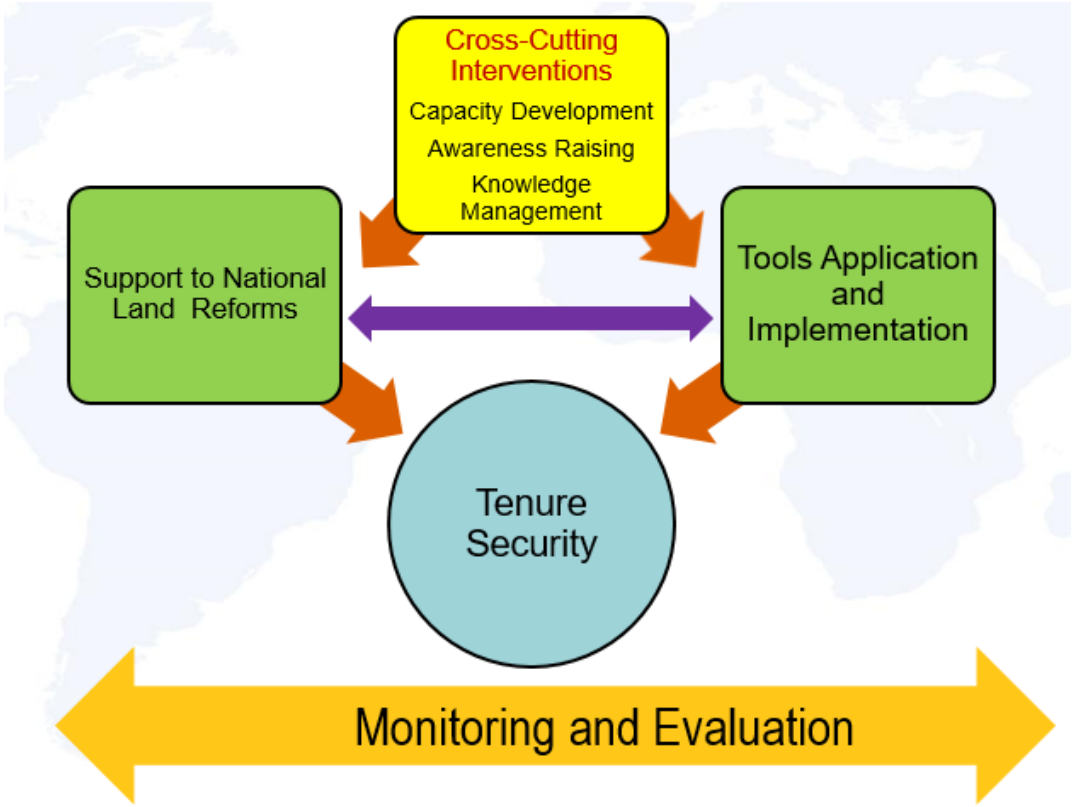
LADM supported by industry

- Esri
  https://storymaps.arcgis.com/stories/b8c187c1864344ffab21e9eaf638a6b4
- Trimble
  https://ffp.trimble.com/
- Innola Solutions
  https://innola-solutions.com/
- IGN FI
  https://www.ignfi.fr/en/administration-fonciere/

LADM Country Profiles & Implementations

Bénin	India	Russian Federation
Brazil	Indonesia	Saudi Arabia
Cape Verde	Israel	Scotland
Chile	Japan	Serbia
China	Kenya	Singapore
Colombia	Malaysia	Slovenia
Croatia	Mongolia	South Africa
Cyprus	Montenegro	South Korea
Czech Republic	Morocco	The Netherlands
Ecuador	Mozambique	Trinidad and Tobago
Ethiopia	Nigeria	Turkey
Finland	Poland	Uganda
Greece	Portugal	Victoria, Australia
Honduras	Queensland, Australia	Vietnam
Hungary	Republic of Srpska	

STDM Implementations

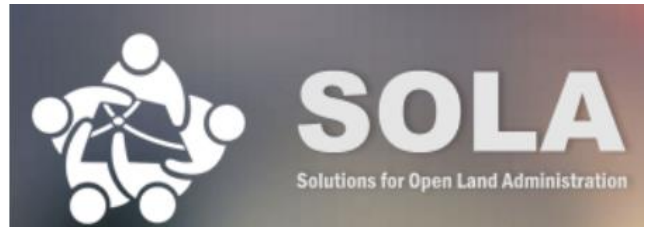


1. Democratic Republic of the Congo
2. Iraq
3. Jordan
4. Kenya
5. Lao PDR
6. Lebanon
7. Libya
8. Namibia
9. Nepal
10. Palestine
11. Philippines
12. South Sudan
13. Syria
14. Tunisia
15. Uganda
16. Yemen
17. Zambia

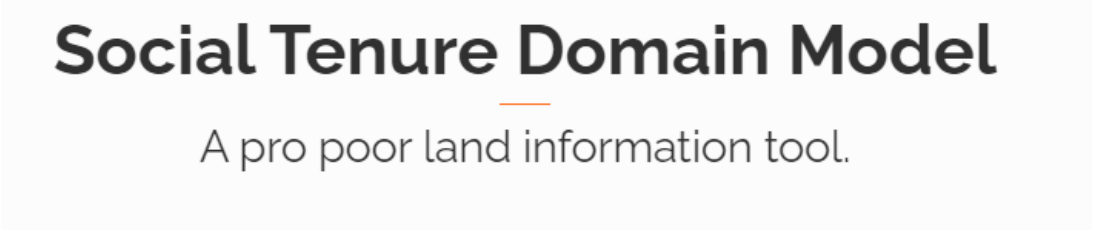
Source: Eva-Maria Unger, Kadaster, the Netherlands
John Gitau, UN-Habitat, Global Land Tool Network

STDM, MAST, SOLA/OpenTenure,..

Next to STDM also MAST and SOLA/OpenTenure have a LADM Compliant Database
https://www.fao.org/tenure/sola-suite/about/ru/



Mobile Applications to Secure Tenure (MAST)



OGC Standard Working Group (SWG) LADM

Challenge: LADM (parts 1-5) ‘only’ provides a conceptual model

→ many different implementations, not interoperable, not efficient

Solution: implementations standards (joint ISO TC211/OGC) to

- Assist LADM implementing community
- Improve actual/technical interoperability
- Decrease implementation cost

Open Geospatial Consortium

(voting within OGC on this proposed SWG ends 24 May’24)

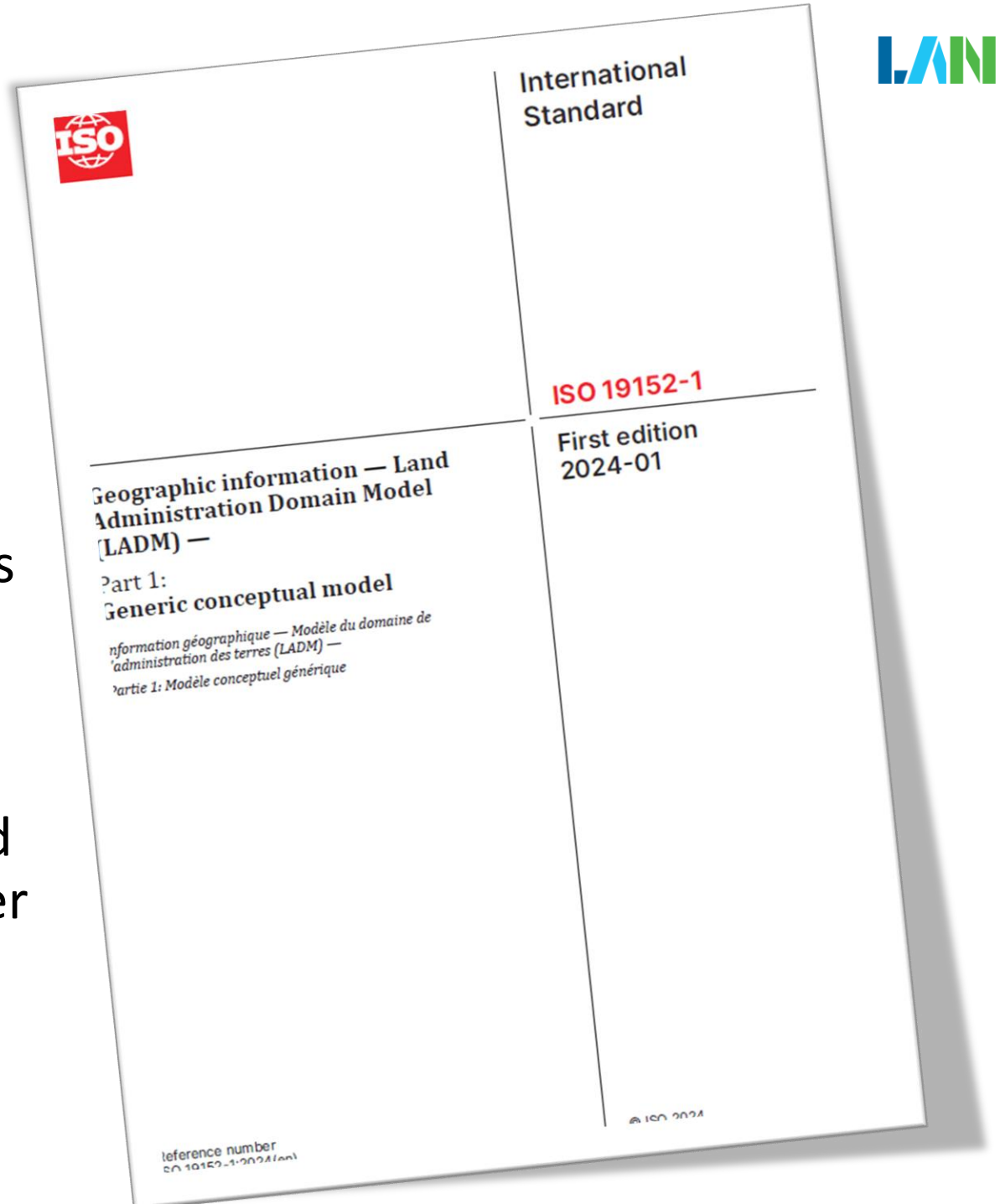
LADM Edition II Part 6: Implementation Aspects

OGC SWG LADM components:

1. Methodology for developing a country profile
2. Technical model / encodings (LD, JSON, GML, INTERLIS, IFC, ..)
3. Management and maintenance of semantically rich code list values (possible SKOS)
4. Procedures / workflows (land registry, marine georegulation, valuation information, spatial plan information)

To conclude

- Integrated conceptual model of various land administration functions: land registry, marine georegulation, valuation and spatial plan information
- Country profiles, implementations, and industry support is growing, but not per se interoperable
- Support/finance needed for OGC innovation initiative for LADM part 6



Mark your calendar!!

Call for papers

Joint International Conference

- FIG Commission 5 Annual Meeting,
- FIG Commission 7 Annual Meeting,
- FIG Land Administration Domain Model (LADM) and 3D Land Administration (LA),
- UN-Habitat Social Tenure Domain Model (STDM),
- Geoinformation Week 2024, and
- Pre-conference Tutorial (23rd Sept) & Exhibition

Dr. Ryan Keenan,
President FIG Commission 5

Assoc. Prof Dr. Rohan Bennett,
President FIG Commission 7

Prof Dr. Peter van Oosterom,
Chair FIG LADM & 3D LA

John Gitau,
Programme Management Officer, UN-Habitat

Prof Dr. Alias Abdul Rahman,
Chair Geoinformation Week
Co-chair FIG LADM & 3D LA

UTM UNIVERSITI TEKNOLOGI MALAYSIA

TU Delft Delft University of Technology

3D Land Administration

FIG

GLTN GLOBAL LAND TOOL NETWORK

UN-HABITAT

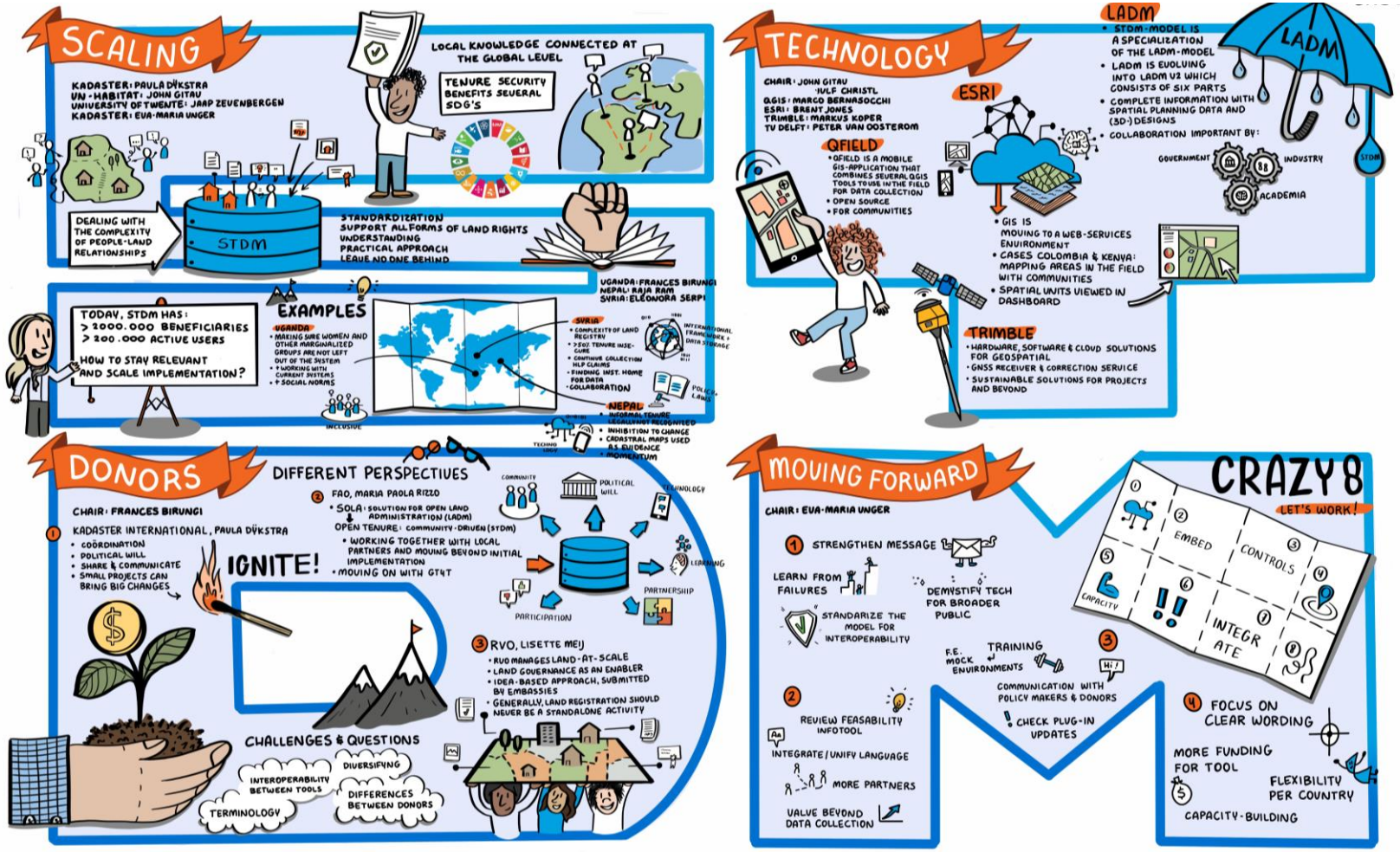
Date : 24th – 26th September 2024

Venue : Riverside Majestic Hotel,
Jalan Tunku Abdul Rahman, 93756, Kuching, Malaysia

