



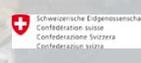
## Spatially Enabled Society

*A joint publication between FIG and GSDI, edited by*

**Daniel Steudler and Abbas Rajabifard**

*Launched at  
FIG Working Week 2012 in Rome, Italy, 7 May 2012  
and  
GSDI-13 in Québec, Canada, 14 May 2012*

*Supported by:*

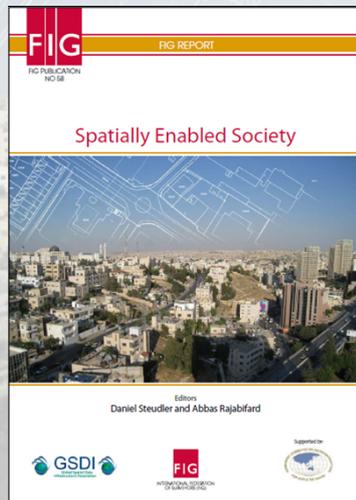


## Task Force, its Aim, and Activities

- FIG-Task Force mandated at Working Week 2009
- to explore the issue of Spatially Enabled Societies (SES);
- to identify the role of the profession, how it can provide for a spatially enabled society;
- to make recommendations
- May 2011: paper and presentation at FIG-Working Week 2011 in Marrakech
- Oct. 2011 in Melbourne: meeting of Task Force
- Feb. 2012: joint workshop as a platform to discuss the findings and gain further input
- May 2012: launch of publication at FIG-Working Week 2012 in Rome and at GSDI-13 in Québec

# Publication «Spatially Enabled Society»

Steucler and Rajabifard, editors, 72 pages, FIG Publication no. 58



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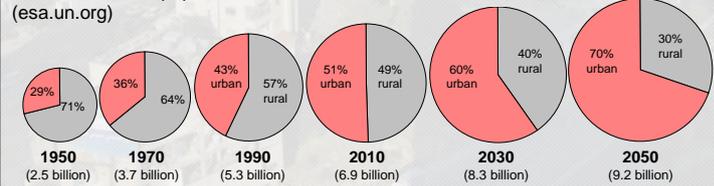
1. Introduction
2. Needs of Societies and Governments
3. Role of Land Administration, Land Management and Land Governance
4. Key Elements for a Spatially Enabled Society
  - Definition of the term «Spatially Enabled Society»
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  - 4.3 Positioning Infrastructure
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5. Discussion
6. Conclusion and Future Directions

## Challenge – Population growth

- World pop. increasing to 9.2 billion by 2050
- huge urbanization process
- UN-Habitat (2010): urban population in Africa of 400million will triple until 2050
- Challenges: development of infrastructures, basic services such as health, education, drinkable water, waste water treatment, public transport, security



World urban/rural population 1950-2050  
(esa.un.org)



## Challenge – Environmental sustainability

### "Tragedy of the commons": Azerbaijan after transition in 1990's

- private landownership was introduced initially only for land within the village;
- land outside the villages remained common property respective state property;
- village society was not sufficiently organized;
- sheep secure the income of the rural population;
- sheep stock became approx. 5 times as big as the actual capacity of the land would have been;
- serious erosion and degradation problems;
- **basic problem was lack of responsibility and accountability for the resource "land".**



## Challenge – Disaster management

- Thailand after tsunami: lack of proper landownership information allowed financial investors to take over land, while local fisherman have been ousted from their properties;
  - well documented landownership information would have protected minorities with lesser economic power against exploitation;
  - Aceh after tsunami: the loss of land registry and cadastral data caused huge problems for reconstruction, planning, and social stability;
- **Disaster management starts before the disaster; landownership information is crucial.**



## Challenge – Land Management



**Nail house in Chongqing, China (2007):** A cadastre with documentation of land ownership is clearly in place, but something else seems to be non-satisfactory.

## Land Administration and Management Paradigm

Tasks	Land related activities	Tools / Methods
<b>Strategy</b> – visions and objectives	<b>Land policy</b>	<ul style="list-style-type: none"> <li>• political activities</li> </ul>
<b>Management</b> – measures and projects for the implementation of the policy	<b>Land management</b> 	<ul style="list-style-type: none"> <li>• land-use planning</li> <li>• land consolidation</li> <li>• land reallocation</li> <li>• melioration</li> <li>• landscape development</li> <li>• land recycling</li> </ul>
<b>Administration / Documentation</b> – handling of spatial information, data analysis, data visualization – cadastral operations, data modelling, data acquisition, data maintenance, data distribution	<b>Land administration and cadastre</b> 	<ul style="list-style-type: none"> <li>• monitoring</li> <li>• navigation</li> <li>• geoinformation</li> <li>• land registration</li> <li>• cartography</li> <li>• surveying</li> <li>• geodesy</li> </ul>

## Definition of a Spatially Enabled Society

A spatially enabled society – including its government – is one that makes use and benefits from a wide array of spatial data, information, and services as a mean to organize its land related activities. Spatial enablement is a concept that adds location to existing information and thereby unlocks the wealth of existing knowledge about the land, its legal and economical situation, its resources, potential use and hazards. Information on landownership is thereby a basic and crucial component to allow for correct decision-making. Such data and information must be available in a free, efficient, and comprehensive way in order to support the sustainable development of society. It therefore needs to be organized in such a way that it can easily be shared, integrated, and analysed to provide the basis for value-added services.

