

Global Land Tool Network (GLTN)

**International Federation of Surveyors (FIG)
Commission 7 – Cadastre and Land Management**

**International Standardisation Organisation (ISO)
Technical Commission 211 Geographic Information (TC211)**

**Preparatory ISO 19152 Meeting on the Second Edition of the Land
Administration Domain Model**

LADM II

**Delft, The Netherlands
March 16, 2017**

SECOND DRAFT PROPOSAL for Agenda

Introduction

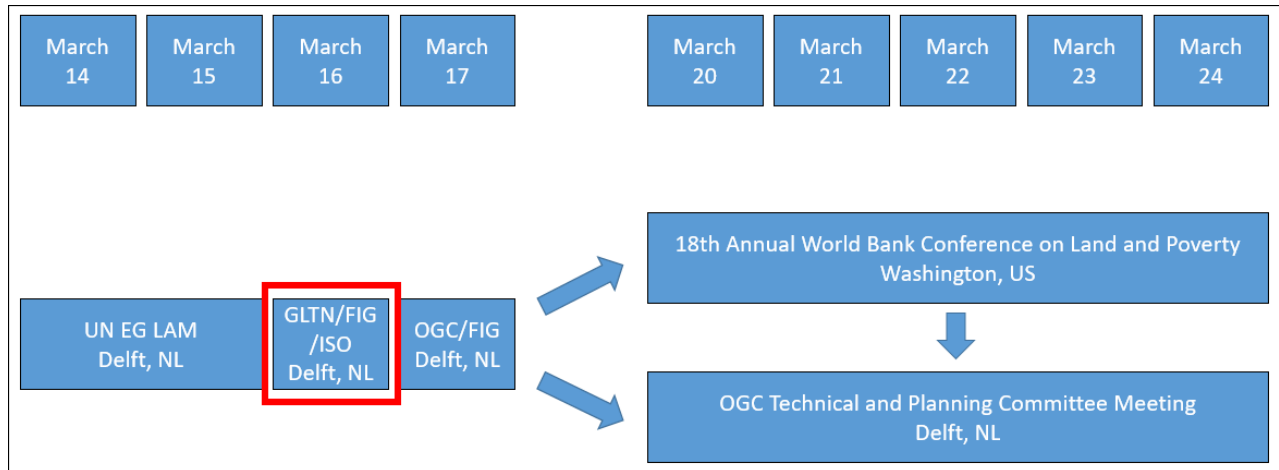
The UN Expert Group on Land Administration and Management (UN-EG-LAM) meets in Delft on Tuesday 14th and Wednesday 15th of March 2017. This meeting is by invitation only. On the Agenda is the country implementation of the global agenda where tenure issues are concerned with a focus on Fit-For-Purpose approaches in Land Administration and on Standardisation on Land Administration. This includes technical, legal and organisational issues.

In the same week there will be a workshop organised by the Global Land Tool Network (GLTN), the International Standardisation Organisation (ISO) and by the International Federation of Surveyors (FIG) on Thursday 16th of March 2017 – and there is a meeting of Open Geospatial Consortium (OGC) on Friday 17th of March. The GLTN/ISO/FIG workshop will focus on the development of requirements for land administration operational standards and for the second edition of the Land Administration Domain Model within ISO TC211. The OGC event will discuss relevant input for consideration by OGC for the development operational domain standards for land administration.

One week later, from March 20th till March 24th the World Bank Land and Poverty Conference will be organised in Washington D.C., US and in that week the OGC will organise its Technical and Planning Committee Meeting in Delft, The Netherlands. Coordination where needed will be organised.

See the schedule below with an overview of the activities.

Overview



Discussion items

During the GLTN/FIG/ISO 19152 workshop there are six central items for discussion:

1. Results of the UN EG LAM
2. GLTN inputs for the LADM: The Social Tenure Domain Model
3. Major Extensions of LADM:
 - Further modelling of LADM's rights, restrictions and responsibilities (RRRs)
 - A fiscal extension module
 - LADM in support to Marine Cadastre
 - More explicit relations with Building Information Modelling (BIM)
4. Linking New Data Acquisition Methods and Maintenance
5. Further Extensions
6. Coordination with OGC

Main expected outcomes of the ISO 19152 Maintenance preparation workshop Expert Group Meeting are:

- Inputs to the OGC events later that week in Delft, and:
- Proposals for maintenance of international code tables for RRRs
- A Draft overview of issues for the Work Plan for the ISO TC211 Working Group LADM Edition II
- First Ideas for Coordination with OGC

On isoladm.org under StandardMaintenance, there is an overview of reported topics and issues to be considered for new (revised) version of IS) 19152. Formally, this is the responsibility of ISO TC211, but the workshop is organized together with key organizations.

