The INSPIRE contaminated sites data exchange model

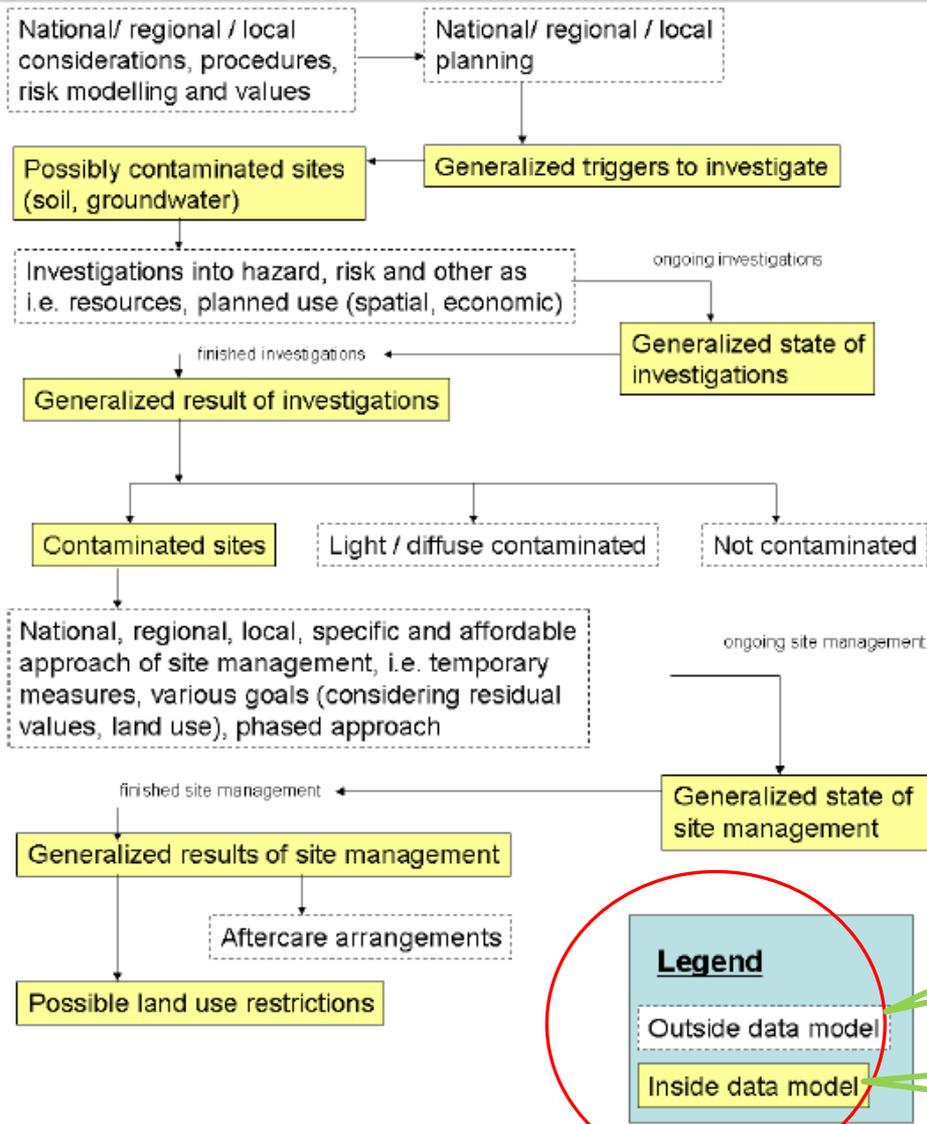Versluijs, RIVM, The Netherlands

11/12/2012

Background

- The INSPIRE SOIL data exchange model includes parameters for soil characterization, these include in principle concentrations of contaminants, mentioned are the metals Cd, Cr, Cu, Pb, Hg, Ni, Zn (linked to legislation in the Sewage sludge directive)
- The annex on contaminated soil contains a non obliging extension of the soil description model, demonstrating the usefulness of the soil model
- The extension gives a geo-referenced description of individual sites, regarding the state of affairs in
  - the identification of contaminated sites,
  - the investigations
  - the measures for remediation or risk reduction
  - the aftercare
- The model is generalized with regards to national procedures

National/ regional / local considerations, procedures, risk modelling and values

National/ regional / local planning

Generalized triggers to investigate

Possibly contaminated sites (soil, groundwater)

Investigations into hazard, risk and other as i.e. resources, planned use (spatial, economic)

ongoing investigations

Generalized state of investigations

finished investigations

Generalized result of investigations

Contaminated sites

Light / diffuse contaminated

Not contaminated

National, regional, local, specific and affordable approach of site management, i.e. temporary measures, various goals (considering residual values, land use), phased approach

ongoing site management

finished site management

Generalized state of site management

Generalized results of site management

Aftercare arrangements

Possible land use restrictions

Legend

Outside data model

Inside data model

identification

investigation

site management

aftercare

FREE, Diversication according national considerations

Standard description of results

Figure 10: Overview of the items inside the data model and the items which are purposely left out of the data model.

