

# ***Towards an EEA Europe-wide assessment of areas under risk for soil contamination***

***Possible monitoring of risk areas of EU concern***

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# *Aim of the Project*

*The main aim of the project is:*

*to develop an effective tool to identify, assess and map the areas under risk or potential problem areas for soil contamination in Europe in order to provide inputs to EEA assessment activities and support policy development.*

**The expected outcomes are:**

- a EEA proposed method for identification and preliminary assessment
- a map and related assessment focussing on potential problem areas for soil contamination

## ***Problem Areas definition***

- The following definition has been adopted (**EEA Technical Report, Volume 1**): *“Areas where soil contamination is considered to pose significant risks to human health and/or ecosystems with impacts beyond the local environment and where the assessment and reporting of pressures, state, impacts and remediation activities has a relevance at the European level.*
- *In particular, these are areas with following aspects*
  - *potential soil polluting activities*
  - *size of the site is above certain thresholds*
  - *estimated risks to human health and/or ecosystems*

# ***2004: Project Development***

**Comparison of Preliminary Risk Assessment methods used in Europe and overseas**

**Identification of indicators and parameters used by each method. Development of a database. Parameters 'harmonization'**

**Selection of main indicators and parameters needed for PRA.MS risk evaluation on the basis of:**

- 'harmonized parameters'
- contaminated sites and GIS data availability at EU level

**Formulation of the methodology**

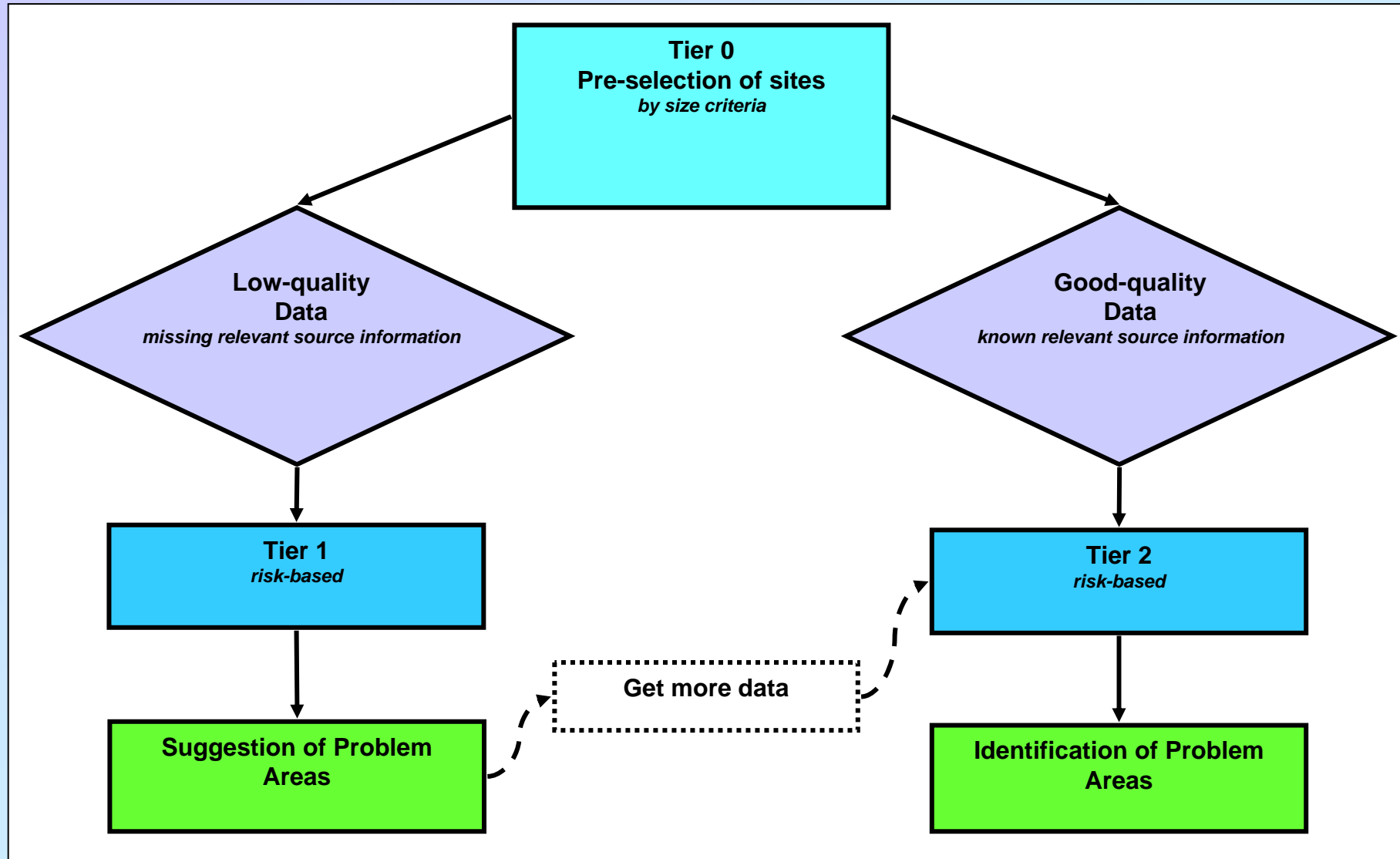
**Application of the methodology to selected sites in Europe and development of maps of potential problem areas**