1. Results of the UN GGIM EG LAM

The results of the Expert Group on Land Administration Management (UN GGIM EG LAM) will be briefly presented. This concerns institutional issues – that is the introduction of National Land Tenure Atlas. This Atlas should be agreeable to global level. This issue can be linked to the proposals for international data exchange on code tables representing the different RRRs in use within countries. Further expected results of the Expert Group Meeting are on standardisation issues (LADM and operational standards) and on organisational issues – this concerns issues for country specific strategies for the Fit-For-Purpose Land Administration approach from a UN GGIM Perspective.

2. GLTN/FAO inputs for the LADM: The Social Tenure Domain Model

GLTN published the Social Tenure Domain Model as a software. Experience has been built in many countries. FAO published its LADM based Open Tenure – this development tends in the direction of using the STDM as a specialisation of LADM.

This requires discussion. The principle difference between LADM and STDM is in the class :LA_BAUnit. This class allows the representation of “Basis Administrative Units” or “Basic Property Units” in LADM. It allows grouping of Spatial Units with the same RRR.

This has impact on conversion from LADM as defined in ISO 19152 to STDM as defined in ISO 19152. There is a need for further specifications here.

From their experience in many countries GLTN and FAO bring their further requirements. This will be included in the Draft overview of issues for the Work Plan for the ISO TC211 Working Group LADM Edition II.

This will be combined with the requirements from UN GGIM EG LAM.

It should be remembered that many developing countries don't have a membership of OGC and/or ISO. Those countries need representation by global organisations.

3. Major Extensions of LADM

3.1 Further modelling of LADMs RRRs

A more detailed classification of the legal part of the LADM is proposed for inclusion in LADM Edition II - i.e. interests in land. More detailed than described in the LADM Edition I from 2012. The proposal from Jesper Paasch from Sweden is further developing the LADM's 'right', 'restriction' and 'responsibility' (RRR) classes and associated code lists. Besides the more obvious formal right descriptions, this paper also deals with informal rights' descriptions as introduced in the Social Tenure Domain Model (STDM) as a foundation for further LADM development. The proposal is based on the Legal Cadastral Domain Model, as developed by and described in the PhD thesis of Paasch, which is used as a conceptual basis for adding an additional level to the LADM. Interests in land can be classified in this model as limiting or beneficial to real property ownership. The extended classification is further based on the paradigm that there are two major types of interest inland, privately agreed interests and regulations imposed by a public agency. The incorporation of a specialized classification of RRRs in the LADM is of value for more inclusion of social tenure in (inter-)national land administration registers. The LADM allows national profiles to be added to the standard, however, such profiles are relevant within a country. These profiles are needed in cases where detailed data of interests in land have to be exchanged internationally. International data exchange requires maintenance of code tables representing the different RRRs in use within countries. OICRF has announced an initiative in support to this.

3.2A fiscal extension module

Taxation, and specifically taxation on land and immobile property, has recently been related to the process of building effective states and markets. The political aspects of this process are critical, but the following addresses the development of the information systems needed to realize the above-mentioned government tax reforms. A fiscal registry or database is supposed to record legal, physical, geometric, economic, and environmental characteristics of the property units, which are subject to immovable property valuation and taxation. A land administration infrastructure is required to link fiscal registries with other public registries (e.g., cadastre, land registry, building and dwelling registries). The ISO 19152:2012 Land Administration Domain Model (LADM) is a conceptual data model which provides a standardized global vocabulary for land administration. There is a proposal from Volkan Çağdaş from Turkey to extend the scope of LADM with a fiscal perspective to provide a data model that could be used to construct information systems for immovable property valuation and taxation, and offer a data exchange option. The proposal (for inclusion in the second edition of LADM) provides a common basis for governments to direct the development of local and national databases, and for the private sector to develop information technology products. An option could be

to include this as informative annex (similar to LPIS or INSPIRE CP annexes). Now mentioned in informative annex K (External classes: ExtValuation and ExtTaxation).

3.3 LADM in support to Marine Cadastre

Role of IHO and new standard S121 – Maritime Limits and Boundaries – has to be discussed. Of course with involvement of IHO.