Identification of sites from administration and archives	Inventory of possibly contaminating activities	Civil complaints, calamities
	Preliminary study	
Soil and groundwater investigations and risk assessment on the site	Preliminary soil investigation	
	Main site investigation into types and levels of contamination, dispersion and risks	
Measures to facilitate landuse	Investigation into measures and planning	
	Realization of measures	
	Aftercare	

Proposed main line of the procedures.
The datamodel considers:
- where are we ?
- which decisions are made yet?

Figure 11: Tiered approach on headlines of the investigation and management of sites with possibly contaminated soil and/or groundwater. Starting on the top and going down following procedures for investigations and management.
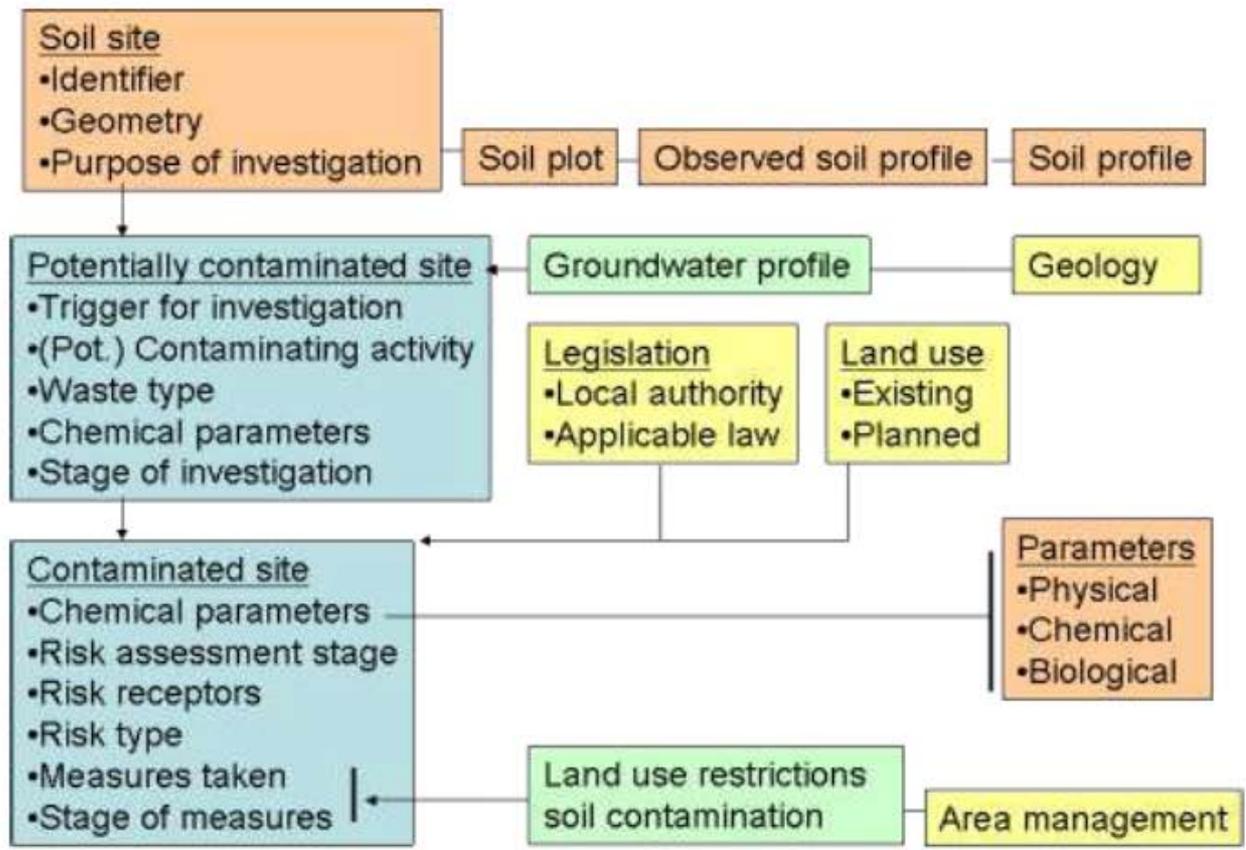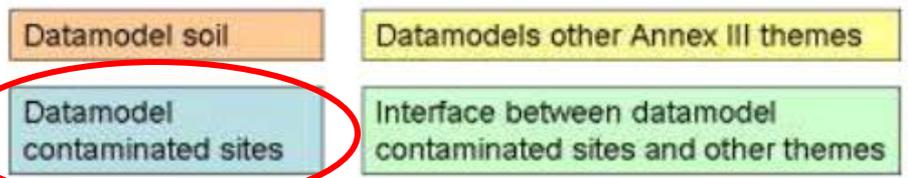
Figure 12: Quick reference view of the model