# ***PRA.MS methodology***

*PRA.MS (Preliminary Risk Assessment Model for the identification of problem areas for Soil contamination in Europe)*

- Objectives:
  - Identify, classify and assess problem areas (of EU concern)
- Background:
  - “Background and outcomes of the project” (**EEA Technical Report, Volume 1**)
  - the “Review and analysis of existing methodologies for preliminary risk assessment” (**EEA Technical Report, Volume 2**) and parameters harmonization process. Associated on-line data base of reviewed methodologies
  - the data available at the EU level, such as:
    - the BRGM/DECHMINUE and EPER databases
    - available European spatial information data

# *PRA.MS tiered approach*



## ***PRA.MS features***

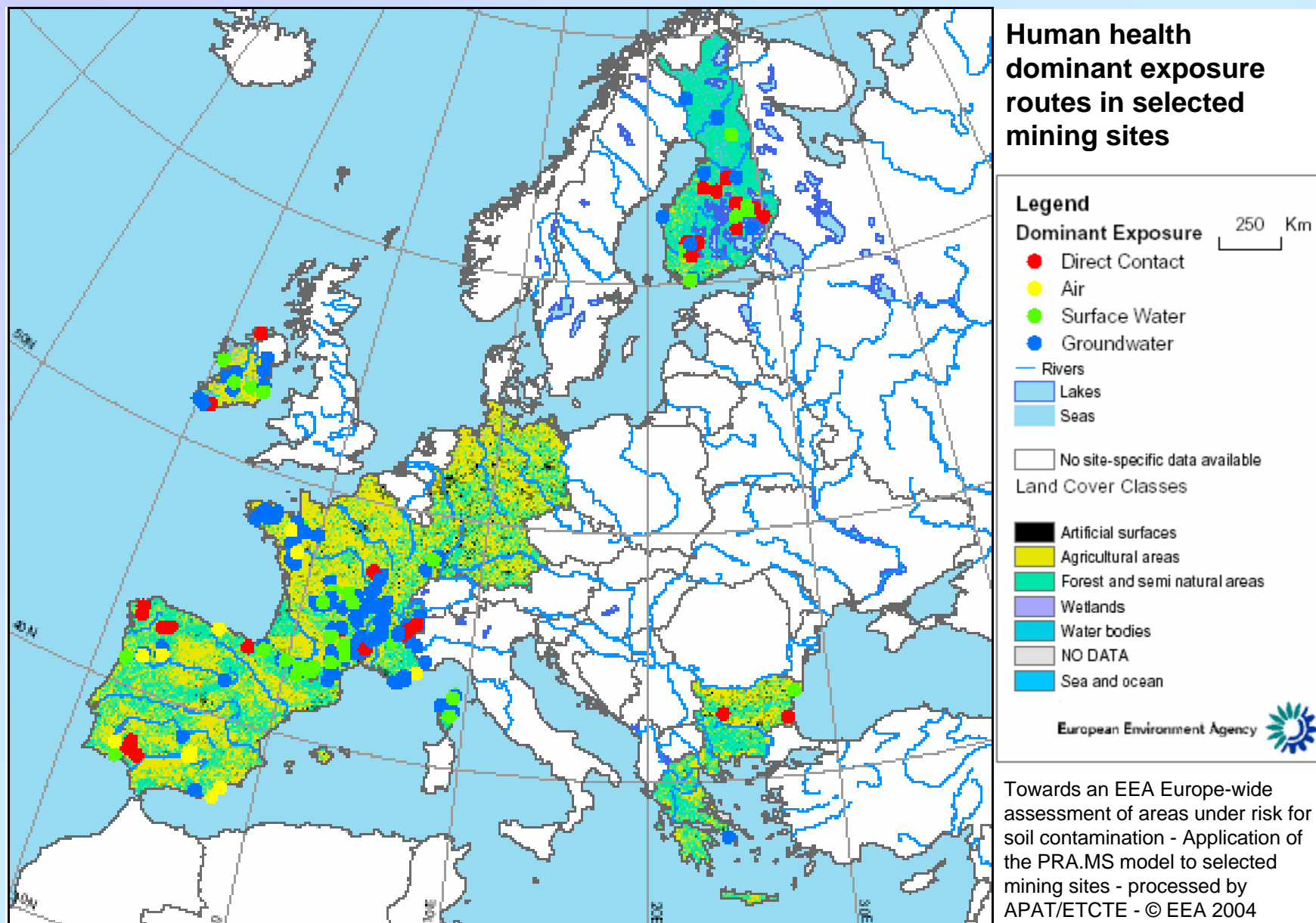
- Tier 0: Preselection of sites based on contaminant sources criteria
- Same conceptual model for Tier 1 and Tier 2
- Separate evaluation of human and ecological risks
- Tier 1: smaller data set – higher uncertainty
- Both site specific and GIS data may be used, together with proxys.