Conference website:
https://geoinfo.utm.my/geoweek/

Social Tenure Domain Model
Industry Workshop

OCTOBER 5 2023



Graphic: Sophie Druif, (2023), STDM Industry Workshop October 2023, Enschede, the Netherlands

FACILITATED BY:
UN-HABITAT FOR A BETTER URBAN FUTURE
GLTN GLOBAL LAND TOOL NETWORK
kadaster

Source: Eva-Maria Unger, Kadaster, the Netherlands
John Gitau, UN-Habitat, Global Land Tool Network

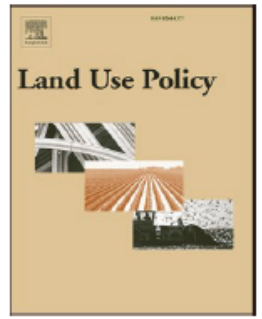
Further reading

Land Use Policy 137 (2024) 107003

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol



Design of the new structure and capabilities of LADM edition II including 3D aspects

Abdullah Kara [a], Christiaan Lemmen [b,*], Peter van Oosterom [a], Eftychia Kalogianni [a], Abdullah Alattas [c], Agung Indrajit [d]

[a] Faculty of Architecture and the Built Environment, Delft University of Technology, Julianalaan 134, 2628 BL Delft, the Netherlands
[b] Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente, P.O. Box 217, 7500 AE Enschede, the Netherlands
[c] Department of Geomatics, Faculty of Architecture and planning, King Abdulaziz University, P.O. Box 80210, Jeddah 21589, Saudi Arabia
[d] Ministry of National Development Planning/National Development Agency of the Republic of Indonesia, Jakarta, Indonesia

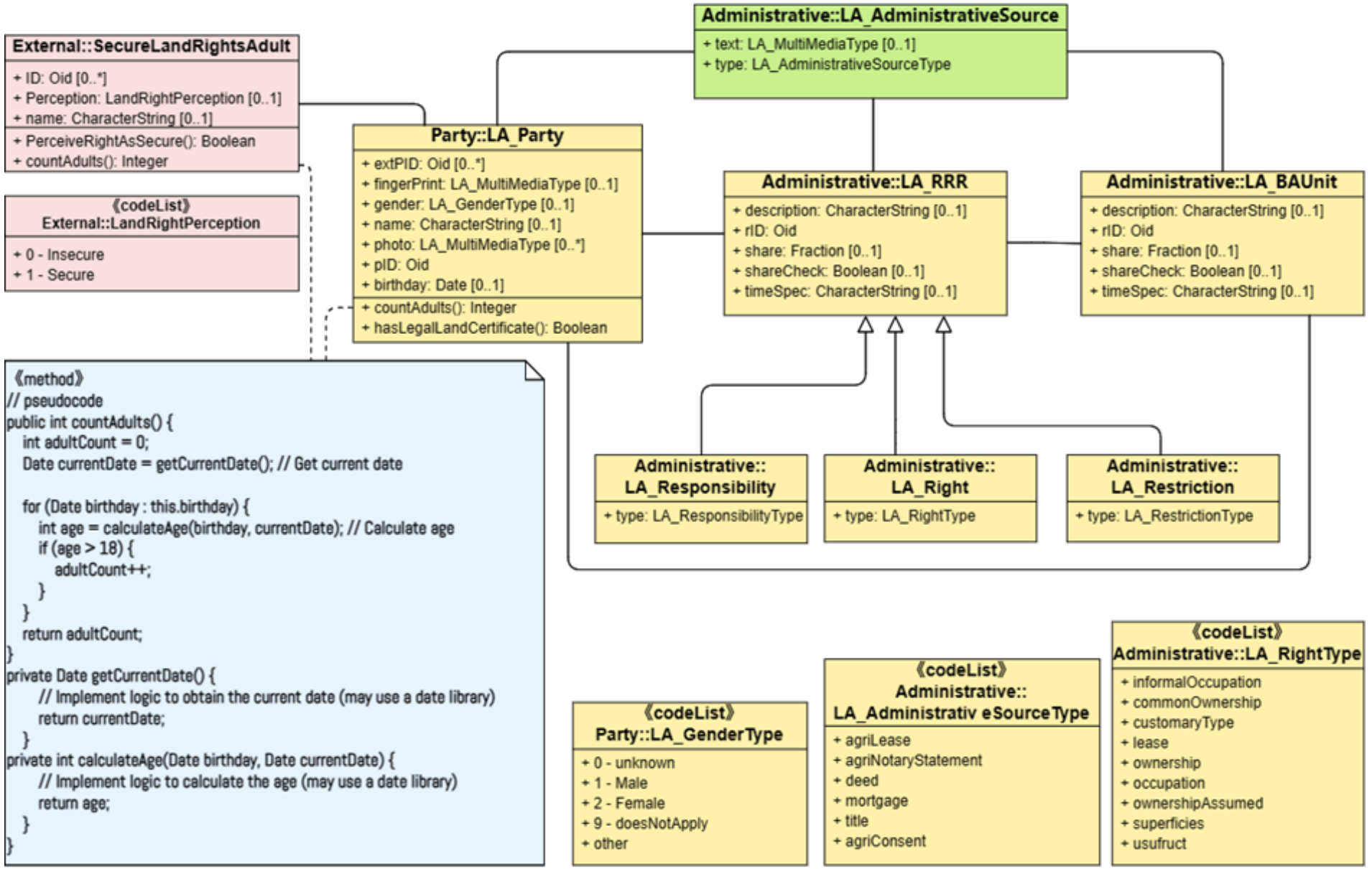
Open access link: http://dx.doi.org/https://doi.org/10.1016/j.landusepol.2023.107003

Sustainable Development Goals
Future LADM Part 6, support for SDG indicator computation

Source: United Nation

- **Broad scope – 17 goals**
- **Comprehensive**
  - 169 targets
  - 248 indicators
- **Land's Crucial Role in SDGs**
  - Environment
  - food security
  - economic development
  - Urbanization
  - climate change
- **Indicator specification in metadata (text), ambiguous**
- **Use of ISO standards sharpens specification**
- **Also: easy computation**

Formalized modelling of SDG Indicators



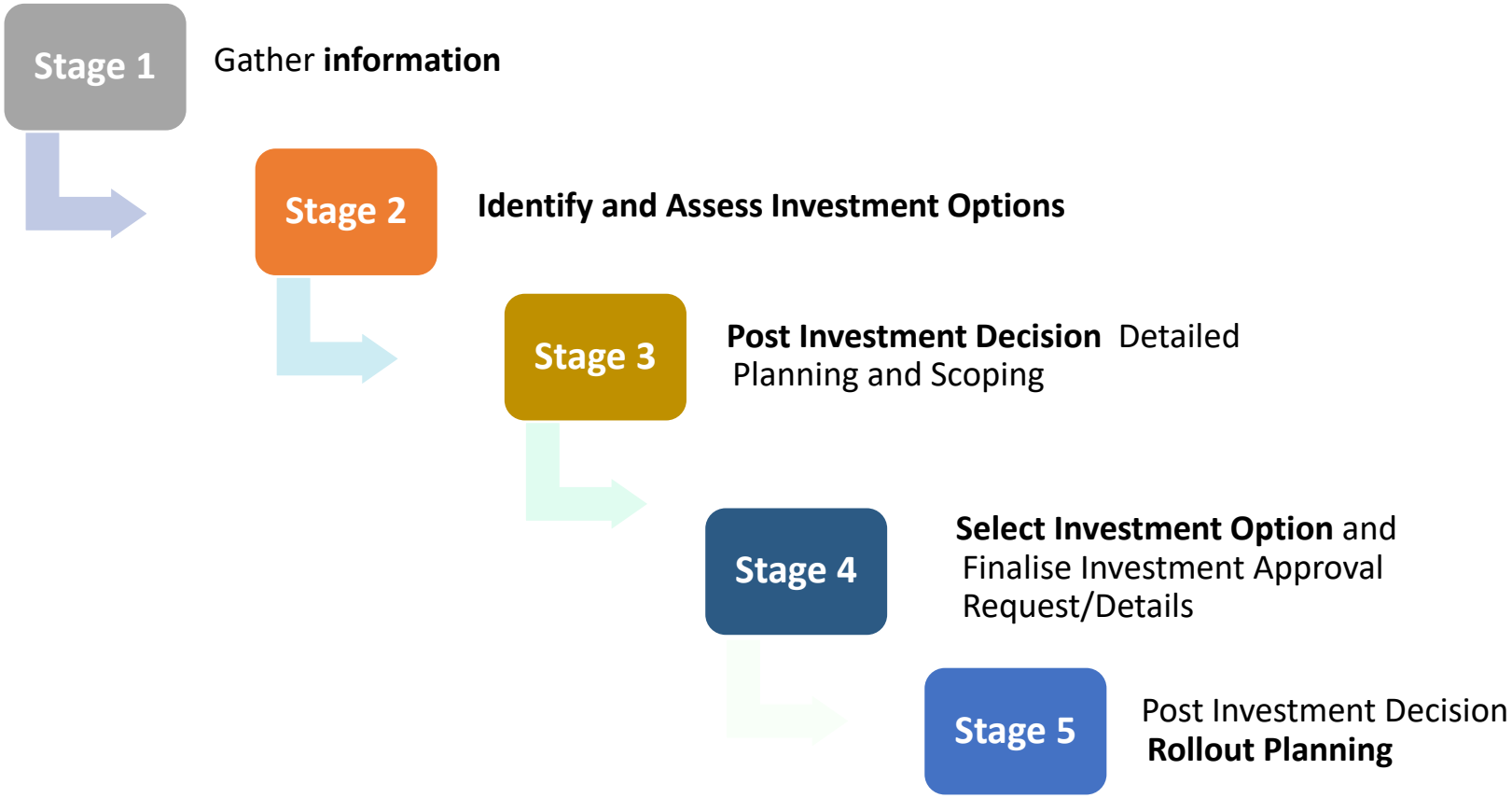
Example Indicator 1.4.2 : ‘Proportion of total adult population with secure tenure rights to land ..’

Mengying Chen, Peter Van Oosterom, Eftychia Kalogianni, Paula Dijkstra, Christiaan Lemmen, Bridging Sustainable Development Goals and Land Administration: The Role of the ISO 19152 Land Administration Domain Model in SDG Indicator Formalization, In: Land, MDPI AG, 13(491), pp. 27, 2024. https://doi.org/10.3390/land13040491

How to best design land records and transaction system reform projects?

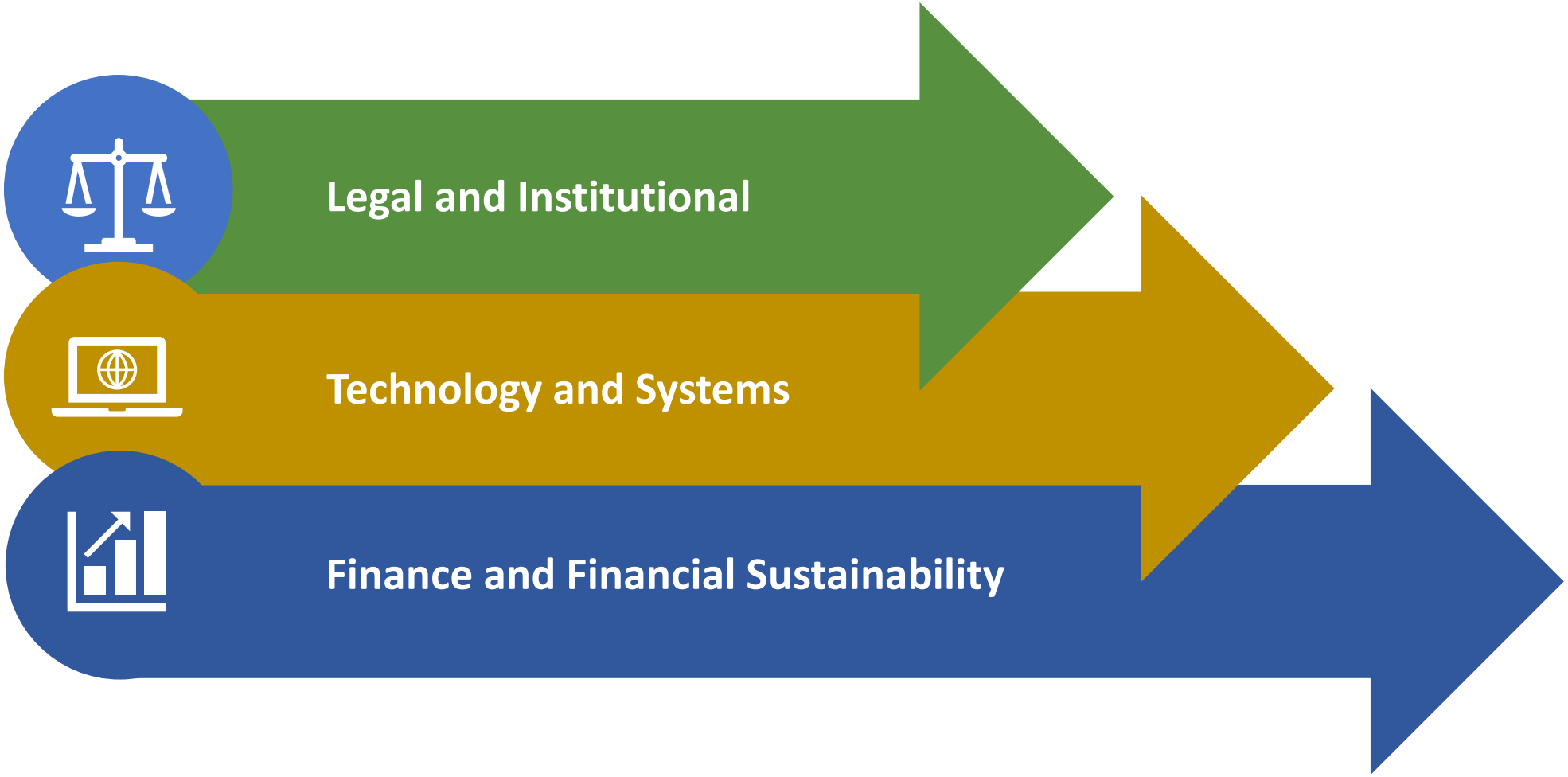
What level of technology is the right level of technology?

What is in the LRTS Toolkit?



What does the LRTS Toolkit look like?

