LADM COUNTRY PROFILES DEVELOPMENT

aspects to be reflected and considered

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L A D M

✓ ISO 19152:2012
   Edition I
✓ Revision process
   → Edition II
LADM INCREMENTAL DESIGN

New project → to meet new requirements

- Multipart standard :: new modules, informative Annexes
- taxation/valuation
- spatial planning
- land indicators

LADM country profiles
- Spatial Units & LADM Spatial Profiles
- LADM processes
- LADM and IHO S-121
- LADM and IndoorGML
- LADM encodings

Enhanced 3D and 4D support
- Volunteered land administration and crowdsourcing information

INVOLVED ORGANIZATIONS

OGC
FIG
FAO
ISO/TC 211
ITC
IHO
United Nations Office of Legal Affairs (OIA)
THE WORLD BANK
UN-HABITAT
RKS
UNOOSA
TU Delft

Colombia
Croatia
Cyprus
Czech Republic
Greece
Hungary
Indonesia
Israel
Japan
Korea
Malaysia
Montenegro

Poland
Portugal
Queensland, Australia
Republic Srpska
Russian Federation
Serbia
South Africa
The Netherlands
Trinidad and Tobago
Turkey
Victoria, Australia
...
MultiPart approach

**PART 1**
Land Administration
Fundamentals

**PART 3**
Marine Space /
Marine Geo-regulations

**PART 5**
Spatial Planning

**PART 2**
Land Tenure /
Land Registration /
Land Interests

**PART 4**
Land Valuation

**PART 6**
Implementation(s)

New NWIPs to be developed
Harmonization and interoperability at international/EU level (shared concepts & vocabulary)
Standardization will result in improved industry support
Supported/ promoted/ funded by international organisations: World Bank, FIG, IHO, RICS
A standardization support for registration of 3D spatial units
First steps to establish 3D Cadastre
Management and administration of specific domain areas: archaeological sites; underground utilities; public (State) property; natural resources; marine space; agricultural land uses.
Need to integrate/ communicate with BIM databases (obligation in some countries) and reuse such data

WHY

Already established a Land Administration System
→ need for modernisation/ reform/ renewal
Not fully established LAS
→ harmonization with international standards
Not yet established
→ opportunity to register directly 3D parcels & international compatibility

LADM meets the requirements of law and organizational administration to achieve sustainable utilization of land, air, water and other related natural resources
Howard

the authors of those profiles did not follow a specific methodology to develop them

- needs & requirements of the model
- 2 categories of CP: 1) holistic approach & 2) focused approach to a specific part of the LAS
- subject to the knowledge on LADM concept & classes
- level of maturity of the existing LAS
- number of organisations involved in current situation
- need to integrate with other databases
- countries only use the parts they need to → each country profile follows a different approach

PARAMETERS examined

- Existing Land Administration System
- Mapping with LADM classes
- Conceptual Model/ UML
- Conformance Level test (Annex A, ISO19152)
- Technical Implementation
- Contributors/ Created by

REFLECTION
Example Country profile:: Malaysia

3 Methodological steps to develop a country profile

- technical aspects (principles of data modelling, UML notation, code lists, etc.)
- non-technical aspects (institutional and legal aspects, etc.)
PHASE I - SCOPE
- Designation of contributors/stakeholders
- Vision/Scope of the new model
- Analysis of Current LAS/National Strategy
- Meetings & interviews!