- In both Tiers uncertainty analysis conducted.



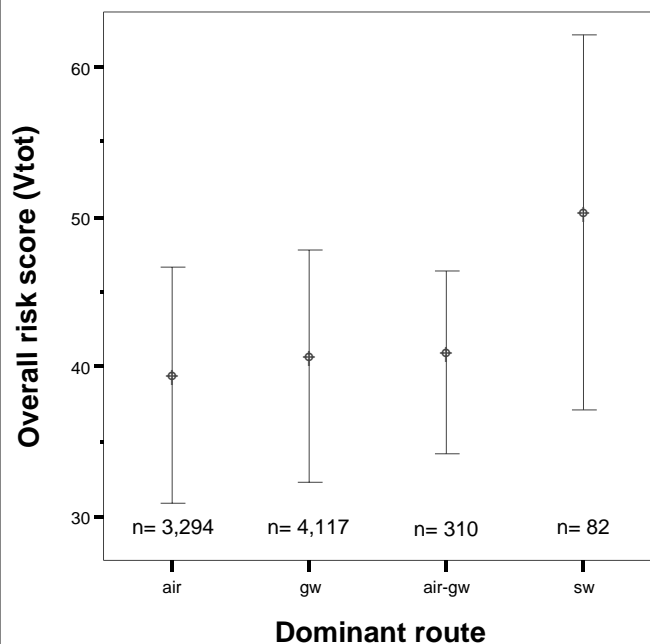
## ***2004 Results: Methodology and Applications***

- “PRA.MS scoring model and algorithm” (**EEA Technical Report, Volume 3**)
- “Application of the PRA.MS model to selected industrial and mining sites” (**EEA Technical Report, Volume 4**):
  - Tier 0 assessment: selection of relevant db (BRGM/DECHMINUE and EPER)
  - Assessment over BRGM/DECHMINUE mining sites by Tier 2
    - Selection of sites with chemical characterization of stored wastes (236)
    - Preliminary assessment of human health risks over 236 sites (9 European countries)
    - Preliminary assessment of uncertainties
    - Preliminary mapping of results
  - Tier 1 assessment over EPER sites
    - Selection of sites on the basis of data availability (7881)
    - Preliminary assessment of human health risks and evaluation of dominant exposure routes
    - Correlation between human health risks and IPPC classes of industrial facilities