In a recent paper by Michael Sutherland, Charisse Griffith-Charles and Dexter Davis it is analysed if LADM is applicable to Marine Cadastres. This analyses concerns LADMs ability to:

- accommodate information on stakeholders in marine space,
- accommodate and model complex overlapping marine boundaries,
- incorporate other relevant spatial information components,
- incorporate relevant non-spatial attributes,
- associate marine parcels with complex legal regimes, and the ability to:
- facilitate marine cadastre's data integration in SDIs.

It is concluded that “Publications dealing with the marine cadastre concept were reviewed and criteria defined therefrom so as to support an assessment of whether the LADM standard is as a whole applicable, as published, to marine cadastres. The discussions in Section 5 seem to suggest a positive response to this query. It can therefore be reasonably assumed that a purely LADMbased marine cadastre can be developed and implemented. This can be good news to those jurisdictions who are seeking to develop marine cadastres – they can reasonably trust the LADM as an applicable conceptual standard.” This means it should be relatively easy to include this functional requirement. The International Hydrographic organisation seems to bring support.

3.4 More explicit relations to design information and topography

More explicit relationships with BIM (IFC), GeoBIM, CityGML, IndoorGML, InfraGML, LandXML, etc. for the external classes in LADM (such as ExtPhysicalBuildingUnit and ExtPhysicalUtilityNetwork), but might also be relevant in the context of the Spatial Unit Package (esp. the Surveying and Representation Subpackage),

This implies a relation to the lifecycle of buildings and related rights.

4. Linking New Data Acquisition Methods and Maintenance – Generic Processes

So far the functionality of LADM concerns the modelling of information at conceptual (knowledge) level. Processes for initial data acquisition and maintenance and publication of the data are not included in the model (LADM I does not include UML Activity Diagrams). Reason is that those processes were considered to be country specific when LADM I was prepared. A global approach would be difficult to model. This view needs reconsideration. The Fit-For-Purpose Land Administration allows to identify modules in data acquisition and data handling. The expectation is that modules can be defined and may be implemented in a sequence that meets the requirements of the user. More generic approaches are expected to be possible:

- Computerising legacy data (indexing and geo locating where possible)
- Determining accuracy labels for all attributes – geometric and administrative
- Recognition of rights, rightholders
- Coding
- Inclusion in Tenure Atlas
- Image based acquisition:
 - o Selection of cloudfree imagery – access to sensors and image libraries
 - o Creating cloudfree compositions – may be from different sensors
 - o Geo referencing (can be in post processing mode)
 - o Feature extraction
 - o Feature classification (optional)
 - o Data cleaning and feature visualisation
 - o Provision to data collectors (logistics) – this can be paper based or digital, paper based acquisition allows leaving the collected field boundary evidence to the local people. This includes participatory approaches, roles, and on line/off line publication. Includes data on people id's, photo's, signatures, fingerprints, video, voice recording etc. And right types and restrictions, incl disputes
 - o Scanning (optional)
 - o Georeferencing (optional)
 - o Polygon creation, topology, identification, linking
 - o Conversion of rights to legal status
- Similar: UAV based acquisition, Lidar based, Radar Based, Conventional Survey Based
- Publication of parties, related rights and spatial units (incl global services as Google, Virtual Earth, Open Street Map)
- Conflict resolution
- Integration in SDI – incl. links to rights and rightholders
- Maintenance of parties and related rights and related spatial units – see book Stubkjear/Zevenbergen

- Inclusion of (legacy) Land Administration Archives and Document Information

Processes as initial data acquisition may concern millions of spatial units (parcels) where people to land relationships have to be determined. The organisation of this process requires geo-support in logistics and case management based on geo-information. During field work a check on completeness needs to be performed – in an easy way.

By using orthophotos to produce spatial frameworks the imagery is typically linked to the national geodetic reference frame through GNSS systems on the space/ aircraft and on the ground.

Field surveys may be needed. Today Lidar and Radar technologies can be used. Automated feature extraction can bring support in the production of co-ordinates from identified visible boundaries drawn on top of imagery.

