

REGULATION OF ENVIRONMENTAL CONTAMINATION (CONTAMINATED LAND) IN FINLAND

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REGULATION OF CONTAMINATION

- Environmental Protection Act (EPA 86/2000 -> 527/2014)
 - Regulation of contamination/pollution integrated under one law
 - Promotion of pollution prevention, sustainability, public participation etc.
 - Contamination/pollution refers to **anthropogenic emissions** that cause harm to human health or the environment -> defined by adverse effects on multiple targets
- Regarding contaminated land (soil and groundwater) EPA defines
 - Prohibitions for soil and groundwater contamination
 - Duties to notify, investigate, assess and treat contaminated soil and groundwater
 - Liabilities and required administrative actions for remediation
 - 1. polluter, 2. site holder/owner, 3. local municipality (for soil, not groundwater)
- Decree on Assessment of Soil Contamination and Remediation Needs
 - General requirements for site-specific risk assessment (contaminated land)
 - Including threshold and guideline values

→ **Risk-based approach needed for decision making (risk management) regarding all contaminants (e.g. As) and environmental media**

→ **Similar national approaches in most other EU countries**

OTHER IMPORTANT REGULATIONS

- Aquatic environment and water resources management, e.g.
 - Requirements to control discharges/emissions and manage contaminants
 - Health protection, e.g.
 - Requirements for drinking water and indoor air quality
 - Waste management, e.g.
 - Requirements on reuse and treatment of excavated (contaminated) soils
 - Land use planning and building, e.g.
 - Requirements and possibilities for spatial planning and construction works
 - Chemicals and fertilizers, e.g.
 - Contaminant-specific requirements and restrictions
- **Additional demands for risk-based decision making regarding contaminated land (incl. agricultural soils and waters)**
- **Some issues regulated directly at the EU level**

DIFFUSE CONTAMINATION AND BASELINES

- Same regulatory demands apply to both diffuse and point sources, but...
 - Soil/site management approaches (e.g. national surveys, soil state database, remediation works etc.) mainly focused on point source contamination
 - Diffuse (soil) contamination not clearly addressed in regulatory framework
- Definition of soil background values / concentrations important
 - *“Naturally occurring normal concentrations of harmful substances in the soil or such elevated concentrations that exist over an extensive area in topsoil in the surroundings of a suspected contaminated site”* (Decree 214/2007)
 - “Elevated” refers to both naturally elevated concentrations (geological anomalies) and concentrations that are widespread and originate from multiple anthropogenic sources (-> diffuse “contamination”)
 - No legal demand (liabilities) for remediation due to background concentrations

→ **Diffuse contamination and/or high baselines may still require risk management (e.g. healthy living environment, quality of food products, drinking water or surface water, emissions due to relocation of excavated soils), but traditional soil remediation methods may not work**

CONTAMINATION IN AGRICULTURAL LAND

- No systematic inventories or management actions within contaminated land regulatory framework
 - Regulation by other means; requirements for the quality of food and fertilizer products and application of fertilizers, sewage sludges and pesticides, guidelines on best practices for agricultural production / cultivation, etc.
 - Management of surface water quality and runoffs mostly seen as nutrient/fertilizer issue, not as soil issue (nutrients not regarded as harmful/hazardous substances)
 - Contaminant concentrations widespread (-> diffuse "contamination") and presumably rather low compared to industrially contaminated land
 - Often low pressure for site development (main driver for soil remediation in other sites)
- Based on European soil surveys (e.g. GEMAS) situation rather good
 - Some concerns do still exist (e.g. contamination of certain persistent organic pollutants due to use of sewage sludges) and should be more clearly addressed

→ **Need for further discussions and potentially joint cross-sectoral actions (e.g. integrated risk-based approach)**

ENVIRONMENTAL ARSENIC – REGULATORY VALUES

- Soil threshold value: 5 mg/kg
 - Trigger value for risk assessment (describing negligible / warning risk level)
 - Based on national baseline + potential leaching to groundwater (conservative estimate)
 - Recommended As baselines for arsenic provinces: 10 / 30 mg/kg
 - Local baselines can be even higher (must be demonstrated by representative sampling)
 - Soil guideline values: 50 mg/kg (residential); 100 mg/kg (industrial)
 - Generic reference values for assessing soil contamination and remediation need
 - NOT legally binding action values, but still often used as such...
 - Based on soil ecotoxicity (56 mg/kg, HC50)
 - Health, residential 424 mg/kg (47 % soil ingestion, 53 % ingestion of homegrown crops)
 - Health, industrial: 2920 mg/kg (99% soil ingestion)
 - TDI = 1 µg/kg-d (RIVM 2001; not regarded as genotoxic carcinogen)
 - No regulatory values for agricultural soil
- **Risk assessment the main regulatory tool for assessing soil contamination and remediation need, and it can never be replaced by generic soil standards**

ENVIRONMENTAL ARSENIC – REGULATORY VALUES

- Surface water: 4-24 µg/L (PNEC/HC5); NOEC: 10-11 000 µg/L
 - No official regulatory values
- Drinking water: 10 µg/L
 - Corresponds with the EU drinking water directive and WHO drinking water guidelines
 - NOTE: Based on treatment performance and analytical achievability, cancer risk (max. WHO): $1.2-2.3 \cdot 10^{-3} \rightarrow 0.05-0.1 \mu\text{g/L} (10^{-5})!$
- Groundwater: 5 µg/L
 - Environmental quality standard (assessing the chemical status of GW bodies within WFD)
 - Based on the drinking water standard x 0,5
- Fertilizers: 25 mg/kg; 40 mg/kg (ashes used in forestry)
 - Derivation basis no clear to me...

→ **Background concentrations in (bedrock) groundwater used for drinking water the main risk driver**

→ **Risk-based approach for contamination in water...?**

PRESENT NATIONAL POLICY APPROACH ON CONTAMINATED LAND IN A NUTSHELL

- Justified risk-based decision-making
 - From conservative to more realistic site-specific risk assessments
 - Diminishing the role of guideline values
 - Main question: is remediation really necessary based on risks?
 - Sustainable risk management and remediation
 - Balancing between environmental, economic and social aspects in decision making process
 - Selection of the most sustainable remediation techniques and other management options
 - Reuse and/or treatment of excavated soils, when excavation is needed
 - Circular bioeconomy and clean solutions strategic policy goals in the Finnish Government Programme
 - 5 strategic objectives and 26 key projects including CLM
- **More emphasis on diffuse contamination and integrated, cross-sectoral policy approaches, including agricultural land...?**



Finland, a land of solutions

Strategic Programme of
Prime Minister Juha Sipilä's Government
29 May 2015

THANK YOU!