# Application of Tier 2 to DECHMINUE sites



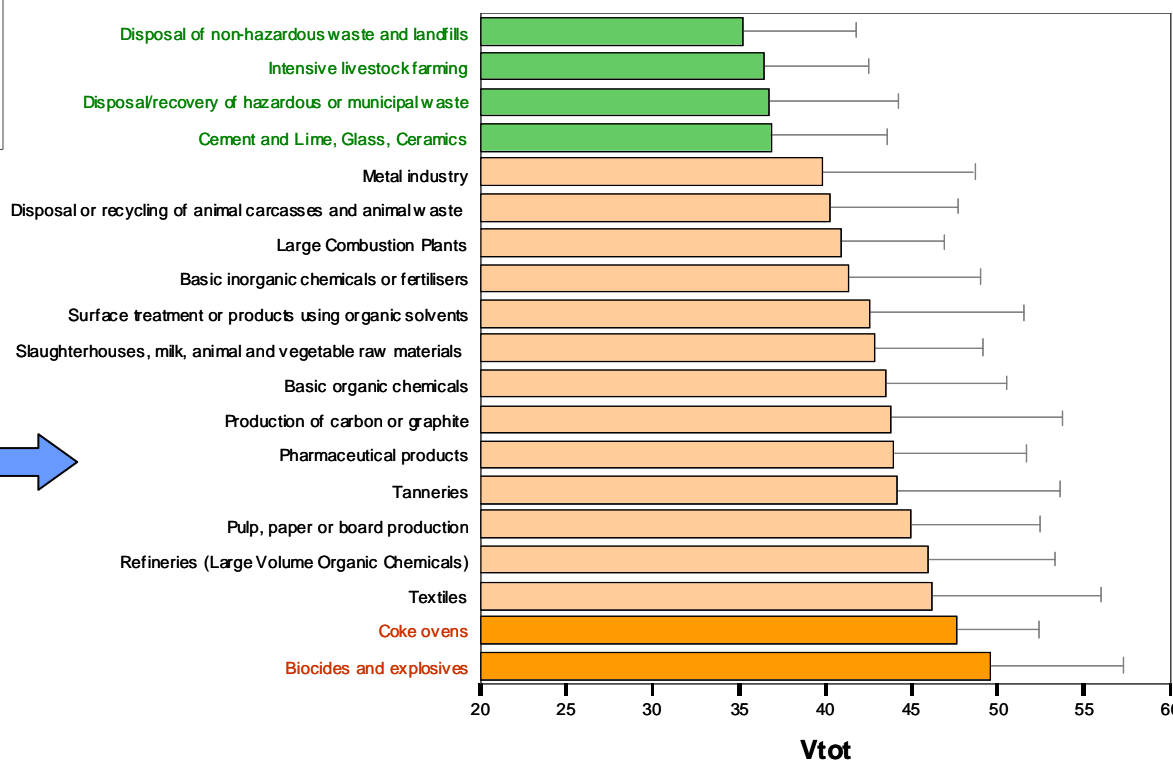
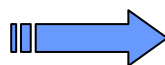
# Application of Tier 1 to EPER sites



Overall risk score of industrial sites grouped according to its dominant exposure route



Overall risk scores of industrial sites grouped according to IPPC classes



## *2005: Inputs from Expert meeting and project revision*

Inputs from invited experts at the Workshop held in Espoo, Finland, in Autumn 2004

- **Methodology revision:**
  - Addition of a pre-screening level
  - Include assessment of multiple risks and multiple sources;
  - Focus on site classification rather than on risk prioritisation;
  - Improve the graphic representation of the results.
- **Data:**
  - Analyse sensitivities of the different parameters required;
  - Availability of data sources of better quality and resolution and improve methods for the derivation of proxy datasets;
  - Explore the use of existing eco-toxicological databases.