Processes to be supported in an integrated way could be: composition of cloud free imagery, logistic support in fieldwork (task management, logistic overviews), initial data acquisition, geo-referencing (based on elevation models), identification of boundaries, surveying (based on imagery, conventional surveys, UAVs, digital pens for imagery, feature extraction, Radar), area management, linking rights – restrictions – responsibilities to spatial units, linking (groups of) persons to (shares in) rights – restrictions – responsibilities, public inspection, publication of land data, formalisation, map renovation and quality improvement and digital archiving. Legacy data requires A/D conversion and linking to digital data from other sources.

5. Further Improvements and Extensions

This concerns a series of improvements and extensions as collected and maintained since the publication of LADM Edition I in 2012. The major proposed extensions are already presented here above. Further improvements and extensions include:

- the formalisation of code lists values: specify registries, procedures for updating the registries with new/ changed/ deleted code list values (possibly with structure: hierarchy; e.g. apply SKOS; W3C), national and international aspects (translation and various languages), versioned code list values (possibility to change over time; e.g. refined definition), etc.. Adding an RRR relationship to relate various rights when needed; e.g. Link a long lease to an ownership right or 2. link the two shares in ownership right of a man and wife. See also above in relation to the proposals from Paasch,

- the correction of omissions; this includea attention to geometry type of LA_BoundaryFace - GM_MultiSurface; constraint in LA_BoundaryFaceString; GM_MultiCurve;
- Processes –
- Linking other ISO Standards. Extensions may be needed:
 - o ISO 19131 – Land Use 1990, 2000, 2010 Data Product Specifications
 - o ISO/WD 19160-1, Addressing -- Conceptual model

6. Coordination OGC/ISO activities

ISO TC211 will develop LADM Edition II. OGC is operationalising standards for Land Administration.

Those developments are preferred to be in support to each other.

The close co-operation between OGC and ISO can develop co-ordination.

It may be a good idea to include global organisations as WorldBank, UN GGIM, UN Habitat/GLTN and FAO into this co-ordination process.

Proposed Agenda

Thursday March, 16th 2017

- | | |
|---------------|--|
| 08:30 – 09:00 | Results of the UN EG LAM |
| 09:00 – 10:00 | GLTN inputs for the LADM: The Social Tenure Domain Model |
| 10:00 – 10:15 | Break |
| 10:15 – 12:30 | Major Extensions of LADM <ul style="list-style-type: none">- Further modelling of LADM's rights, restrictions and responsibilities (RRRs)- A fiscal extension module- Marine Cadastre- Building Information Modelling |
| 12:30 – 13:30 | Lunch |
| 13:30 – 15:00 | Linking New Data Acquisition Methods and Maintenance |
| 15:00 – 15:15 | Break |
| 15:15 – 16:00 | Further Extensions (incl SKOS, W3C) |
| 16:00 – 17:00 | Coordination with OGC |

Open Geospatial Consortium (OGC)

Considerations for Operational Standards in Land Administration

OGC workshop on Operational Standards in Land Administration

**Delft, The Netherlands
March 17, 2017**

SECOND DRAFT PROPOSAL for Agenda

Introduction

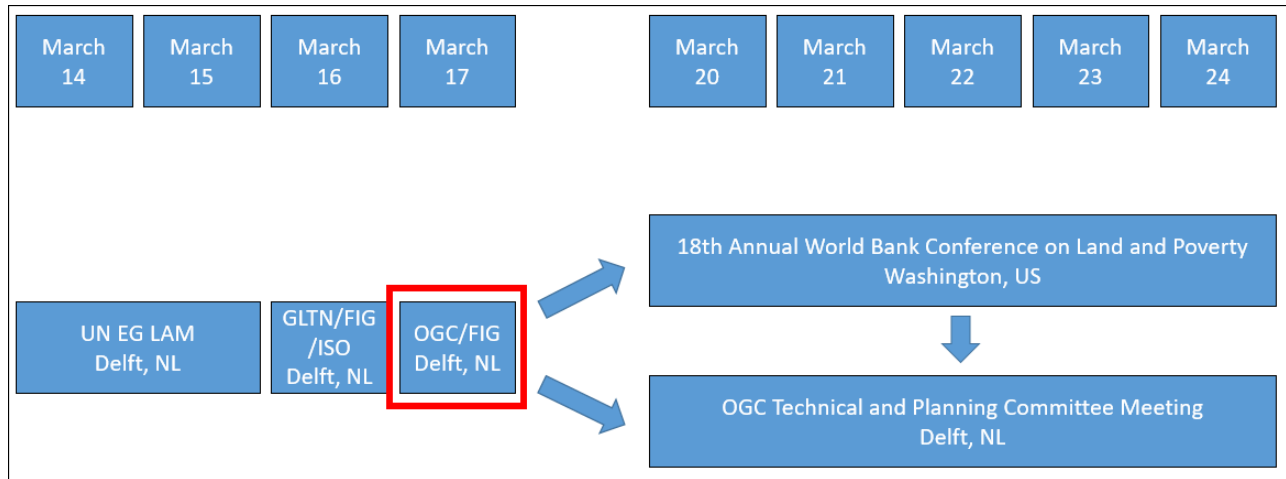
The UN Expert Group on Land Administration and Management (UN-EG-LAM) meets in Delft on Tuesday 14th and Wednesday 15th of March 2017. This meeting is by invitation only. On the Agenda is the country implementation of the global agenda where tenure issues are concerned with a focus on Fit-For-Purpose approaches in Land Administration and on Standardisation on Land Administration. This includes technical, legal and organisational issues.