## Six key elements for a SES

- **Legal framework** for basic geoinformation;
- **Common Data integration concept:**
  - legal and institutional independence of information (to allow for independent responsibilities);
  - common geodetic reference framework;
  - standardized data modelling concept;
- **Positioning infrastructure** for the common reference framework;
- **Network infrastructure** to enable integration and sharing of spatial data through the spatial data infrastructure SDI;
- **Landownership information** as one of the basic information topics;
- **Data and information:**
  - official, authentic, complete, comprehensive, updated;
  - accessibility of data i.e. public sector information initiatives;
  - volunteered geographic information (VGI), web 2.0 possibilities.

## Legal Framework

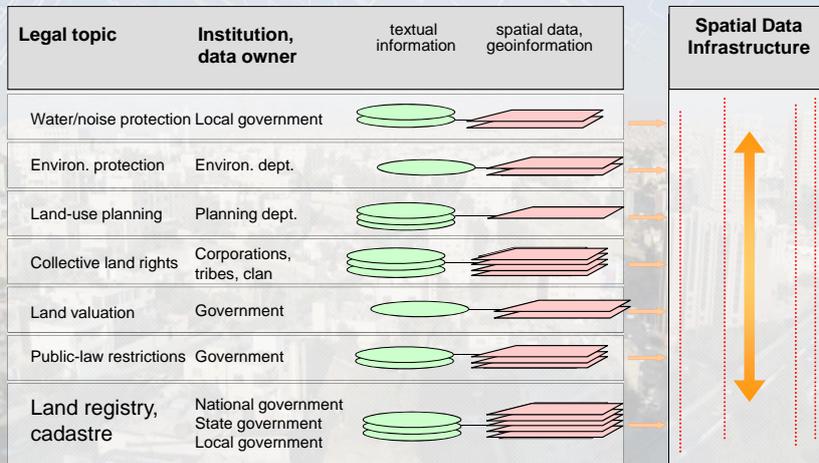
Serene Ho, Jude Wallace  
and Abbas Rajabifard

- Jurisdictional framework
  - constitutional statement about geoinformation
  - national law on geoinformation to be harmonized
  - national law on documentation of land ownership
- Legal interoperability
  - use conditions clear and determinable
  - no restrictions on derivative products
  - no restrictions on use and access of other datasets
- Governance
  - comprehensiveness, coverage
  - transparency of information
  - inclusion of public-law restrictions (RRR)



# Common Data Integration Concept

Jürg Kaufmann,  
Daniel Steudler

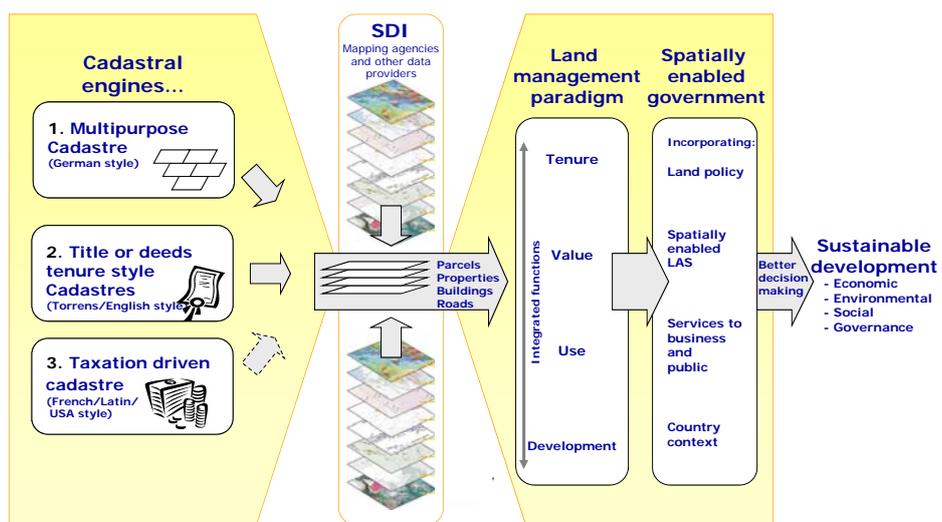


Three key elements for data integration concept:

- legal resp. institutional independence
- common geodetic reference framework
- standardized data modelling concept