## ***2005: Inputs from Expert meeting and project revision***

Inputs from invited experts at the Workshop held in Espoo, Finland, in Autumn 2004 (continues)

- **Assessment:**
  - Finalise the assessment of ecological risks;
  - Apply the methodology to a selection of sites identified on the basis of agreed criteria,
  - Focus on certain areas of interest such as urban areas and protected areas.
- **Software development:**
  - Automate the methodology where feasible and relevant and integrate the procedures in an information system.

## ***Recent developments: Pilot data request to selected European Countries***

### **Pre-screening step for pre-selection of problem areas (Tier 0):**

- Two sets of criteria are proposed in order to cover:
  - areas where knowledge on impact extent is available (A criteria – impacts of EU relevance relating to EU policy issues) and
  - areas where this knowledge is not sufficiently available and “surrogate” information is required (B criteria – size and complexity, i.e multiple sites/properties).

### **On-line questionnaire requiring relevant data on areas which pass the pre-screening step:**


**Towards an EEA European-wide assessment of problem areas under risk for soil contamination**

**PROBLEM AREAS QUESTIONNAIRE**

Country

Password

European Environment Agency 

  
European Topic Center  
Terrestrial Environment

The on-line questionnaire is available at ETCTE website:

<http://terrestrial.eionet.eu.int/activities/announcements>

Access to the on-line questionnaire is allowed to country contact points by providing a **Country password**

Full access to data is allowed only to ETCTE partners of the project

## On-line questionnaire: resume table of data inputs

Country	Problem area	Problem area Delimitation	Source	Ground water	Surface water	Land use(s)	Sediments and coastal areas	Food Safety	Climate	Metadata
AUSTRIA (Republic of Austria)	AT001		1 - f7	1 - f7	1	1 - f8				
BELGIUM (Kingdom of Belgium)	BE001	f1	f3	f1	f5	f5	f2	f2		
FINLAND (Republic of Finland)	FI001		2	1	1	1		1		
FRANCE (French Republic)	FR001									
ITALY (Italian Republic)	IT001	f1	1	1	2	2	1			
SWEDEN (Kingdom of Sweden)	SE001									
SWITZERLAND (Swiss Confederation)	CH001									
GERMANY (Federal Republic of Germany)										
HUNGARY (Republic of Hungary)										
NETHERLANDS (Kingdom of the Netherlands)										
SLOVAKIA (Slovak Republic)										
SPAIN (Kingdom of Spain)										