Stage One: Gather Information



Using the LRTS Toolkit

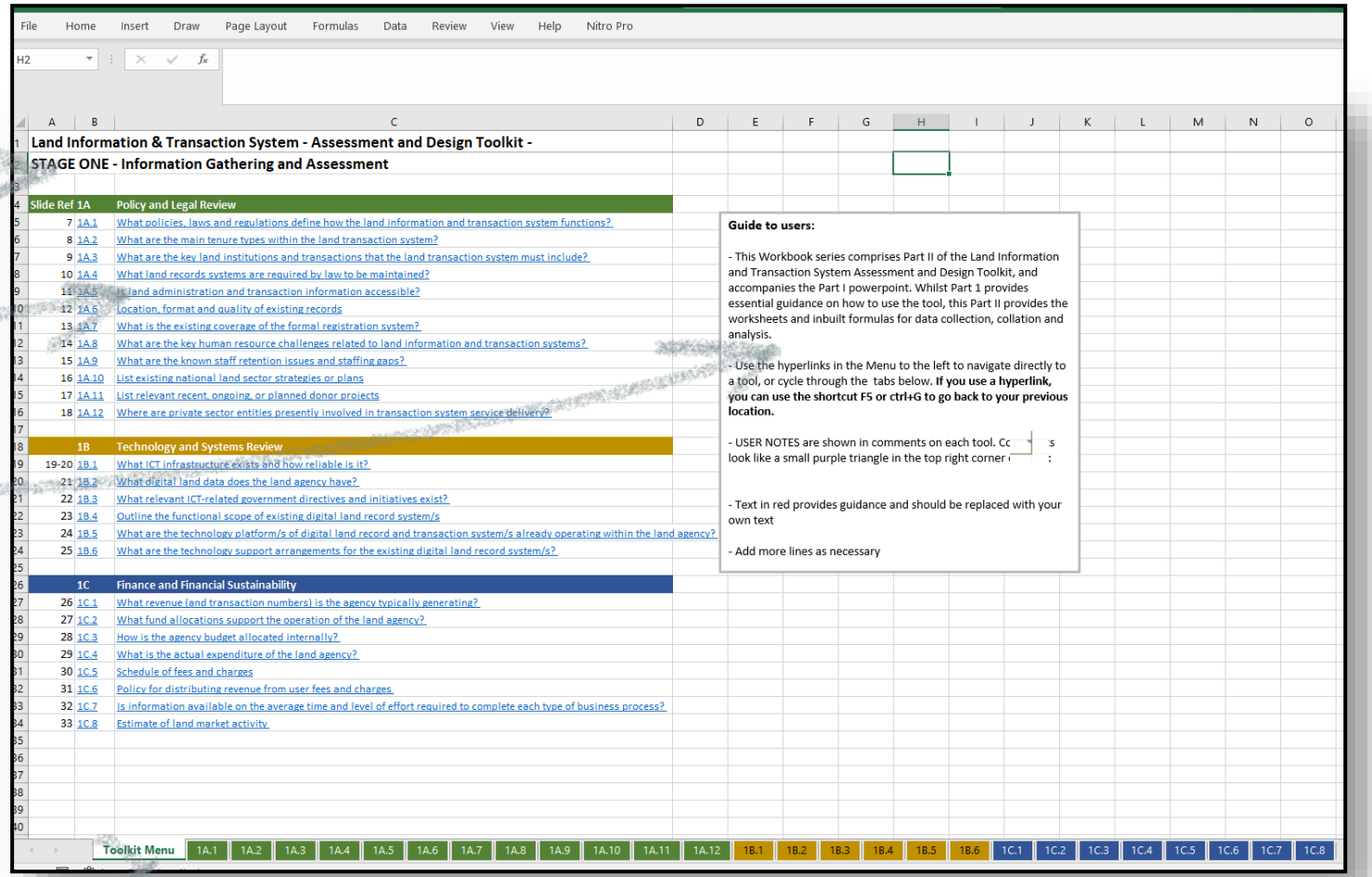
Part II contains individual tools in MS Excel tabs, with navigation shown as below:

Heading and stage

Tools

Guidance

Each tab contains one tool



What policies, laws and regulations define how the land records and transaction syst

Guiding statement

To make an investment, we need to know the extent to which
legal framework will support or hinder proposed changes. Thi

- Captures the main policies, laws and regulations that are
to the land records and transaction system; and
- Identifies whether there are obvious gaps that may need to be addressed prior to, or during an. investment.

It is not intended to be a comprehensive legal review, but should identify whether a further review is necessary as a prerequisite to any investment

Considerations

ing out the table, consider:

here fundamental gaps in the legal framework that must be
essed prior to deciding on and/or making the investment?

- Is a larger legal review necessary?
- Does the legal framework, after a cursory examination, provide a reasonable basis for moving forward with the investment?

List relevant laws

A- Land Act 2023
B- Survey Act 2023
C- eGovernment Act 2023
D- Cadastral Survey Regulations 2023

Inputting details

What laws, policies or other documents:	Ref	Are t	obvious gaps (Y/N, describe)
and safeguard rights to land?	E.g. A		
			es not recognised
			not recognised – e.g. processes for formalisation, individualisation
			fit-for-purpose approaches by being overly prescriptive?
			egistration/ownership by women or specific groups?
			on transactions available to majority tenure types
			overlapping or ambiguous responsibility allocations
...provide for transparency and public access to information?			dequate transparency or information access provisions
...provide for the recognition of digital data and digital signatures?			. Conflict or ambiguity over the primacy of digital vs. non-digital data
...provide for e-government, NSDI and data sharing/exchange?			E.g. Insufficient legislative support and identification of responsibilities
...underpin personal identity/legal entity registration/databases and information privacy and protection?			E.g. Inadequate privacy protections
...require data security protections			E.g. inadequate data security protections
...provide for compensation against fraudulent or other loss of land?			E.g. Compensation inadequate or only in select circumstances

Legal and Institutional

Outline the functional scope of existing digital land record system/s?

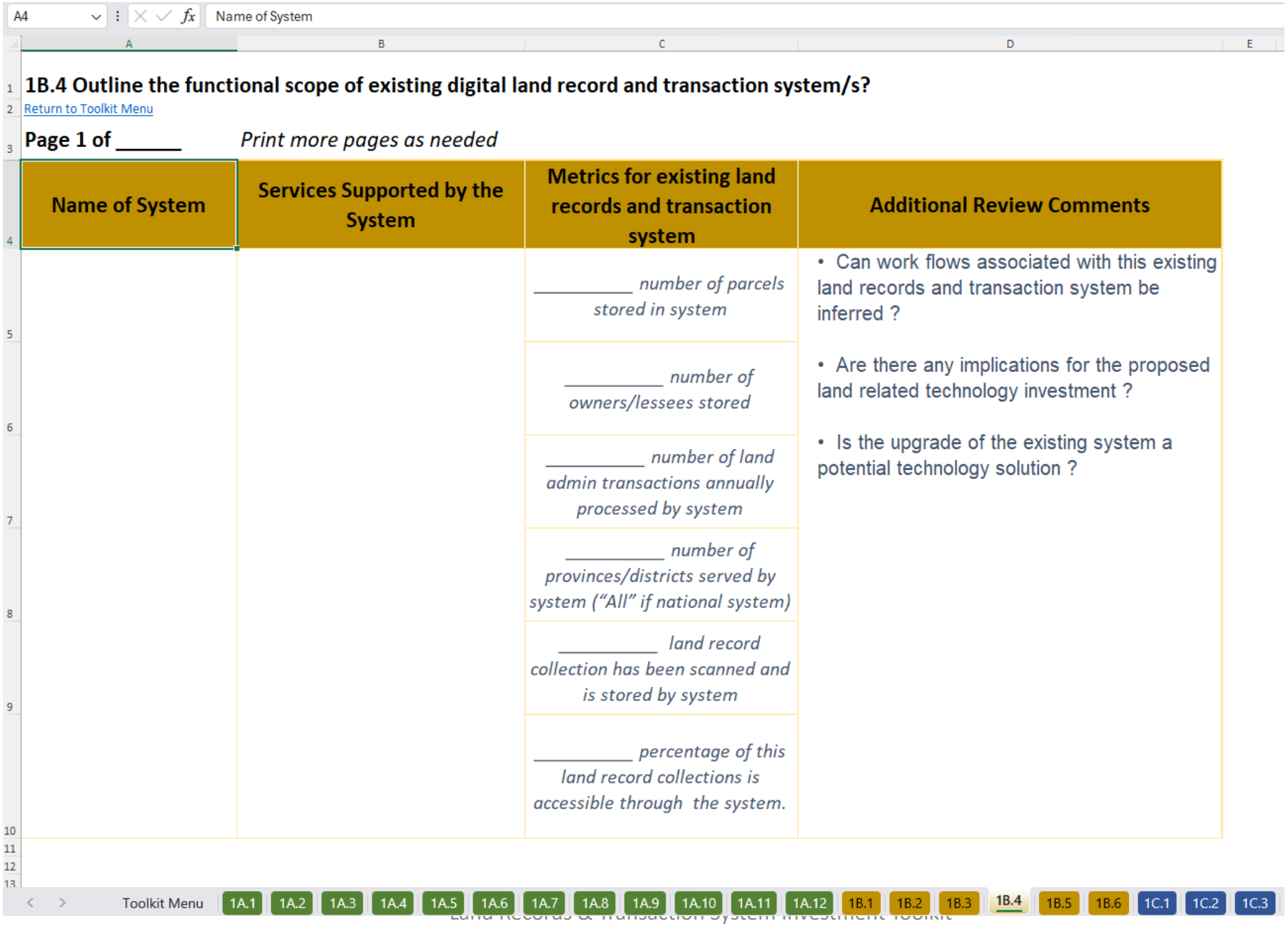
To determine the readiness of the land agency to implement or upgrade existing land records and transaction system/s (whether analogue or digital), it is necessary to identify and review existing systems, and specifically the data these systems contain, and the business processes for transactions.

When filling out the table, consider:

- Stakeholder inputs
- Available documentation (e.g. User manuals)

Name of System	Services supported by the System	Metrics for existing land records and transaction system	Addi nal Review Comments
List ... 1,	Refer here	_____ number of parcels stored in system stored by system _____ percentage of this land record collections is accessible through the system.	• Is the system requi existing LRT IT system be land related otential technology
List name of system 2, refer here			
List name of system 3, refer here			

Technology and Systems



A4 | Name of System

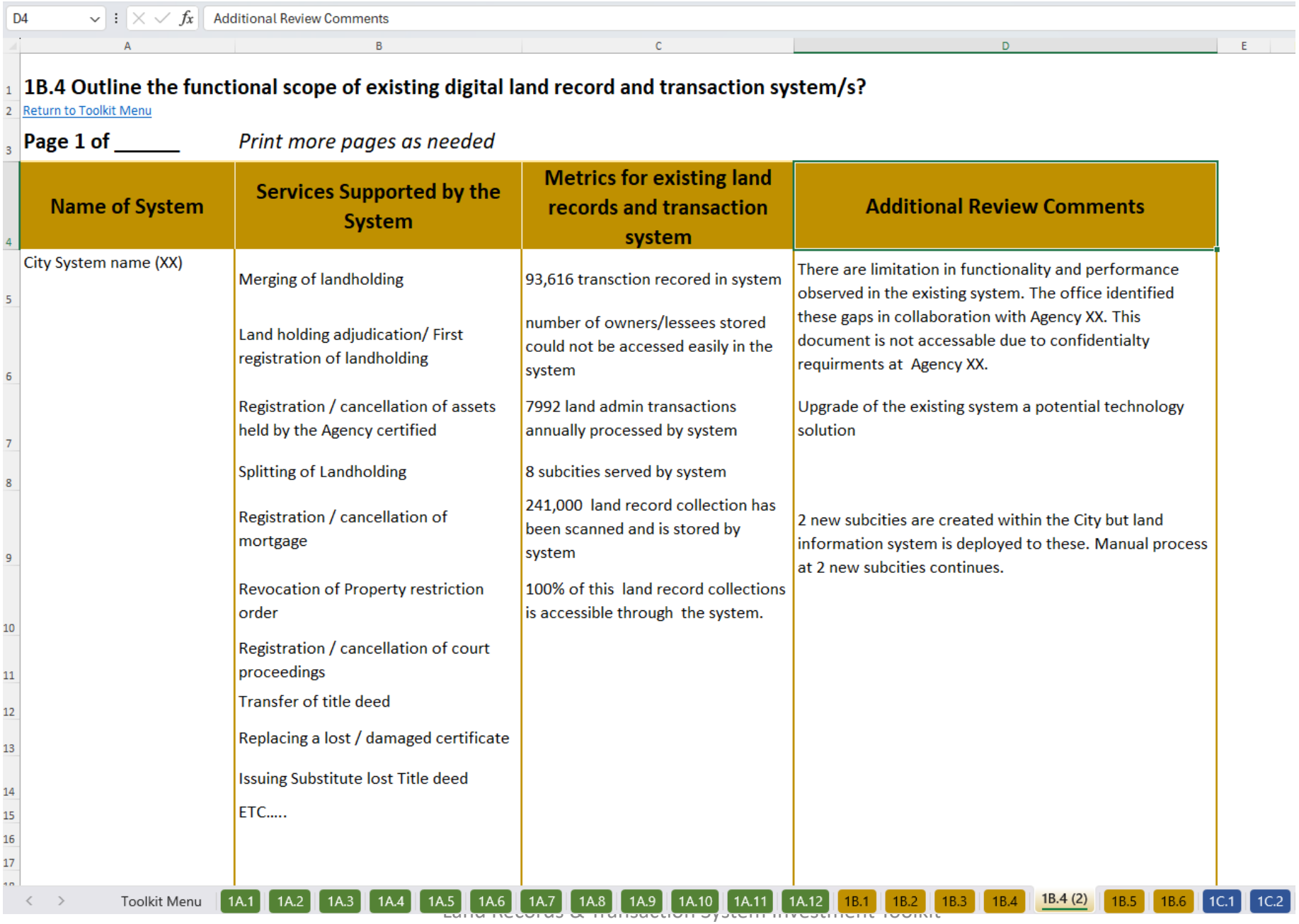
1B.4 Outline the functional scope of existing digital land record and transaction system/s?

Return to Toolkit Menu

Page 1 of _____ *Print more pages as needed*

Name of System	Services Supported by the System	Metrics for existing land records and transaction system	Additional Review Comments
		_____ *number of parcels stored in system*	• Can work flows associated with this existing land records and transaction system be inferred ? • Are there any implications for the proposed land related technology investment ? • Is the upgrade of the existing system a potential technology solution ?
		_____ *number of owners/lessees stored*	
		_____ *number of land admin transactions annually processed by system*	
		_____ *number of provinces/districts served by system ("All" if national system)*	
		_____ *land record collection has been scanned and is stored by system*	
		_____ *percentage of this land record collections is accessible through the system.*	

Toolkit Menu | 1A.1 | 1A.2 | 1A.3 | 1A.4 | 1A.5 | 1A.6 | 1A.7 | 1A.8 | 1A.9 | 1A.10 | 1A.11 | 1A.12 | 1B.1 | 1B.2 | 1B.3 | 1B.4 | 1B.5 | 1B.6 | 1C.1 | 1C.2 | 1C.3



D4 | Additional Review Comments

1B.4 Outline the functional scope of existing digital land record and transaction system/s?

Return to Toolkit Menu

Page 1 of _____ *Print more pages as needed*

Name of System	Services Supported by the System	Metrics for existing land records and transaction system	Additional Review Comments
City System name (XX)	Merging of landholding Land holding adjudication/ First registration of landholding Registration / cancellation of assets held by the Agency certified Splitting of Landholding Registration / cancellation of mortgage Revocation of Property restriction order Registration / cancellation of court proceedings Transfer of title deed Replacing a lost / damaged certificate Issuing Substitute lost Title deed ETC.....	93,616 transction recored in system number of owners/lessees stored could not be accessed easily in the system 7992 land admin transactions annually processed by system 8 subcities served by system 241,000 land record collection has been scanned and is stored by system 100% of this land record collections is accessible through the system.	There are limitation in functionality and performance observed in the existing system. The office identified these gaps in collaboration with Agency XX. This document is not accessable due to confidentialty requirments at Agency XX. Upgrade of the existing system a potential technology solution 2 new subcities are created within the City but land information system is deployed to these. Manual process at 2 new subcities continues.

Toolkit Menu | 1A.1 | 1A.2 | 1A.3 | 1A.4 | 1A.5 | 1A.6 | 1A.7 | 1A.8 | 1A.9 | 1A.10 | 1A.11 | 1A.12 | 1B.1 | 1B.2 | 1B.3 | 1B.4 | 1B.4 (2) | 1B.5 | 1B.6 | 1C.1 | 1C.2

1C.1 What revenue (and transaction numbers) is the agency typically generating?

Return to Toolkit Menu

Number of transactions and revenue for the agency as a whole, by transaction type

Transaction type *(ref)*	Financial year x		Financial year x -1	
	#	$	#	
Land holding adjudication/ First registration of landholding				
Splitting of Landholding				
Merging of landholding				
Registration / cancellation of mortgage				
Registration / cancellation of assets held by the Agency certified				
Revocation of Property restriction order				
Registration / cancellation of court proceedings				
Transfer of title deed				
Replacing a lost / damaged certificate				
Issunig Substitute lost Title deed				
Indicate boundary markers and provide evidence for boundary disputes				
Landholding boundary Change Registration Service				

What does the LRTS Toolkit look like?