# Land Management Paradigm

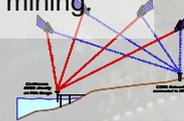


(Williamson, Enemark, Wallace, Rajabifard, 2010)

## Positioning Infrastructure

Matt Higgins

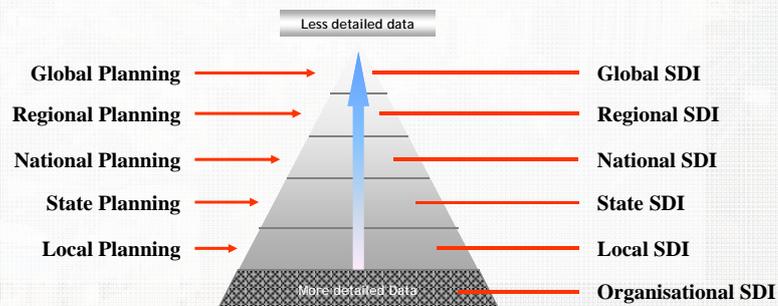
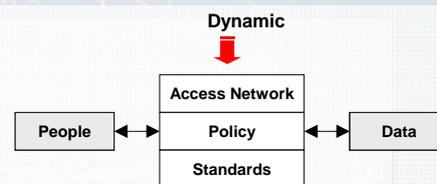
- in Australia, a report estimated the benefits for agriculture, construction and mining through precision machine guidance to AUD 73-134 billion over the next 20 years, mainly in fuel efficiency.
- underpinning the broad spatial enabling of society;
- ubiquity for hundreds of million mobile phone users to locate themselves; hunger for improved performance;
- ultimate accuracy requirement of both PI and SDI is likely to be better than 10cm at a very high confidence level;
- establishing of a PI for surveying and geospatial sector alone can only be justified in densely populated areas; the extension into rural and remote areas can only be justified, when the business case is broadened beyond surveying and spatial data → machine guidance for agriculture, construction and mining.



## Spatial Data Infrastructure

Abbas Rajabifard

- Enabling platform
- Social and technical components
- Interoperability



## Land Ownership Information

Paul van der Molen

- application of subsidiary principle: political decisions should be taken at lowest administrative and political level, and as close to the citizens as possible;
- interaction between Government, business, and citizens is concerned with land tenure, land tenure security, land and mortgage market;
- it is generally accepted that a land administration system is to be based on land ownership data;
- examples are INSPIRE (where cadastral parcel is a core data set) and the six Dutch official and authentic registries (with one of them "parcel and land registration").



## Data and Information

Robin McLaren

### **Location revolution, LBS, social media turn location-based**

*Public Sector response:* NSDI, INSPIRE, Open Government Data;

*Private Sector response:* high resolution satellite imagery; crowd-sourced data; big digital powers create digital civilizations;

*Citizen response:* dramatic shift to crowd-sourcing, also "passive" crowd sourcing through mobile devices;

**The Future of NMCAs:** strategies to incorporate crowd-sourced data into production processes: using data from trusted sources, act as moderators of input portals; cautious about change; retreat to diminishing market for authoritative geospatial data?

→ Global technology companies understood the power of location



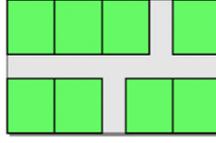
# Spatial Enablement *in action*

A GFC Early Warning System

The real world...



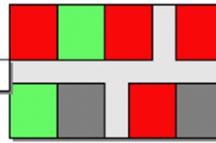
Build a cadastre...



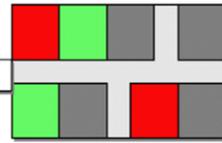
Add a mortgage layer (grey)



Aggregate nationally and respond promptly...



Monitor spatially for clustering



Record foreclosures spatially (red)

...most countries, including the US do not have this capacity yet

Bennett, R., Rajabifard, A., Williamson, I., (2010). Drivers for national land administration infrastructures, Land Use Policy, "Under internal review.

synthesis informatik

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Infos **Frühjahrserhebung**

Erhebungsstelle

- Überprüfen der Bewirtschaftung
- Bewirtschaftung
- Mitglieder
- Zahlverbindung
- Arbeitskräfte
- Abmeldung Programme
- Produktionsstätte
- Tiere
- Bewirtschaftete Parzellen
- Kulturflächen
- Prüfen und Beenden
- Einstellungen

Frühjahrserhebung ▶ Kulturflächen

Kulturflächen **Raumdaten** Übersicht der Kulturen Zurücksetzen

Speichern Abbrechen

Sichtbare Ebenen

- Naturschutz
- GelanBOF
- Landw. Zonengrenzen

42 Meter Massstab 1 : 1047

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## Where to get it

directly at conferences (FIG-Working Week, GSDI-13)

can be ordered at FIG Office in Copenhagen ([www.fig.net](http://www.fig.net))

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