the table is used to resume total data available in the database

### Legend

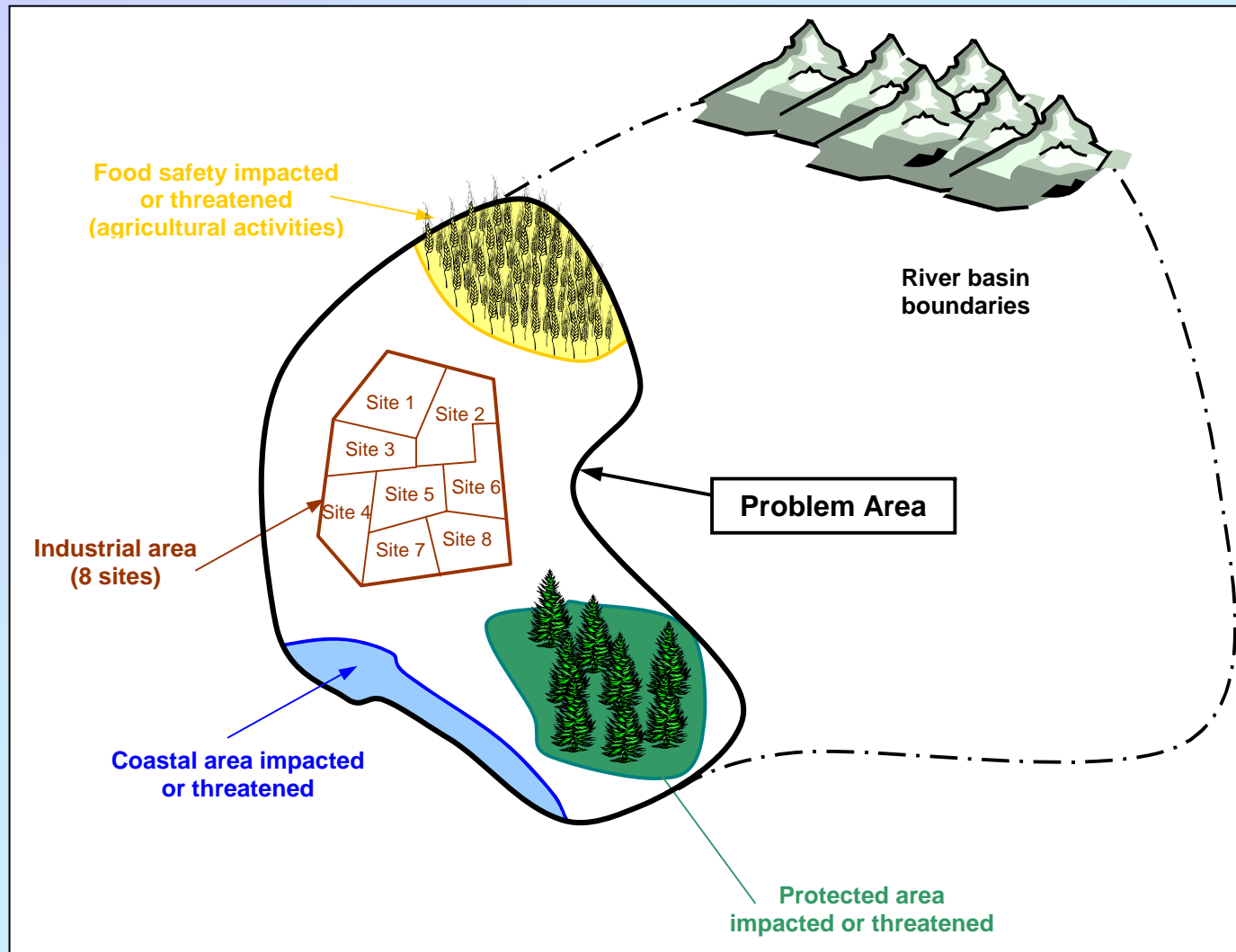
- green box : the questionnaire section is filled
- number: elements related to the single section
- f(tot): tot GIS files are uploaded