The datamodel (blue) and its connection to:
- the main soil data model (orange),
- other Inspire datamodels (yellow).

Explanation of the model

- Simple: 2 entities (in blue)
- Details: in *attributes* defining the properties and in *codelists* giving applicable entries (all definitions and codelist are included in the INSPIRE report, referring to existing international codelists)
- The 2 entities connect with
  - The main soil model (orange)
  - The models of other Thematic working groups (yellow):
    - Geology
    - Legislation
    - Land use
    - Area management
- The arrows indicate inheritance of properties, i.e. the blue entities inherit georeferencing from the entity soil site in the main soil model

The difference between the 2 entities in the datamodel

- [1] The reason to include a site as *potentially contaminated* is based on the trigger for investigation:
  - a certain type of polluting activity,
  - a certain type of waste found,
  - contamination found in soil surveys,
  - justified civil complaints
- [2] A site will remain potentially contaminated as long as no verdict is given that it is *contaminated* over treshold values (which may be different for different nations and for different regions, i.e. in relation to background values, and also in relation to land use / exposure management)

Example of a possible application

- On the basis of the attributes of (potentially) contaminated sites these sites can be subdivided in categories. This helps to makes clear which types of sites are included and which are left out.

- This may explain the differences between EEA-reports of the numbers of (potentially) contaminated sites in the member states and

- It reflects which type of sites are the most important in the specific industrial, economic, historical, juridical circumstances of a member state and what is considered as the highest priority.

Why it is important to know the state of soil pollution?

Possible tasks in risk management of local soil pollution

Direct human health protection	Water system management	Food and agriculture management
Control direct contact with soil pollution	Control drinking water wells	Maintain primary production- fertility and biological cycles of material
Avoid local food pollution (home produce or local storage)	Limit dispersion of pollution with groundwater	Avoid pollution dispersion with agricultural and other produce
	Maintain water quantity and quality regulation by soil	Maintain flexibility of natural system in plague control, recovery and adaptation
Control indoor air	Protect surface waters from run-off of polluted sites	

Cultural human interest	Global system protection	Soil material and waste management
Protect inheritance / special sites for archeology, earth sciences, landscapes	Protection of biodiversity (e.g. genes for crop renewal)	Avoid pollution dispersion by digging, soil transport and uncontrolled disposal
	Maintain carbon storage in soil (protect peat bogs)	Protect useability of soil materials

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Sphere of interest

Human	
Water	
Eco	Natural capital
Soil materials	

Scale (text colour):

site

regional / surroundings

large community

Figure 13: Possible tasks in management of soil pollution, with (in grey) the main management issues in which these tasks may be integrated. This is an illustration of the wider fields of risk management on soil pollution and not part of the proposed data model.

Conclusions

- *The main obstacle for implementation is the proposal to collect and exchange data for individual sites.*

- An alternative route is to exchange only the number of sites and sizes, but this is not the subject of INSPIRE, being geo-referenced data

- A logical and recommended in between is a subdivision between site and program management:

  - *Scale of site management (by the local authorities who have to maintain the law, judge the procedures and make the verdicts):* the data systems contain full georeferenced data of individual sites in line with the INSPIRE proposal.

  - *Scale of program management* (*for national and EU bodies):* limited data for agreed indicators obtainable by exchange procedures with the systems of local authorities.

The public availability of data on individual contaminated sites (1/2)

- The general use of knowing individual sites is that
  - It may help citizens, real estate agents and others to establish a fair land and housing market.
  - It may help law enforcement for industry.
  - It gives the necessary information to act in time to prevent stagnation in planning procedures.
  - It supports communication on the sustainability of soils.

- The backdrop is …..

The public availability of data on individual contaminated sites (2/2)

- The backdrop is
  - Sometimes unnecessarily worried citizens.
  - Earlier hidden problems may disturb the existing land and housing market in some places.
  - Waste disposal may become a financial burden for otherwise profitable industries.
  - Land use changes with sustainable results should be planned more carefully and more ahead.

- Are the benefits worth the costs ?