Stage Two : Identify and Assess Funding Options

Issue	Illustrative possible actions for inclusion, depending on scope/goal of project. Other actions may also be identified.
☑ **There are fundamental gaps in the legal framework.** *Is there a legal basis for all tenures? Is there a sufficient legal basis for digital processes and e-governance? Are there any significant legal conflicts? Does the law overprescribe land registration processes/surveying accuracies? Is there provision for private sector involvement?*	Make investment conditional on: ☐ Drafting and approval of new laws and regulations
☐ **Insufficient information on tenure coverage.** *Is sufficient information available to support the identification of dominant tenures and estimation of potential transaction loads and demand/revenue streams?*	Define investment to include: ☐ Improved organization and review of paper records ☐ Improved institutional capacity support to improve tenure mapping and record managements
☐ **Key tenure regimes are not legally recognised, or do not allow sufficient transaction rights.** *The law does not recognise the property rights of a significant proportion of the population. There are policy/other constraints in the land market that limit or may limit future transactions (e.g. customary/cultural limits on property transfers, poorly developed mortgage markets, etc.). The lack of legal recognition limits ability to design a sustainable project and/or limits likely project scope or sustainability.*	Make investment conditional on: ☐ Drafting and approval of new laws and regulations
☐ **There is no or limited political support for change.** *Key land sector legislation is out of date and/or poorly implemented. There is no high-level document/s setting out a land sector reform agenda.*	Make investment conditional on: ☐ Consensus seeking consultation involving all key potential stakeholders prior to finalization of investment
☑ **There are significant political economy risks.** *Transparency International's corruption index indicates a significant risk of corruption. There are no real incentives for government employees to use formal processes and technology. A significant number of articles on high-level rent-seeking feature in news/popular media.*	Make investment conditional on: ☐ Consensus seeking consultation involving all key potential stakeholders prior to finalization of investment Define investment to include: ☐ Measures in both the design of the land system and the associated business processes that strengthen land governance within the land agency and wider government environment

Example Funding Option Identification

Core Issues Identification		
Legal/Institutional Issues to be addressed • complexity from fragmentation of land blocks from urbanization • expectations of land professionals for more modern land systems • loss of institutional knowledge through retirement of key land agency staff	**Technology/Systems Issues to be addressed** • physical deterioration of key land records • digital record to be legal recognized record • need for modern geocentric geodetic datum (& associated map projection)	**Financial/Financial Sustainability Issues to be addressed** • land agency operational units have "user pay" based fee targets that need to be met • minimal changes to land agency budget allocations possible • Loss of staff with IT skills to private sector & overseas

Overview of government's long-term strategic initiatives to address core issues			
Associated strategic initiatives are: • modernising urban survey control & cadastral maps through introduction of new datum • Land Court computerisation project	Timeframe • in the 2 years following the end of the compact • Currently Year 1 of 3 year project	Lead Agency • Land ministry • Land Court	Funding • within existing ministry budget for survey operations • Development assistance grant to government from XYZ

Main elements of identified Funding Options		
• Draft/adopt new Title registration legislation • Implement new simple workflows for title registration across registration & survey operational units • Prepare HR strategy identifying key actions to strengthen sustainability through recruitment and appropriate outsourcing of critical tasks	• Develop computerized system-registration & map • Establish new geodetic datum • Create digital cadastral map • Convert microfilm records to digital	• New system to calculate "user pay" fees & record payments • Secure services of "bonded" IT students on government study awards on graduation

Technology Solution Options

Technology Solution Option 1: Low or No Technology	Technology Solution Option 2: Medium Technology	Technology Solution Option 3: High Technology
Paper based title registration	Integrated Title Registration & Cadastral Mapping Computerized System	Integrated Title Registration & Cadastral Mapping Computerized System with modern geodetic datum

Clarifications, Conditions & Prerequisite actions (prior to finalization of Project/Compact Approval Documentation):

- Parliamentary consideration and adoption of new Title Registration legislation by XX month after EIF.
- Land agency to confirm availability of sufficient resourcing by X months after EIF, to undertake deeds conversion, cadastral map digitization & new geodetic datum survey field work including connections to old datum survey work
- Government commits to amending survey act to permit use of drone imagery

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Standard Name	Reference	Lead Organization
LADM - Land Administration Domain Model	ISO 19152:2012	FIG, ISO/TC211
Simple Feature Access Part 2 SQL Options	ISO 19125:2004	OGC
GML – Geography Markup Language	ISO 19136:2007	OGC, ISO/TC211
PDF/A – a data format for digital preservation	ISO 19005	PDF Association, ISO
UML – Unified Modelling Language	ISO 19501:2005	Object Management Group
BPMN – Business Process Model & Notation	ISO/IEC 19510:2013	Object Management Group
Java programming language	1998 ->	Oracle & Open JDK community
Unicode	1988	Unicode Consortium
JSON	ISO/IEC 21778:2017	ISO/IEC JTC 1/SC22
HTTPS communication protocol	RFC 2818 (2000)	The Internet Society (Network Working Group)

What does the LRTS Toolkit look like?

Stage Three: Final Pre-Approval Options

- Where possible, identified costs should be reviewed by relevant experts – though the process should not be significantly delayed in doing so.

Summary of costs, showing example approach to apportion costs

Establishment costs (US$)

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Check Total %
Software & software development	20%	30%	40%	10%							
Physical ICT infrastructure	50%	50%									
Hardware & Equipment		20%	80%								
Initial LAaaS service contract			100%								
Other Costs	30%	40%	30%								
Contingency*	8%	12%	20%	30%	30%						
Funding Total	Total Yr 1	Total Yr 2	Total Yr 3	Total Yr 4	Total Yr 5	Total Yr 6	Total Yr 7	Total Yr 8	Total Yr 9	Total Yr 10	*Total establishment funding needs*

Operations and maintenance costs

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Check Total %
Annual Operating Costs					50%	50%	100%	100%	100%	100%	
Laaas Annual fee						100%	100%	100%	100%	100%	
Cost of replacement system or system upgrade at end of operating life										100%	
Additional staff costs	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	
Required land agency operational budget(US$)	Total Yr 1	Total Yr 2	Total Yr 3	Total Yr 4	Total Yr 5	Total Yr 6	Total Yr 7	Total Yr 8	Total Yr 9	Total Yr 10	*Total operational budget allocations required*

- Note contingency is suggested at 40%, apportioned over the years when establishment costs are expected to be incurred.
- Replacement/upgraded system costs at end of life suggested as 30% of original establishment costs

What does the LRTS Toolkit look like?

Stage Four: Post Approval Detailed Planning and Scoping

Suitability of a MICROSERVICES software architecture				
Suitability Question		**Responses**		**Add**
	GREEN	**ORANGE**	**RED**	
Is this new system an upgrade of an existing LRT IT system ?	____*Yes*	____ *No, but there is significant local microservice architecture software development experience*	____*No*	
Is there significant local microservice architecture software development ?	____*Yes*	____ *No, but local software developers involved can be up-skilled*	____*No*	
Is continuous, reliable internet connectivity available ?	____*Yes*		____*No*	
Do software requirements indicate software complexity is moderate – high?	____*Yes*	____ *No, but there is significant local microservice architecture software development experience*	____*No*	

What does the LRTS Toolkit look like?

Stage Five: Post Approval Rollout

- **Further detail to address risks impacting success, pace or sustainability of implementation.**
  - Business process re-engineering and business continuity
  - Data conversion
  - System complexity
  - Training and capacity development

LRTS Key Principles

- No information = move on!
- Focus on sustainability
- Focus on the formal sector
- Adopt a “comfort-level’ approach to risk.

Maximising tool use

- Strong local interest is essential
- Land transaction systems focus
- Wide use is encouraged, increased use will indicate where improvements could be of value.

MILLENNIUM CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Land Equity International

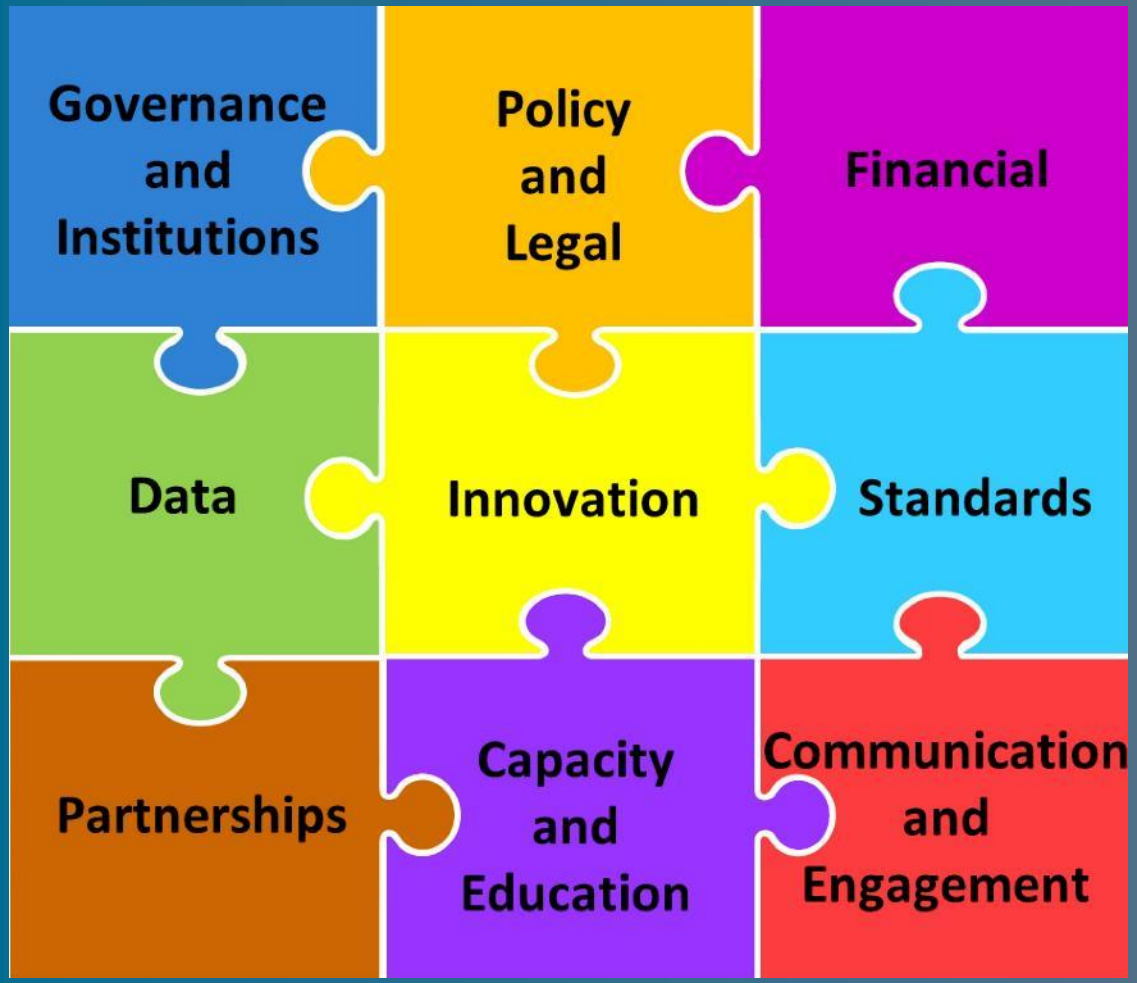
https://www.mcc.gov/resources/doc/toolkit-land-records-and-transaction-systems-technology

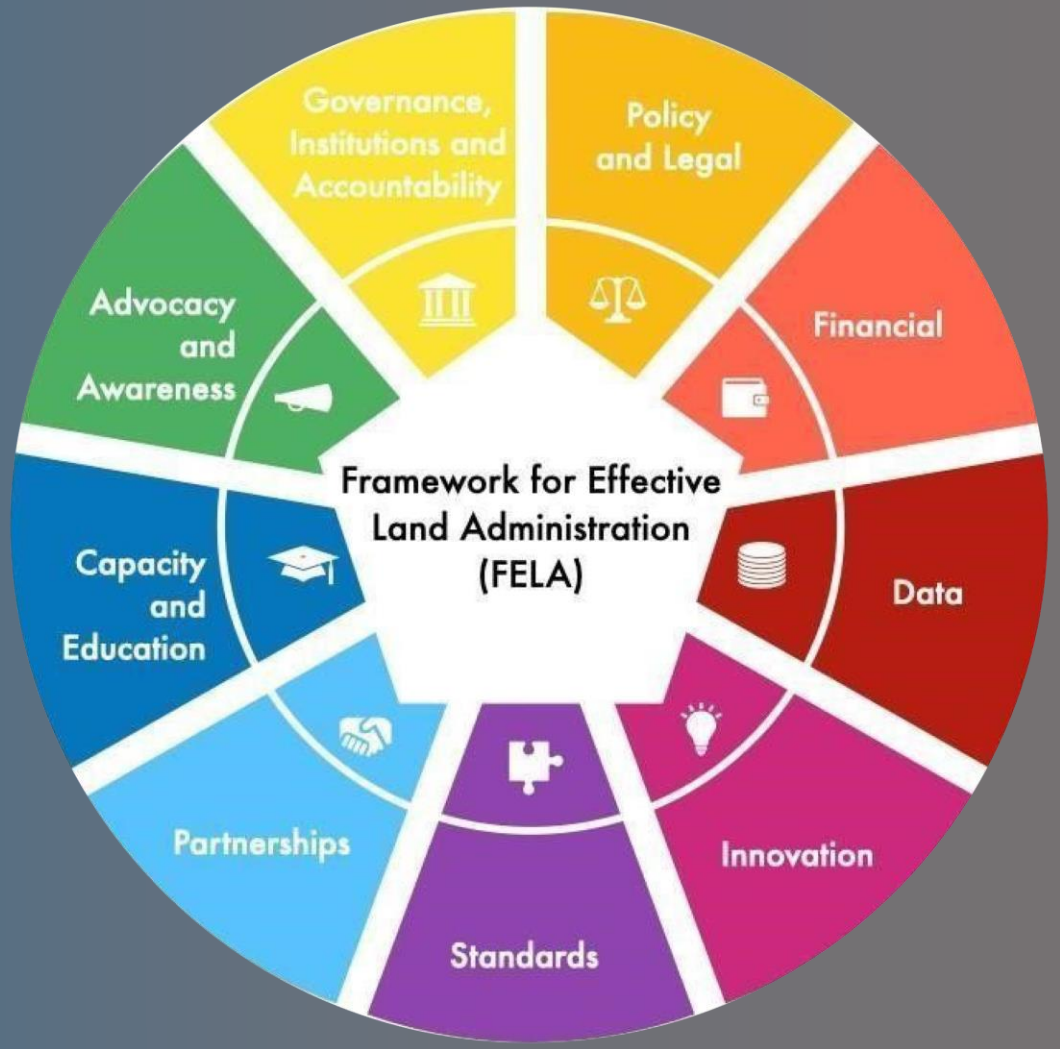
kadaster

Frank Tierolff

Chair Executive Board Kadaster
Co-Chair UN-GGIM Europe

13 May 2024


Governance and Institutions
Policy and Legal
Financial
Data
Innovation
Standards
Partnerships
Capacity and Education
Communication and Engagement


Governance, Institutions and Accountability
Policy and Legal
Financial
Data
Innovation
Standards
Partnerships
Capacity and Education
Advocacy and Awareness
Framework for Effective Land Administration (FELA)