In the same week there will be a workshop organised by the Global Land Tool Network (GLTN), the International Standardisation Organisation (ISO) and by the International Federation of Surveyors (FIG) on Thursday 16th of March 2017 – and there is a meeting of Open Geospatial Consortium (OGC) on Friday 17th of March. The GLTN/ISO/FIG workshop will focus on the development of requirements for land administration operational standards and for the second edition of the Land Administration Domain Model within ISO TC211. The OGC event will discuss relevant input for consideration by OGC for the development operational domain standards for land administration.

One week later, from March 20th till March 24th the World Bank Land and Poverty Conference will be organised in Washington D.C., US and in that week the OGC will organise its Technical and Planning Committee Meeting in Delft, The Netherlands. Coordination where needed will be organised.

See the schedule below with an overview of the activities.

Overview



Discussion items

During the OGC there are five central items for discussion:

1. Introduction of the OGC and the OGC Land Administration Domain Working Group
2. Results of the UN EG LAM and the GLTN/FIG/ISO events earlier this week in Delft – issues for consideration
3. Information Infrastructure
4. Coordination with UN GGIM, ISO, FIG, WB, UN Habitat GLTN and FAO

Main expected outcomes of the OGC workshop on Operational Standards in Land Administration are:

- Inputs to the OGC Technical and Planning Committee Meeting next week (20 – 24 March 2017) in Delft
- Inputs to the World Bank Land and Poverty Congress next week (20 -24 March 2017) in Washington DC ,
- A Draft overview of issues for consideration to the OGC Land Administration Domain Working Group
- First Ideas for Coordination with UN GGIM, ISO, FIG, WB, UN Habitat GLTN and FAO

1. OGC Land Administration Domain Working Group

In a OGC Charter the Land Administration Domain Working Group introduced as follows:

This Domain Working Group (DWG) charter defines the role for OGC activities related to land administration. Worldwide, effective and efficient land administration is an ongoing concern, inhibiting economic growth and property tenure. Only 40 countries around the world have mature land information systems. Of the developing nations, most have 10% or less of their land in formal systems. In many nations, land administration systems are either non-existent or manual paper-based or semi-automated systems subject to limited public access. All of these approaches are at significant risk of data loss and failure due to disasters and lack of interoperability. The charter members of this DWG seek to identify enabling standards and best practices to guide countries in a programmatic way to establish more cost effective, efficient and interoperable land administration capability, to upgrade current manual to semi-automated processes, and to suggest solutions that are more automated and flexible to new data sources technologies. These challenges are faced today in countries considered as “developing” as well as those designated as Official Development Assistance (ODA) recipients.

The key to beneficial use of land administration data by all stakeholders is the ability of land administration frameworks to support the regulatory and policy environments that are often unique to individual jurisdictions and nations.

This DWG will focus on:

- the examination of existing systems of land administration;
- preparation of best practices that enable nations to address their needs in less time, cost, and effort through standards-based implementations; and
- dialog on the integration of emerging information resources and/or technologies to assist nations in leapfrogging capability.

Additionally, the DWG will identify proposals for industry interoperability assessments, interoperability testbeds, pilots and experiments designed to bring together users and technology providers to test, demonstrate and validate best practices for use to guide the acquisition and implementation of sustainable, scalable and interoperable systems.