### **Example:**

1 - f8

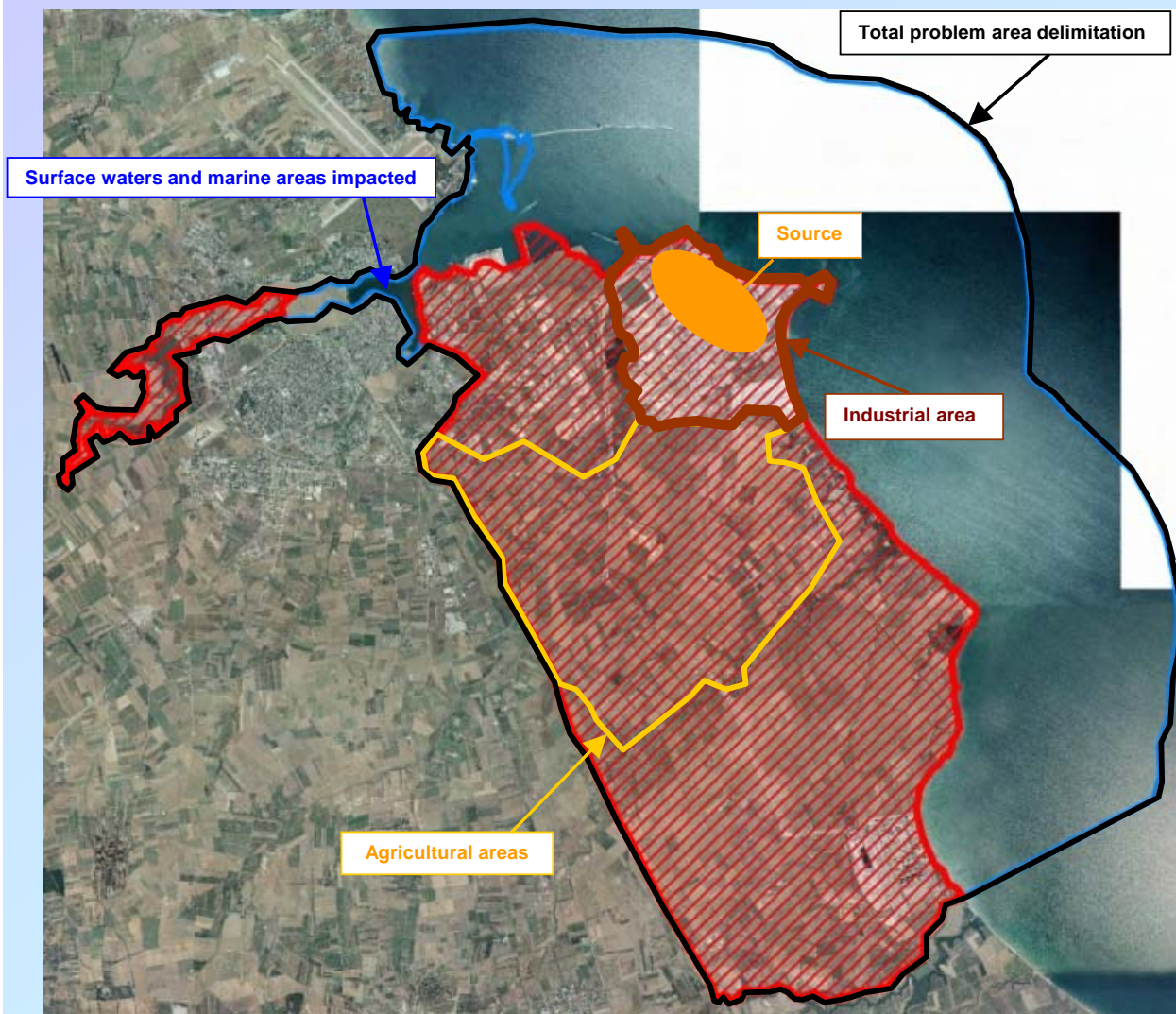
- Questionnaire filled up
- 1 land use accounted
- 8 GIS files

# Schematic representation of a Problem Area





# Example of one problem area data in the questionnaire



**Main menu**

**Country:** ITALY (Italian Republic)  
**Problem area:** IT001

- Total problem area delimitation
- Source
- Groundwater
- Surface water
- Land use(s)
- Sediments and coastal areas
- Food Safety
- Climate

**Chemicals of (potential) Concern as primary soil contamination source**

BTEX and other Volatile Organic Compounds (VOCs)   
 Specify: BTEX, Styrene, Light Hydrocarbons C<12

PAH and other SemiVolatile Organic Compounds (SVOCs) \*   
 Specify: PAH, Heavy Hydrocarbons C>12, Phtalates

Phenols and other "high solubility" HC\*\*\*   
 Specify:

Clorinated HC   
 Specify: 1,2 Dichloroethylene, monochlorobenzene

Heavy Metals   
 Specify: As, Cd, Hg, Cu, V, Ni

Herbicides and Pesticides   
 Specify:

## ***Next steps and preliminary conclusions***

- PRA.MS (2004 version) is now used by the JRC in a pilot study for the assessment of mining sites
- Questionnaire update and data requirements will reflect the outcomes of the pilot data request
- The pilot data request may be extended to other countries which may voluntarily contribute with relevant data
- The data processing and assessment methodology development will reflect the results of the pilot data request and the applications carried out by the JRC
- The new assessment methodology will focus on classification of problem areas rather than on risk prioritisation
- The methodology shall reflect the EEA objectives related to soil threats spatial assessment.