The Netherlands

~40.000 km^2
~17,8 million inhabitants
342 Municipalities
21 Water Authorities

Country: e-Government spatial data infrastructure

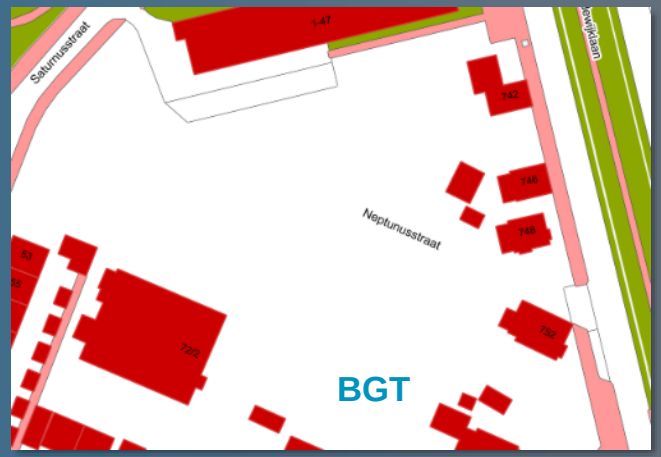
Provinces: Spatial planning, environment and conservation

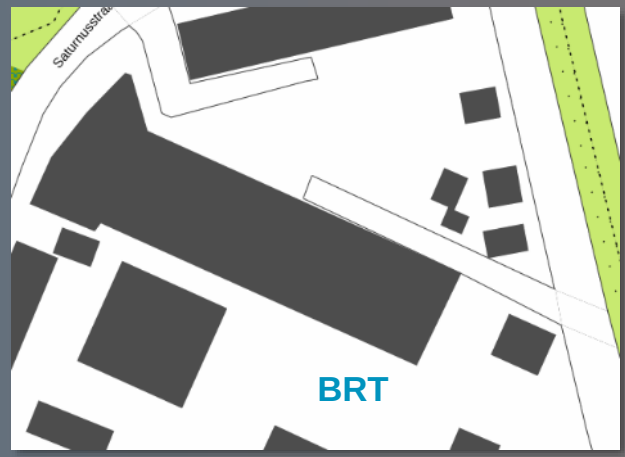
Municipalities: land management, zoning, local development
Key partner in e-Government and SDI

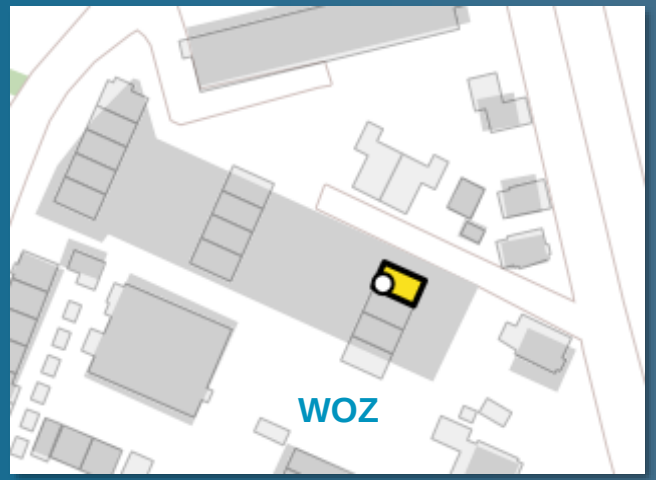
kadaster

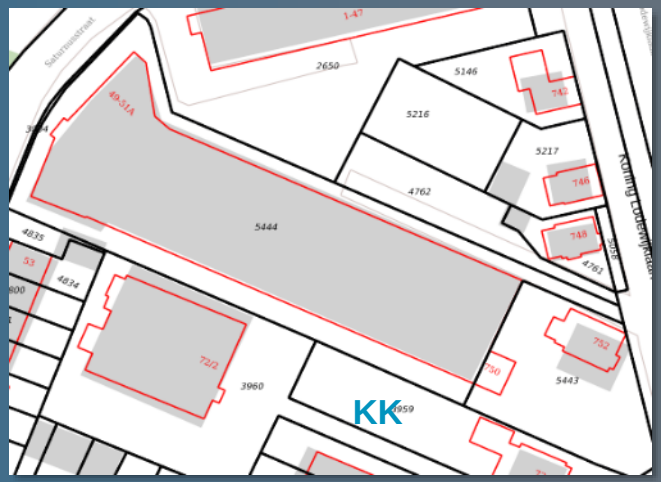

TE KOOP/TE HUUR
Voorstraat 280
D&B RETAIL
TE HUUR
WINKELRUIMTE
D&B RETAIL

The ‘picture’ in the key registers









Neptunusstraat, Apeldoorn, 22 June 2019


Reebok
HONDA

In summary

1. Frameworks, Standards and Models are only working when implemented. A stronger focus on practicing and ‘’keep on working’’ is the best way to learn and understand

2. Frameworks, Standards and Models usually strive for the same objective by making things easier and better; important though is to realise that they are complementary

3. Complexity is sneaking in easily; try to avoid or learn from it. Keeping things simple is needed

4. Cooperation between all stakeholders is needed to achieve the best results

Success Factors in Land Administration:

How Standards Empower

People, Environment, Economic Progress and its underlying data

Dr Diane Dumashie, RICS
FIG President

Power of Partnerships
FIG Opening Remarks at Kadaster Workshop

Click to edit Date

World Bank Lands conference
WDC 13th May 2024

Power of Partnerships for People Environment & Economic Progress

Lands conference:

Securing land tenure and access for climate action

Our workshop ambitions:

- Connectivity, Capacity and Champions in Land Administration
- Land professionals roles and responsibilities
    - What, Who, How..

1. What: The Future We want to shape

Graphic UN HABITAT

Linked to the 2030 Sustainability Agenda FIG 2023- 26 work plan aims to deliver and demonstrate our resolve to serve:

FIG Vision:

- Serving Society, benefitting people and the planet

FIG Theme:

Tackling the Global (to local) Challenges

FIG Aims:

- Planet, People, **Partnership,** Governance and Communication

Depth of experience Survey and Geospatial

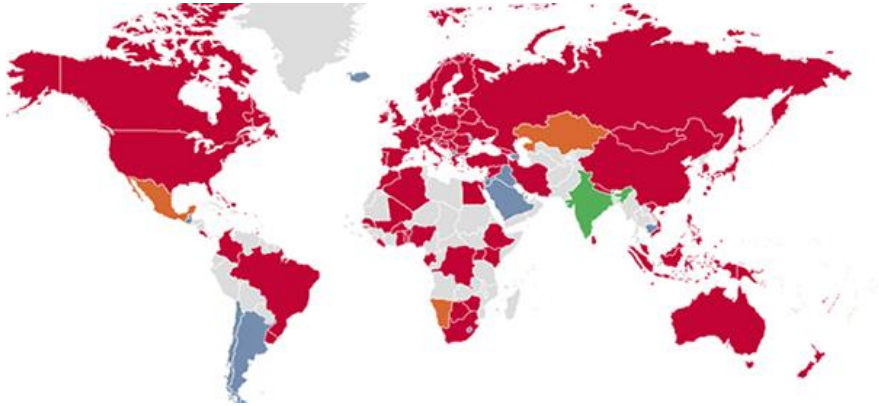


FIG Global membership of land professional associations, affiliates & Academics (115 countries, incl Netherlands/ Kadaster)

- **Professional: <u>Standards</u>**
- **Institutional: Build capacity**
- **Global Development: Regional/ International**

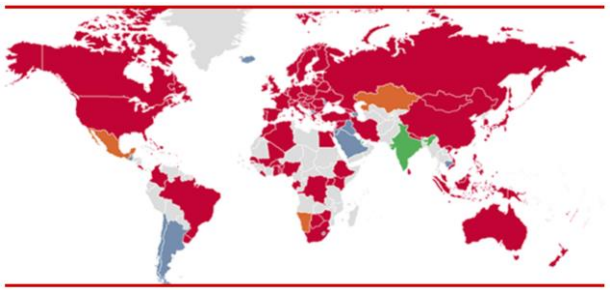
How we tackle the global challenges

FIG Members, led by

- Council & Task Forces
- Commissions
- Networks (incl Standards)
- Permanent institutions

- Knowledge generation:
  - in our collective hands, and
  - With partners

2. Where: FIG and UN Partnerships



- **Sustainability** is about making sure that both internal and external partnerships are working effectively and cultivating stronger engagement

We've

- Collaborated, Contributed, Co-created with partners and successfully communicated with communities

3. Robust Standards are an imperative

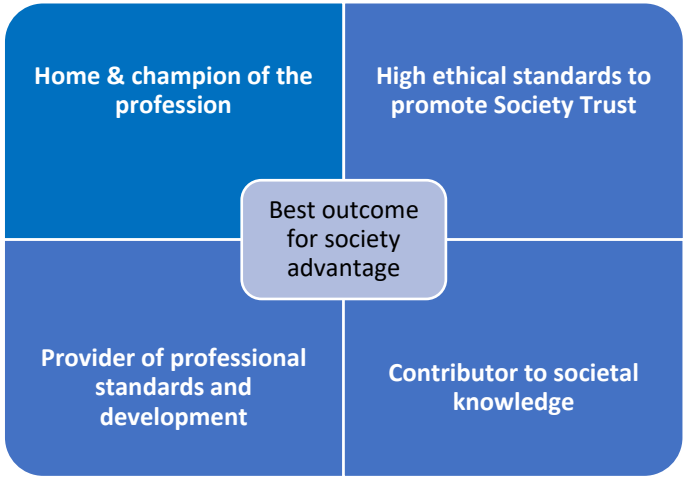


Image Adapted from RICS

FIG

- A global community with high ethical standards
- Strengthen Trust in the Profession
- Inspire Members to be the best they can

Uphold standards

- **Maintain public confidence and trust**
- We innovate for the benefit of society

How: International Standards empowering People

As we look to the future, it is apparent that to ensure effective land administration;

- The **vital role of data exchange, data integration,** and
- The need to **foster institutional interoperability**

- FIG Global to local promotion of both **professional practice and standards**
  - specifically in ….

Successful Outreach:
Global Standards and Data Models

C3= Spatial Information Management
C7, Cadastre and Land Management

STDM and LADM (ISO 19152:2012)

- **Acknowledge path makers**: Chrit Lemmen, Peter van Oosterom and Eva Maria Unger
- **Celebrating Success** of FIG Standards Network + FIG Commissions (3&7)
- Importantly, working in partnership with others.
- A data model is not just about data collection;
- It is also about implementation (multi stakeholder users FAO/SOLA, USAIDs MAST)
- **Evolution** is Key! Let us not stand still……

….Recognising benefits of an Evolutionary approach

Power of Partnership working

LADM: 2nd edition to be expanded

- **Collaboration** ISO/ TC211/FIG/ IHO and OGC
  - Geographic information LADM pt1 (ISO 19152-1-2024)
  - Additional scope from FIG relating to Hydro, spatial planning, valuation and construction (BIM)
- **Connectivity**: WB today + FIG Acca conference (May) + FIG Malaysia commission meetings (Sept),

- **Continuing** to evolve for society benefit

Tackle the Global (to local) Challenges

Relevance of standards requires a **Purposeful** and continuing intent **to implement.**

Celebrate your success; There is more to do

- To advance the global land agenda:
- To build partnerships and relationships
- Above all, to create robust data and professional standards

Evidenced by our collective ability, and:

- Desire to **champion** and lead (Netherlands)
- Build our **capacity**, and
- Can only be done with an inclusive **connected** multi-stakeholder approach
    - **To achieve a global standard that benefits All**

Looking to the Power of Partnerships

Thank You

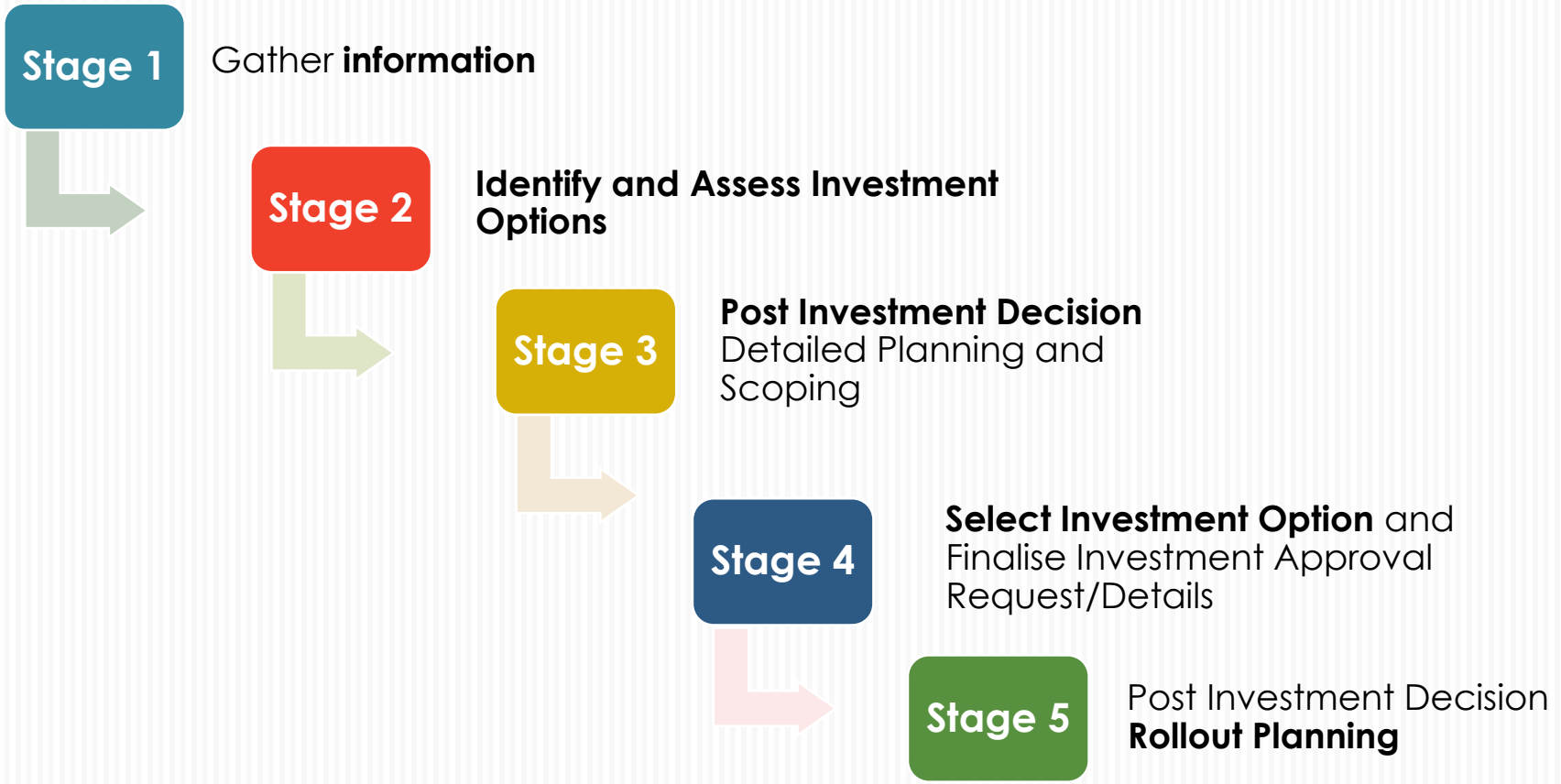
- WWW.fig.net

- President
- FIG: Dr D Dumashie
- ddd@dumashie.co.uk

How to best design land records and transaction system reform projects?