The LandAdmin DWG cannot work in isolation. The LandAdmin DWG will work closely with the LandInfra DWG and SWG to identify existing standardization efforts underway in the OGC that reference Land Administration concepts to work toward interoperability with LandInfra standards. In addition to engaging OGC membership, the DWG will leverage OGC’s formal alliance partnerships and liaisons with other associations and standards development organizations (e.g. ISO/TC 211, Royal Institute of Chartered Surveyors (RICS), World Wide Web Consortium (W3C), OASIS, International Federation of Surveyors (FIG), and The Global Land Tool Network (GLTN)) to address interoperability issues that span the land administration community of practice, geographic information

systems, and the broader IT environment. Examples include linkages with ISO TC 211 regarding the LADM (Land Administration Domain Model, ISO 19152:2012) standard as well as those Standards Development Organizations (SDOs) responsible for IT standards related to topics such as security, web and mobile services. Further, this DWG will be open for participation by any interested organizations and individuals.

This Domain Working Group and the way the group operates will be introduced.

2. Results of the UN EG LAM and the GLTN/FIG/ISO events earlier this week in Delft – issues for consideration

The results of the Expert Group on Land Administration Management (UN EG LAM) and of the GLTN/FIG/ISO event earlier this week in Delft will be presented.

This concerns institutional issues – that is the introduction of National Land Tenure Atlas. This Atlas should be aggregable to global level. This issue can be linked to the proposals for international data exchange on code tables representing the different RRRs in use within countries. Further expected results of the Expert Group Meeting are on standardisation issues (LADM and operational standards) and on organisational issues – this concerns issues for country specific strategies for the Fit-For-Purpose Land Administration approach from a UN GGIM Perspective.

It further concerns the Social Tenure Domain Model, major Extensions of LADM (that is further modelling of LADM's rights, restrictions and responsibilities (RRRs), a fiscal extension module, Marine Cadastre, Building Information Modelling, etc.). A comprehensive overview will be discussed.

A principle issue is the inclusion of a series non-geometric functional requirements. This is about administrative and legal issues related to land.

A further principle issue is the consideration of a wider information infrastructure.

3. Information Infrastructure

Spatial data sets are most useful in the support of decision making, management of space, performance of government and business, etc., when integrated in governmental information infrastructures (architectures).

This implies availability of well-maintained links between spatial datasets and other 'basic' or 'key' datasets, e.g. on addresses, persons, companies, buildings, land rights etc. Integrated, and inter-organizational value chains, business process management and reduction in administrative overheads can be introduced based on new business models.

In general the resolution of problems in society requires more information than provided from one single data set, and this is equally true for problems with a spatial concept. It is evident that this type of data provision is complex in case data is stored at a variety of locations and in data models specific to its application domain. In this chapter it is argued that an effective infrastructure can be achieved solely by the use of authentic registers (or 'key registers') to store key data that is available for integration and multiple use.

The ISO 19152 Land Administration Domain Model (LADM) provides an extensible basis for efficient and effective cadastral system development based on a model driven architecture (MDA), and enables involved parties to communicate based on the shared ontology implied by the model. As it is already difficult within one domain (such as Land Administration) to agree on the used concepts and their semantics, it will be even more difficult in case of dealing with other domains. However, we cannot avoid this if a meaningful interoperable spatial information infrastructure has to be developed and implemented.

We need to discuss the links between land administration and other data sets: persons, companies, addresses etc. We need to discuss the level of integration to operational standards in land administration.

This is a fundamental interoperability issue.

4. Coordination ISO activities and further Communication

ISO TC211 will develop LADM Edition II. OGC is operationalising standards for Land Administration.

Those developments are preferred to be in support to each other.

The close co-operation between OGC and ISO can develop co-ordination.

It may be a good idea to include global organisations as WorldBank, UN GGIM, UN Habitat/GLTN and FAO into this co-ordination process.

Communication concerns:

- Inputs to the OGC Technical and Planning Committee Meeting next week (20 – 24 March 2017) in Delft
- Inputs to the World Bank Land and Poverty Congress next week (20 -24 March 2017) in Washington DC ,

Proposed Agenda

Friday March, 17th 2017

08:30 – 10:00	Introduction of the OGC and the OGC Land Administration Domain Working Group
10:00 – 10:15	Break
10:15 – 12:30	Results of the UN EG LAM and the GLTN/FIG/ISO events earlier this week in Delft – issues for consideration
12:30 – 13:30	Lunch
13:30 – 15:00	Information Infrastructure
15:00 – 15:15	Break
15:15 – 17:00	Coordination with ISO and further Communication