PHASE II - CREATE
- Mapping with LADM classes
- UML modelling
- Populating code lists
- Conformity test (Annex A, ISO19152)

PHASE III - TEST
- Real data collection
- Instance level diagrams creation
- Database/XML Implementation & population
- (3D) visualization

MODEL A
CURRENT SITUATION
**NEW SCOPE**
(extended \(\rightarrow\) LADM Edition II)

**MODEL A**

**PHASE I**
- Designation of contributors/stakeholders
- Vision/Scope of the new model
- Analysis of Current LAS/National Strategy

**PHASE II**
- Mapping with LADM classes
- UML modelling
- Populating code lists
- Conformity test (Annex A, ISO19152)

**PHASE III**
- Real data collection
- Instance level diagrams creation
- Database/XML Implementation & population
- (3D) visualization

**FUTURE SITUATION**

**MODEL B**
Designation of contributors/stakeholders

- National Mapping Agencies
- Governmental Organisations
- Academic Community

Vision/Scope of the new model

- current situation of the jurisdiction
- future proof model → new elements that are not registered at all, or they are not registered by the mapping authority
- Wider scope of LADM Edition II: valuation/taxation, spatial planning, marine environment

Analysis of Current LAS/National Strategy

- Requirements’ analysis: national legislative framework & other relevant regulations.
- Current RRRs & code lists, enumerations
- Current documentation, data model & data dictionaries
- New strategies (BIM, etc.)

Iteration!
PHASE II

Mapping with LADM classes

- mapping the key concepts of the existing model(s) with LADM classes

UML modelling

- Inheritance from LADM core classes using a prefix
- Creation of new classes to serve the needs of the country, only when the existing concepts do not fit to the LADM Edition I classes
- Keep the associations as defined in LADM
- Adjusting cardinalities according to national regulations and/or define relevant constraints to be imposed
- Addition of new values to existing code lists. Use hierarchical structure of code lists or think about adopting CaLAThe
- Usage of the external classes to link the model with current external registries

Populating code lists

- MDA approach
  - Includes technical and modelling aspects, such as: definition of a prefix for the jurisdiction, evaluations, new classes to be added, inheritance from LADM core classes, etc.
  - The more LADM core classes are being used, the less complex the profile will be

Conformity test

- Conformity with ISO 19152 should be tested, according to Annex A of ISO 19152:2012 Edition I

Iteration!
PHASE III

- Real-world data collection
  - Involve the stakeholders/contributors to provide real-world data (administrative & spatial)

- Instance level diagrams creation
  - Create instance level diagram for use cases & indicate with different colours which authority is responsible for which class/attribute
  - Do the same at the future profile to monitor the changes on the responsibilities of the authorities

- Database/XML Implementation & population
  - UML model to be translated into database schema and stored in relevant software (e.g. PostgreSQL and PostGIS) for the implementation of the profile

- (3D) visualization
  - Visualisation & query of the country profile in (3D web) environment

Iteration!
✓ Need for an established, flexible methodology to build LADM country profiles

- Study and analyze requirements derived from national (existing) LAS, legislative framework & national strategies (e.g. BIM adoption)
- Involve government, industry and academia, organize interviews & meetings
- Identify and underline the role of involved authorities
- Assessment and feedback to be given at the end of each phase - - if needed repeat a phase of the methodology
- Use real world data (spatial & non-spatial) to test the country profile
- Implementation of the profile in a database and visualization

Annex D of LADM Edition II

inventory of the developed of country profiles →

Collect, store, maintain, organise & disseminate

Which organisation will be responsible for this inventory/registry (ISO, FIG, UN statistical division)?

CONCLUSIONS

Provide generic guidelines to set a framework for country profiles development respecting the differences of the various LA systems and their maturity level
based on the needs of the different LA systems (deeds, titles, strata titles, etc.) → provision of detailed matching with LADM classes & outline more specific methodological steps for each system to facilitate design decisions // ISO meetings to assign subgroups with experts

code lists usage: proposed by LADM, introduce new ones or extend the existing ones with new values // to avoid complexity & redundancy → hierarchical structure

Semantic technologies (e.g. SKOS, RDF, linked data, and ontologies), CaLAThe to be used for further refinement of code list values or semantic relationships between the terms → Annex J, LADM Edition II

Select one country to implement the proposed methodology and assess it

- level of compliance (Annex A of LADM Edition I): which organisation is responsible to decide and certify this level of compliance? // certification from relevant national organisation(s)

- software compliant with LADM implementation & its level of compliance
THANK YOU!