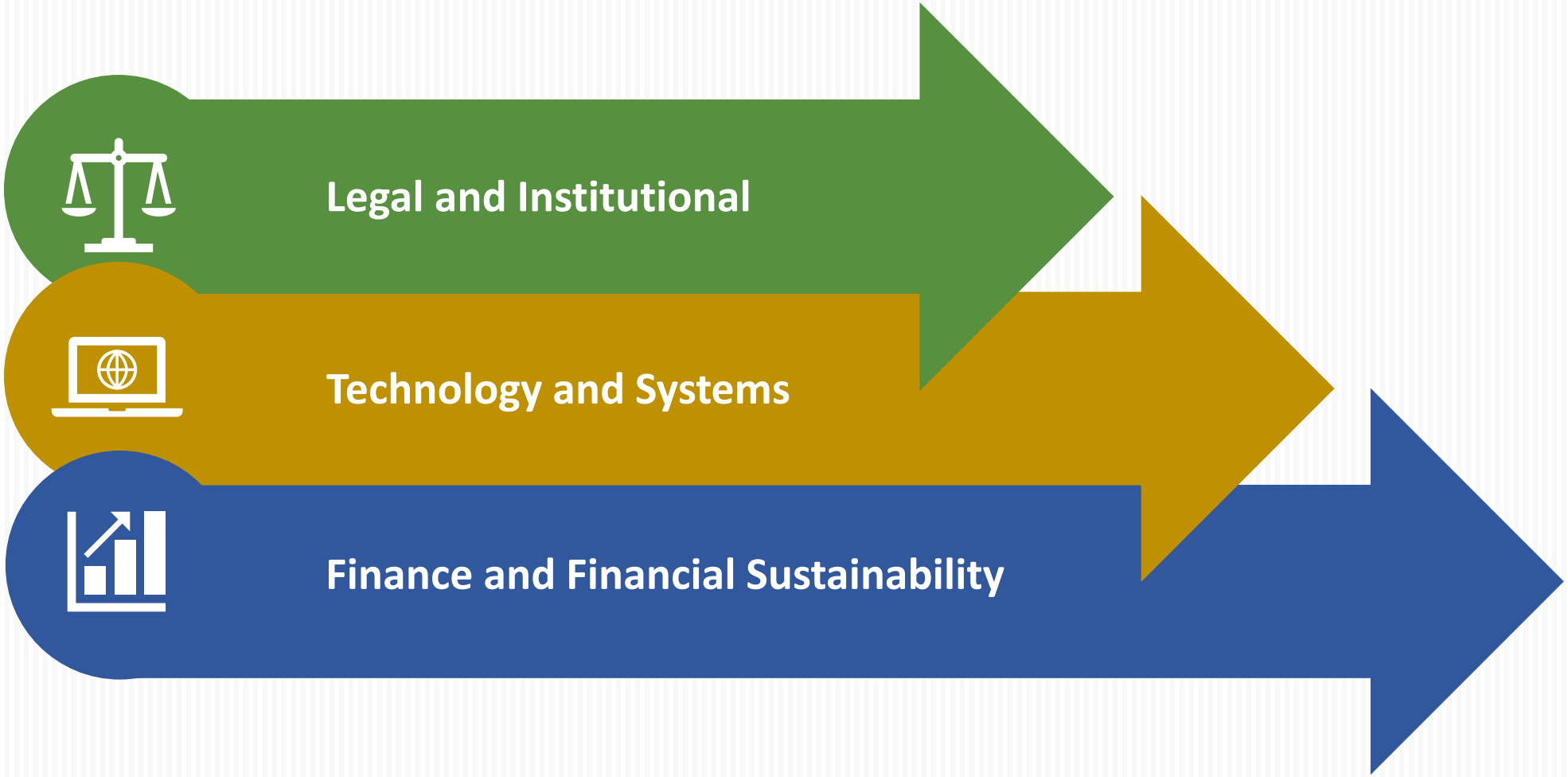
What level of technology is the right level of technology?

What is in the LRTS Toolkit?



What does the LRTS Toolkit look like?

Stage One: Gather Information



Using the LRTS Toolkit

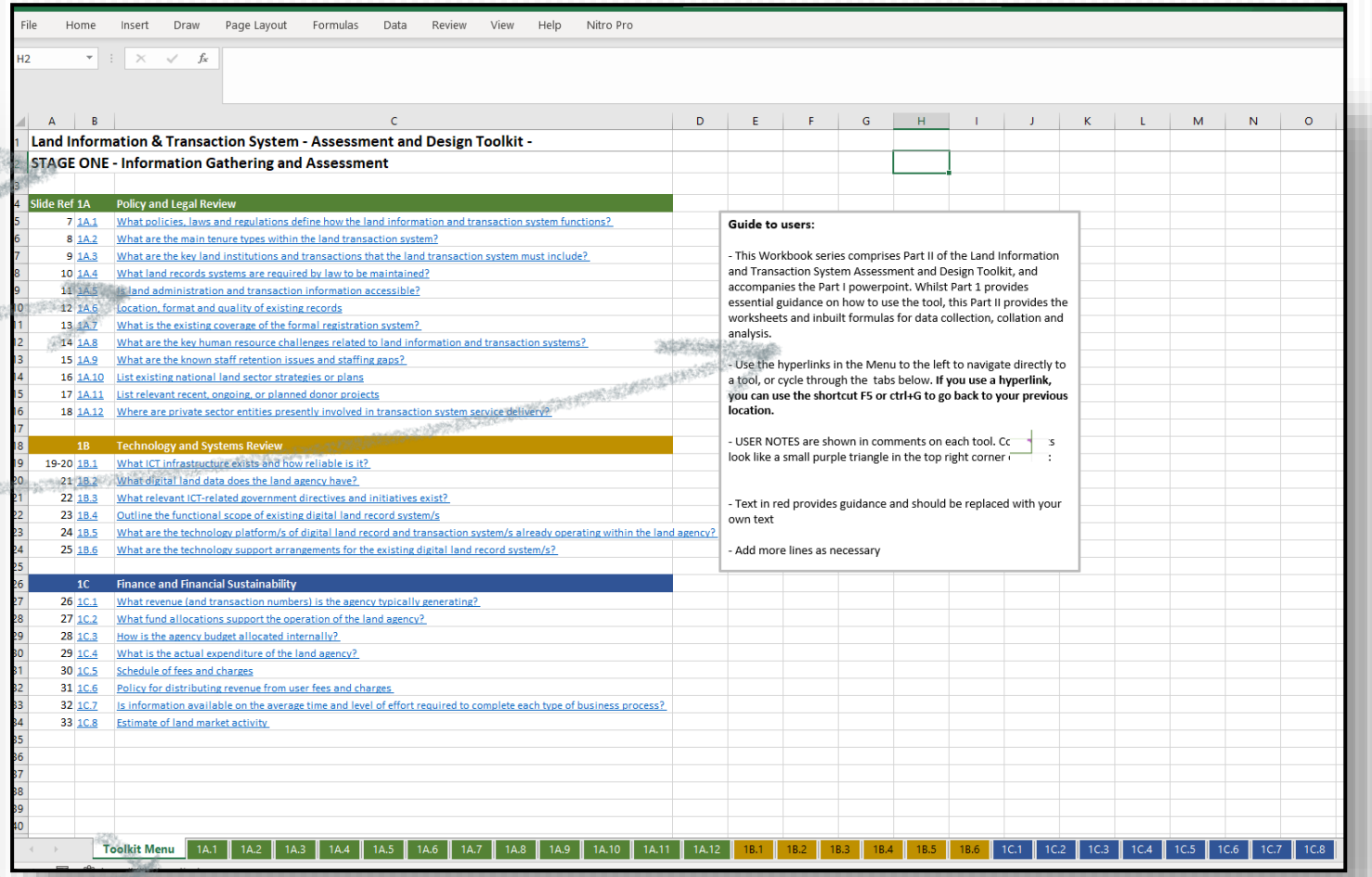
Part II contains individual tools in MS Excel tabs, with navigation shown as below:

Heading and stage

Tools

Guidance

Each tab contains one tool



What policies, laws and regulations define how the land records and transaction syst… f…?

Considerations

Guiding statement

To make an investment, we need to know the extent to which… legal framework will support or hinder proposed changes. Thi…

- Captures the main policies, laws and regulations that are … to the land records and transaction system; and
- Identifies whether there are obvious gaps that may need to be addressed prior to, or during an. investment.

It is not intended to be a comprehensive legal review, but should identify whether a further review is necessary as a prerequisite to any investment

…ing out the table, consider:

- …here fundamental gaps in the legal framework that must be …essed prior to deciding on and/or making the investment?
- Is a larger legal review necessary?
- Does the legal framework, after a cursory examination, provide a reasonable basis for moving forward with the investment?

List relevant laws

Inputting details

A- **Land Act 2023**
B- **Survey Act 2023**
C- **eGovernment Act 2023**
D- **Cadastral Survey Regulations 2023**

What laws, policies or other documents:	Ref	Are t… obvious gaps (Y/N, describe)
…and safeguard rights to land?	*E.g. A*	
		…es not recognised
		… not recognised – e.g. processes for formalisation, individualisation
		…fit-for-purpose approaches by being overly prescriptive?
		…egistration/ownership by women or specific groups?
		…on transactions available to majority tenure types
		… overlapping or ambiguous responsibility allocations
…provide for transparency and public access to information?		*…dequate transparency or information access provisions*
…provide for the recognition of digital data and digital signatures?		*… Conflict or ambiguity over the primacy of digital vs. non-digital data*
…provide for e-government, NSDI and data sharing/exchange?		*E.g. Insufficient legislative support and identification of responsibilities*
…underpin personal identity/legal entity registration/databases and information privacy and protection?		*E.g. Inadequate privacy protections*
…require data security protections		*E.g. inadequate data security protections*
…provide for compensation against fraudulent or other loss of land?		*E.g. Compensation inadequate or only in select circumstances*

Legal and Institutional

Outline the functional scope of existing digital land record system/s?

To determine the readiness of the land agency to implement or upgrade existing land records and transaction system/s (whether analogue or digital), it is necessary to identify and review existing systems, and specifically the data these systems contain, and the business processes for transactions.

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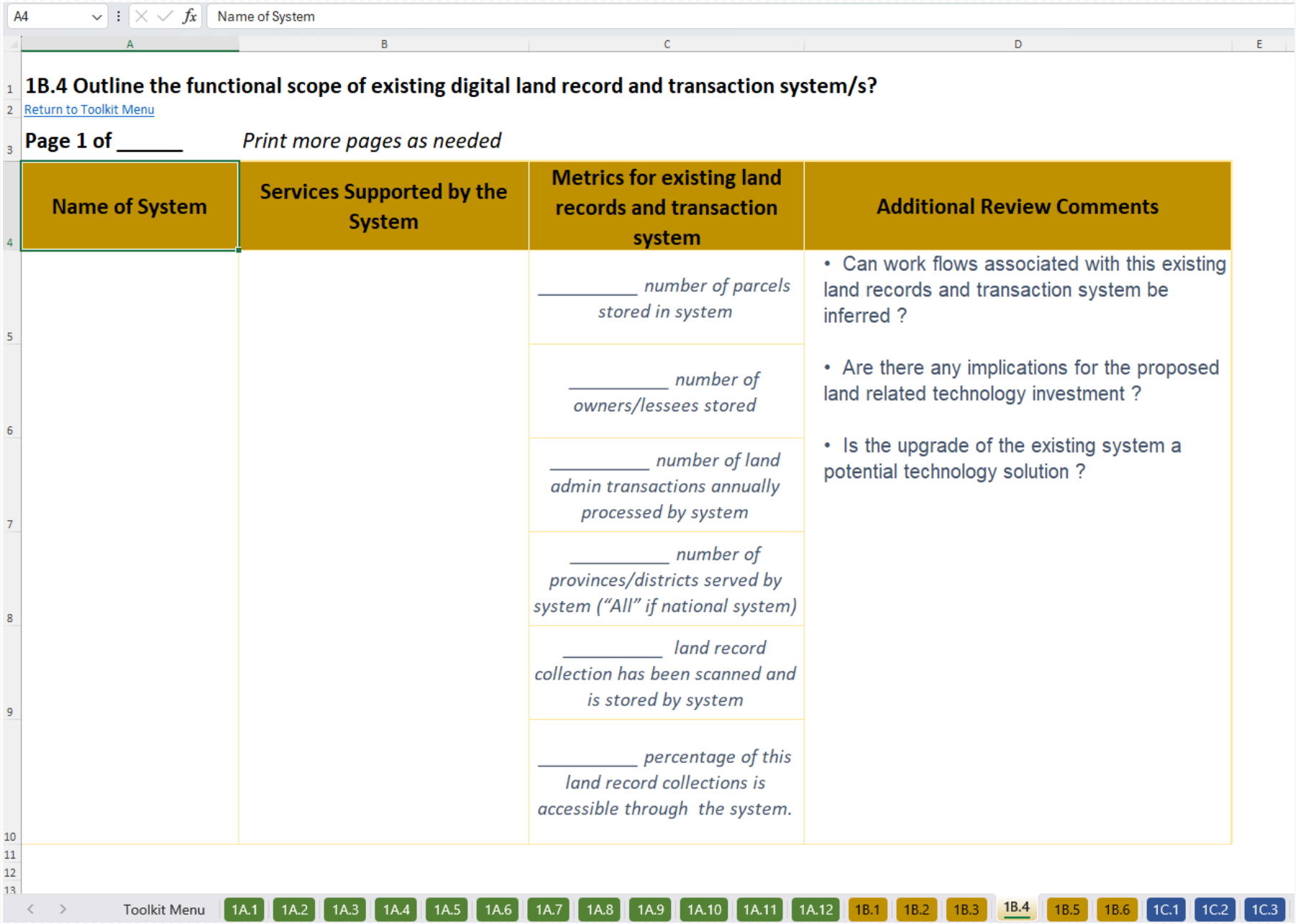
Technology and Systems


A4
Name of System
1B.4 Outline the functional scope of existing digital land record and transaction system/s?
Return to Toolkit Menu
Page 1 of _____
Print more pages as needed
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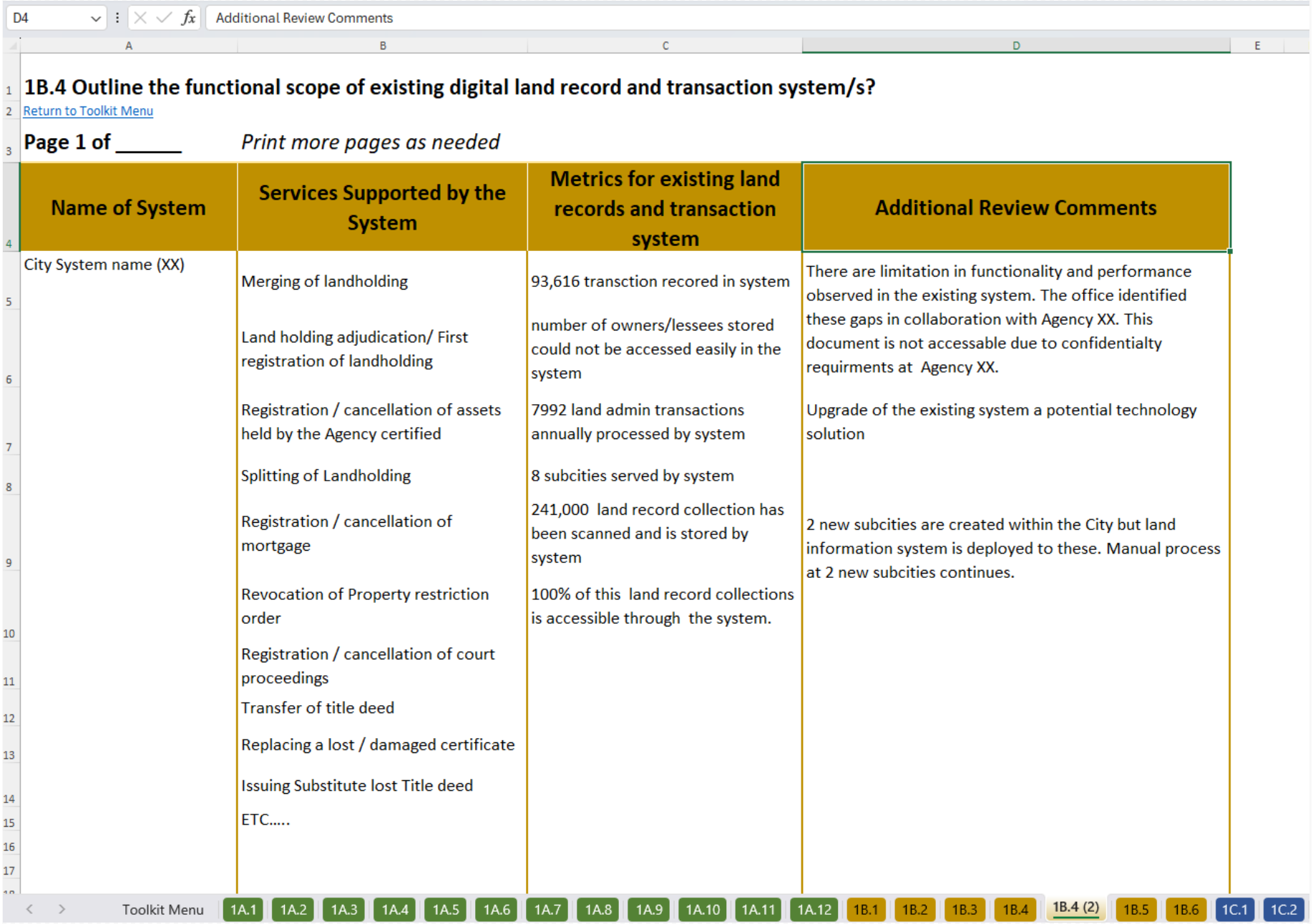
Toolkit Menu
1A.1
1A.2
1A.3
1A.4
1A.5
1A.6
1A.7
1A.8
1A.9
1A.10
1A.11
1A.12
1B.1
1B.2
1B.3
1B.4
1B.5
1B.6
1C.1
1C.2
1C.3



D4 | Additional Review Comments

1B.4 Outline the functional scope of existing digital land record and transaction system/s?

Return to Toolkit Menu

Page 1 of _____ *Print more pages as needed*

Name of System	Services Supported by the System	Metrics for existing land records and transaction system	Additional Review Comments
City System name (XX)	Merging of landholding Land holding adjudication/ First registration of landholding Registration / cancellation of assets held by the Agency certified Splitting of Landholding Registration / cancellation of mortgage Revocation of Property restriction order Registration / cancellation of court proceedings Transfer of title deed Replacing a lost / damaged certificate Issuing Substitute lost Title deed ETC.....	93,616 transction recored in system number of owners/lessees stored could not be accessed easily in the system 7992 land admin transactions annually processed by system 8 subcities served by system 241,000 land record collection has been scanned and is stored by system 100% of this land record collections is accessible through the system.	There are limitation in functionality and performance observed in the existing system. The office identified these gaps in collaboration with Agency XX. This document is not accessable due to confidentialty requirments at Agency XX. Upgrade of the existing system a potential technology solution 2 new subcities are created within the City but land information system is deployed to these. Manual process at 2 new subcities continues.

Toolkit Menu | 1A.1 | 1A.2 | 1A.3 | 1A.4 | 1A.5 | 1A.6 | 1A.7 | 1A.8 | 1A.9 | 1A.10 | 1A.11 | 1A.12 | 1B.1 | 1B.2 | 1B.3 | 1B.4 | 1B.4 (2) | 1B.5 | 1B.6 | 1C.1 | 1C.2

1C.1 What revenue (and transaction numbers) is the agency typically generating?

Return to Toolkit Menu

Number of transactions and revenue for the agency as a whole, by transaction type

Transaction type *(ref)*	Financial year x		Financial year x -1	
	#	$	#	
Land holding adjudication/ First registration of landholding				
Splitting of Landholding				
Merging of landholding				
Registration / cancellation of mortgage				
Registration / cancellation of assets held by the Agency certified				
Revocation of Property restriction order				
Registration / cancellation of court proceedings				
Transfer of title deed				
Replacing a lost / damaged certificate				
Issunig Substitute lost Title deed				
Indicate boundary markers and provide evidence for boundary disputes				
Landholding boundary Change Registration Service				

What does the LRTS Toolkit look like?

Stage Two : Identify and Assess Funding Options

Issue	Illustrative possible actions for inclusion, depending on scope/goal of project. Other actions may also be identified.
☑ **There are fundamental gaps in the legal framework.** *Is there a legal basis for all tenures? Is there a sufficient legal basis for digital processes and e-governance? Are there any significant legal conflicts? Does the law overprescribe land registration processes/surveying accuracies? Is there provision for private sector involvement?*	Make investment conditional on: ☐ Drafting and approval of new laws and regulations
☐ **Insufficient information on tenure coverage.** *Is sufficient information available to support the identification of dominant tenures and estimation of potential transaction loads and demand/revenue streams?*	Define investment to include: ☐ Improved organization and review of paper records ☐ Improved institutional capacity support to improve tenure mapping and record managements
☐ **Key tenure regimes are not legally recognised, or do not allow sufficient transaction rights.** *The law does not recognise the property rights of a significant proportion of the population. There are policy/other constraints in the land market that limit or may limit future transactions (e.g. customary/cultural limits on property transfers, poorly developed mortgage markets, etc.). The lack of legal recognition limits ability to design a sustainable project and/or limits likely project scope or sustainability.*	Make investment conditional on: ☐ Drafting and approval of new laws and regulations
☐ **There is no or limited political support for change.** *Key land sector legislation is out of date and/or poorly implemented. There is no high-level document/s setting out a land sector reform agenda.*	Make investment conditional on: ☐ Consensus seeking consultation involving all key potential stakeholders prior to finalization of investment
☑ **There are significant political economy risks.** *Transparency International's corruption index indicates a significant risk of corruption. There are no real incentives for government employees to use formal processes and technology. A significant number of articles on high-level rent-seeking feature in news/popular media.*	Make investment conditional on: ☐ Consensus seeking consultation involving all key potential stakeholders prior to finalization of investment Define investment to include: ☐ Measures in both the design of the land system and the associated business processes that strengthen land governance within the land agency and wider government environment

Example Funding Option Identification

Core Issues Identification

Legal/Institutional Issues to be addressed	Technology/Systems Issues to be addressed	Financial/Financial Sustainability Issues to be addressed
• complexity from fragmentation of land blocks from urbanization • expectations of land professionals for more modern land systems • loss of institutional knowledge through retirement of key land agency staff	• physical deterioration of key land records • digital record to be legal recognized record • need for modern geocentric geodetic datum (& associated map projection)	• land agency operational units have "user pay" based fee targets that need to be met • minimal changes to land agency budget allocations possible • Loss of staff with IT skills to private sector & overseas

Overview of government's long-term strategic initiatives to address core issues

Associated strategic initiatives are:	Timeframe	Lead Agency	Funding
• modernising urban survey control & cadastral maps through introduction of new datum • Land Court computerisation project	• in the 2 years following the end of the compact • Currently Year 1 of 3 year project	• Land ministry • Land Court	• within existing ministry budget for survey operations • Development assistance grant to government from XYZ

Main elements of identified Funding Options

• Draft/adopt new Title registration legislation • Implement new simple workflows for title registration across registration & survey operational units • Prepare HR strategy identifying key actions to strengthen sustainability through recruitment and appropriate outsourcing of critical tasks	• Develop computerized system-registration & map • Establish new geodetic datum • Create digital cadastral map • Convert microfilm records to digital	• New system to calculate "user pay" fees & record payments • Secure services of "bonded" IT students on government study awards on graduation

Technology Solution Options

Technology Solution Option 1: Low or No Technology	Technology Solution Option 2: Medium Technology	Technology Solution Option 3: High Technology
Paper based title registration	Integrated Title Registration & Cadastral Mapping Computerized System	Integrated Title Registration & Cadastral Mapping Computerized System with modern geodetic datum

Clarifications, Conditions & Prerequisite actions (prior to finalization of Project/Compact Approval Documentation):

- Parliamentary consideration and adoption of new Title Registration legislation by XX month after EIF.
- Land agency to confirm availability of sufficient resourcing by X months after EIF, to undertake deeds conversion, cadastral map digitization & new geodetic datum survey field work including connections to old datum survey work
- Government commits to amending survey act to permit use of drone imagery

Standard Name	Reference	Lead Organization
LADM - Land Administration Domain Model	ISO 19152:2012	FIG, ISO/TC211
Simple Feature Access Part 2 SQL Options	ISO 19125:2004	OGC
GML – Geography Markup Language	ISO 19136:2007	OGC, ISO/TC211
PDF/A – a data format for digital preservation	ISO 19005	PDF Association, ISO
UML – Unified Modelling Language	ISO 19501:2005	Object Management Group
BPMN – Business Process Model & Notation	ISO/IEC 19510:2013	Object Management Group
Java programming language	1998 ->	Oracle & Open JDK community
Unicode	1988	Unicode Consortium
JSON	ISO/IEC 21778:2017	ISO/IEC JTC 1/SC22
HTTPS communication protocol	RFC 2818 (2000)	The Internet Society (Network Working

Malawi Case

Ethiopia Case

Designed as a modular and adaptive tool.

Designed around key standards.

What does the LRTS Toolkit look like?

Stage Three: Final Pre-Approval Options

- Where possible, identified costs should be reviewed by relevant experts – though the process should not be significantly delayed in doing so.

Summary of costs, showing example approach to apportion costs

Establishment costs (US$)

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Check Total %
Software & software development	20%	30%	40%	10%							
Physical ICT infrastructure	50%	50%									
Hardware & Equipment		20%	80%								
Initial LAaaS service contract			100%								
Other Costs	30%	40%	30%								
Contingency*	8%	12%	20%	30%	30%						
Funding Total	Total Yr 1	Total Yr 2	Total Yr 3	Total Yr 4	Total Yr 5	Total Yr 6	Total Yr 7	Total Yr 8	Total Yr 9	Total Yr 10	*Total establishment funding needs*

Operations and maintenance costs

	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Check Total %
Annual Operating Costs					50%	50%	100%	100%	100%	100%	
Laaas Annual fee						100%	100%	100%	100%	100%	
Cost of replacement system or system upgrade at end of operating life										100%	
Additional staff costs	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	?extra staff cost	
Required land agency operational budget(US$)	Total Yr 1	Total Yr 2	Total Yr 3	Total Yr 4	Total Yr 5	Total Yr 6	Total Yr 7	Total Yr 8	Total Yr 9	Total Yr 10	*Total operational budget allocations required*

- Note contingency is suggested at 40%, apportioned over the years when establishment costs are expected to be incurred.
- Replacement/upgraded system costs at end of life suggested as 30% of original establishment costs

What does the LRTS Toolkit look like?

Stage Four: Post Approval Detailed Planning and Scoping

Suitability of a MICROSERVICES software architecture				
Suitability Question	**Responses**			**Add**
	GREEN	**ORANGE**	**RED**	
Is this new system an upgrade of an existing LRT IT system ?	____*Yes*	____ *No, but there is significant local microservice architecture software development experience*	____*No*	
Is there significant local microservice architecture software development ?	____*Yes*	____ *No, but local software developers involved can be up-skilled*	____*No*	
Is continuous, reliable internet connectivity available ?	____*Yes*		____*No*	
Do software requirements indicate software complexity is moderate – high?	____*Yes*	____ *No, but there is significant local microservice architecture software development experience*	____*No*	

What does the LRTS Toolkit look like?

Stage Five: Post Approval Rollout

- **Further detail to address risks impacting success, pace or sustainability of implementation.**
  - Business process re-engineering and business continuity
  - Data conversion
  - System complexity
  - Training and capacity development

LRTS Key Principles

- No information = move on!
- Focus on sustainability
- Focus on the formal sector
- Adopt a “comfort-level’ approach to risk.

Maximising tool use

- Strong local interest is essential
- Land transaction systems focus
- Wide use is encouraged, increased use will indicate where improvements could be of value.

MILLENNIUM CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Land Equity International

https://www.mcc.gov/resources/doc/toolkit-land-records-and-transaction-systems-technology

Success Factors in Land Administration:

How Standards Empower

People, Environment, Economic Progress and its underlying data

Dr Diane Dumashie, RICS
FIG President

Power of Partnerships
FIG Opening Remarks at Kadaster Workshop

World Bank Lands conference
WDC 13th May 2024

Power of Partnerships for People Environment & Economic Progress

Lands conference:

Securing land tenure and access for climate action

Our workshop ambitions:

- Connectivity, Capacity and Champions in Land Administration
- Land professionals roles and responsibilities
    - What, Who, How..

1. What: The Future We want to shape

Graphic UN HABITAT

Linked to the 2030 Sustainability Agenda FIG 2023- 26 work plan aims to deliver and demonstrate our resolve to serve:

FIG Vision:

- Serving Society, benefitting people and the planet

FIG Theme:

Tackling the Global (to local) Challenges

FIG Aims:

- Planet, People, **Partnership,** Governance and Communication

Depth of experience
Survey and Geospatial

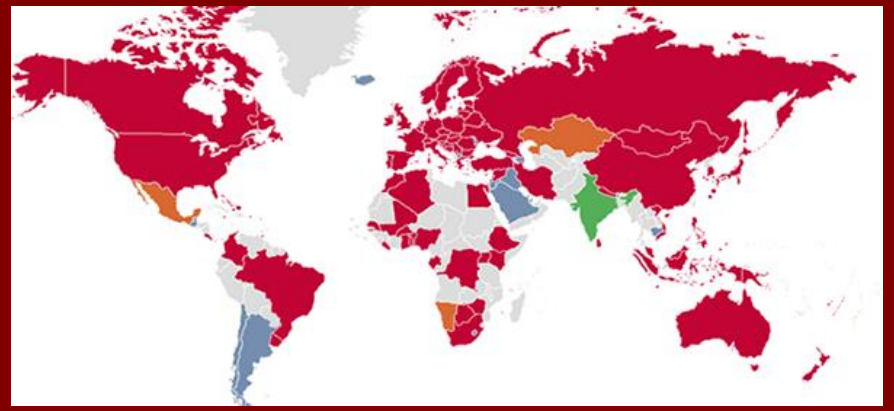


FIG Global membership of land professional associations, affiliates & Academics (115 countries, incl Netherlands/ Kadaster)

- **Professional: <u>Standards</u>**
- **Institutional: Build capacity**
- **Global Development: Regional/ International**

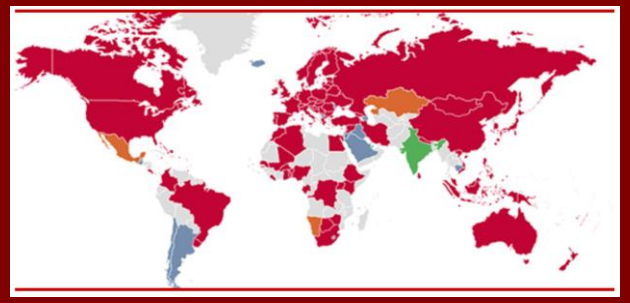
How
We tackle the global challenges

FIG Members, led by

- Council & Task Forces
- Commissions
- Networks (incl Standards)
- Permanent institutions

- Knowledge generation:
  - in our collective hands, and
  - With partners

2. Where: FIG and UN Partnerships



- **Sustainability** is about making sure that both internal and external partnerships are working effectively and cultivating stronger engagement

We've

- Collaborated, Contributed, Co-created with partners and successfully communicated with communities

3. Robust Standards are an imperative

Image Adapted from RICS

FIG

- A global community with high ethical standards
- Strengthen Trust in the Profession
- Inspire Members to be the best they can

Uphold standards

- **Maintain public confidence and trust**
- We innovate for the benefit of society

How: International Standards empowering People

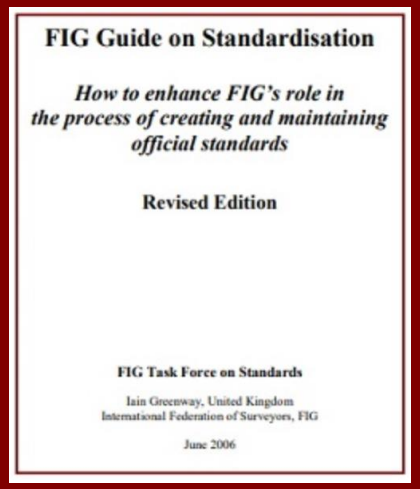


FIG Guide on Standardisation

How to enhance FIG's role in the process of creating and maintaining official standards

Revised Edition

FIG Task Force on Standards

Iain Greenway, United Kingdom
International Federation of Surveyors, FIG

June 2006

As we look to the future, it is apparent that to ensure effective land administration;

- The **vital role of data exchange, data integration,** and
- The need to **foster institutional interoperability**

- FIG Global to local promotion of both **professional practice and standards**
  - specifically in ….

Successful Outreach: Global Standards and Data Models

C3= Spatial Information Management
C7, Cadastre and Land Management

STDM and LADM (ISO 19152:2012)

- **Acknowledge path makers**: Chrit Lemmen, Peter van Oosterom and Eva Maria Unger
- **Celebrating Success** of FIG Standards Network + FIG Commissions (3&7)

- Importantly, working in partnership with others.

- A data model is not just about data collection;
- It is also about implementation (multi stakeholder users FAO/SOLA, USAIDs MAST)

- **Evolution** is Key! Let us not stand still……

….Recognising benefits of an Evolutionary approach

Power of Partnership working

LADM: 2nd edition to be expanded

- **Collaboration** ISO/ TC211/FIG/ IHO and OGC
  - Geographic information LADM pt1 (ISO 19152-1-2024)
  - Additional scope from FIG relating to Hydro, spatial planning, valuation and construction (BIM)
- **Connectivity**: WB today + FIG Acca conference (May) + FIG Malaysia commission meetings (Sept),

- **Continuing** to evolve for society benefit

Tackle the Global (to local) Challenges

Relevance of standards requires a **Purposeful** and continuing intent **to implement.**

Celebrate your success; There is more to do

- To advance the global land agenda:
- To build partnerships and relationships
- Above all, to create robust data and professional standards

Evidenced by our collective ability, and:

- Desire to **champion** and lead (Netherlands)
- Build our **capacity**, and
- Can only be done with an inclusive **connected** multi- stakeholder approach
- **To achieve a global standard that benefits All**

Looking to the Power of Partnerships

Thank You

- WWW.fig.net

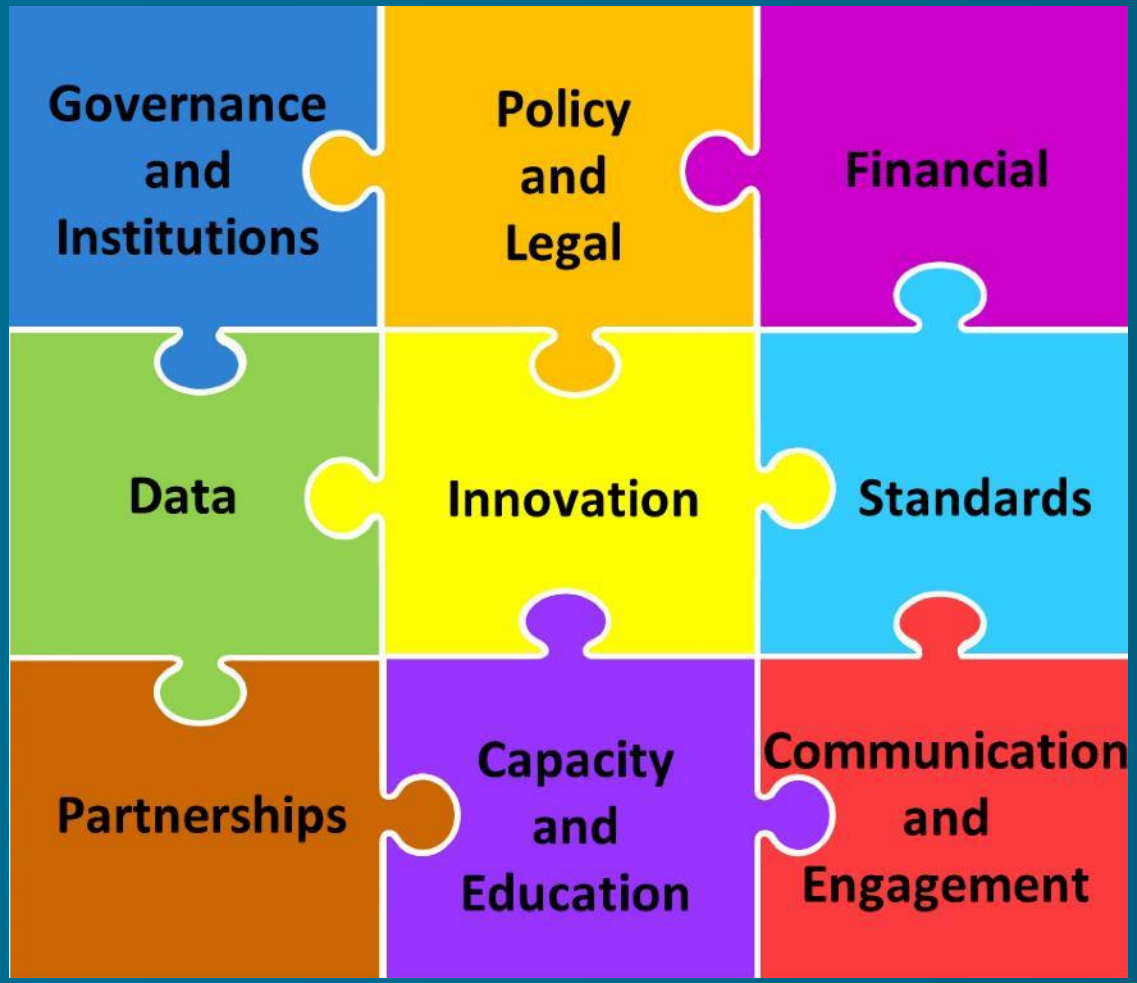
- President
- FIG: Dr D Dumashie
- ddd@dumashie.co.uk

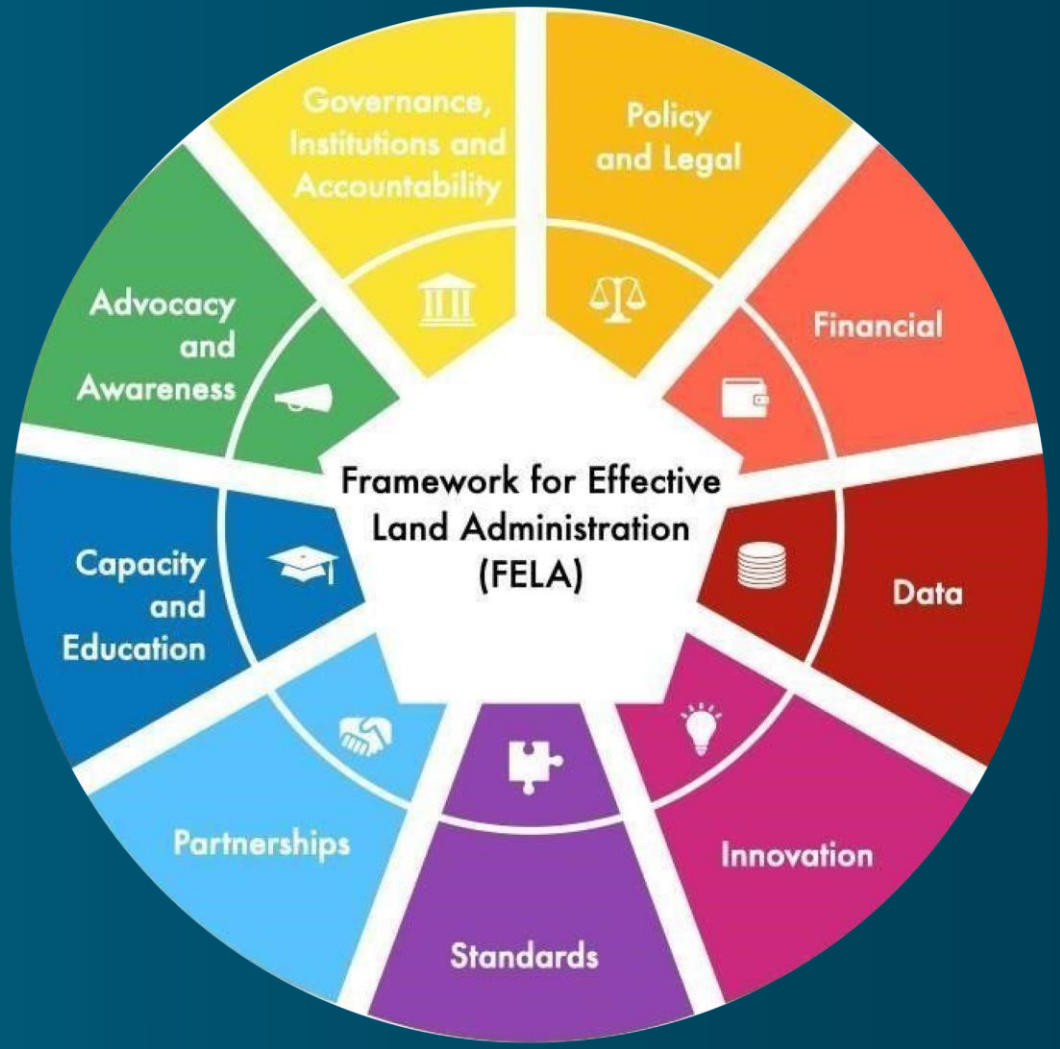
kadaster

Frank Tierolff

Chair Executive Board Kadaster
Co-Chair UN-GGIM Europe

13 May 2024


Governance and Institutions
Policy and Legal
Financial
Data
Innovation
Standards
Partnerships
Capacity and Education
Communication and Engagement


Framework for Effective Land Administration (FELA)
Governance, Institutions and Accountability
Policy and Legal
Financial
Data
Innovation
Standards
Partnerships
Capacity and Education
Advocacy and Awareness

The Netherlands

~40.000 km^2
~17,8 million inhabitants
342 Municipalities
21 Water Authorities

Country: e-Government spatial data infrastructure

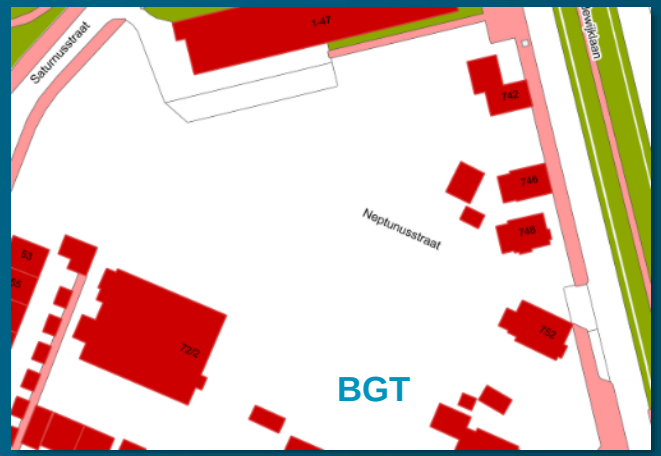
Provinces: Spatial planning, environment and conservation

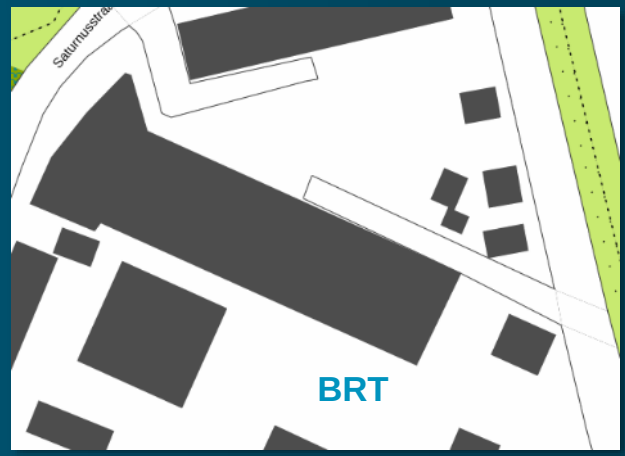
Municipalities: land management, zoning, local development
Key partner in e-Government and SDI

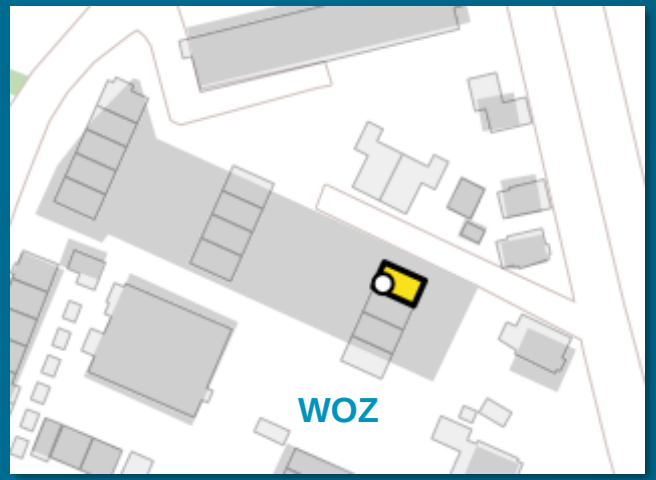
kadaster

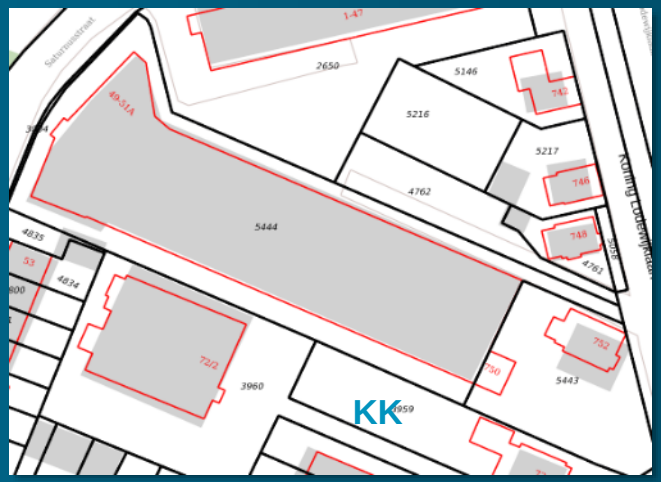

TE KOOP/TE HUUR
Voorstraat 280
D&B RETAIL
TE HUUR
WINKELRUIMTE
D&B RETAIL

The ‘picture’ in the key registers









Neptunusstraat, Apeldoorn, 22 June 2019


Reebok

In summary

1. Frameworks, Standards and Models are only working when implemented. A stronger focus on practicing and ‘’keep on working’’ is the best way to learn and understand

2. Frameworks, Standards and Models usually strive for the same objective by making things easier and better; important though is to realise that they are complementary

3. Complexity is sneaking in easily; try to avoid or learn from it. Keeping things simple is needed

4. Cooperation between all stakeholders is needed to achieve the best results