Workshop 3 "The end isn't always near: "Challenges associated with diffuse soil contamination investigation and remediation"

Context

In most countries Soil Investigation & Remediation focuses on point sources related to specific risk activities. In these cases source areas are relatively feasible to delineate and removal of high contaminant mass is possible. The polluter pays principle is applicable.

Diffuse soil contamination is however more difficult to manage due to small activities in the past, originated from dispersed sources and spread over large areas. This will often result in costly remediation (high cost per kg mass removal). Moreover, multiple problem owners/stakeholders are defined.

During this workshop challenges & opportunities were inventoried from different stakeholder's view and in different international context.

To broaden the context of the discussion an introduction was given by Frans Verstraete (European commission) to demonstrate the link between diffuse contamination and Food safety. More specific the **analogy** of the **ALARA principle** (as-low-as-reasonably-achievable-principle) in the European legal framework for contaminants in food was explained. In order to achieve the general objective of a high level of protection of human health and animal health, EU feed and food legislation is based on **risk analysis which is a process consisting of three interconnected components**:

- **risk assessment**: derivation of a tolerable intake / health-based guidance value, based on the available scientific evidence and undertaken in an independent, objective and transparent manner → risk assessment performed by EFSA
- **risk management**: takes into account the results of risk assessment, other factors & the precautionary principle. Other factors include: a cost–benefit considerations (impact assessment), feasibility/achievability by applying good practices, if safety cannot be guaranteed by setting maximum levels or other regulatory measures for all consumer groups complementary consumption advice is proposed, analytical achievability/feasibility by routine methods to ensure effective enforcement.
- **risk communication**

<u>Participants</u>

During the workshop different stakeholders were present (Environmental consultant – service provider, industry, contractors, authorities, research institutes) from different EU countries.

<u>Discussion on CECs- investigation and remediation</u>

Besides the usual suspect PFAS, mainly pesticides but also heavy metals, pharmaceuticals, flame retardants and nanoparticles were of particular concern. Pesticides are designed to kill, lots of different pesticides are present, many are persistent and the effect of the mixture of pesticides is difficult.

The most important challenges related to the **investigation of diffuse** pollution were prioritised:

1. Multiple problem owners, multiple stakeholders, liabilities, …:
    - investigation is a challenge, large areas with multiple parties, how to get participation of multiple stakeholders (people, municipalities, industries, waterbodies,…)
    - need for regional management plan and active removal of sources

- multiple stakeholders have often multiple goals and multiple interests – difficult to manage
- stakeholders feel a lot of pressure and uncertainty: what is the impact, what should we do to solve the problem, who is accountable ➔ balance between investigation, deal with uncertainties and in meantime manage risks by clear guidelines
- how to explain to the people? Media and activists play a big role, diffuse pollution should be put in the right perspective

2. Scientific uncertainties on compounds' toxicity (CECs), risk assessment, remediation goals,…
    - scientific uncertainties should be dealt with, otherwise the studies are so expensive that the financial capacity is rapidly exceeded
3. Large areas (high costs/efforts to investigate, low concentrations, low overall pollutant load per area)
4. Analytical limitations: low detection limits, lack of procedures, standards, …

Investigation strategy of diffuse contamination should be based on "risk management" rather than on "delineation". Delineation and mapping should be related to BATNEEC-principle.

The most important challenges related to **remediation** of diffuse pollution (e.g PFAS in soil movement/dewatering etc) were prioritized:

1. Large areas (high costs/efforts to investigate, low concentrations, low overall pollutant load per area)
2. Multiple problem owners, multiple stakeholders, liabilities,
3. Scientific uncertainties on compounds' toxicity (CECs), risk assessment, remediation goals,…
4. Analytical limitations: low detection limits, lack of procedures, standards, …

<u>Overall conclusion</u>

Diffuse pollution has a complicated local multi-site history where multiple stakeholders have played a role: (1) Local industries, (2). urban development close to the industry, and (3) the general public that has enjoyed the (industry) benefits (presence of CECs in consumer goods, pharmaceuticals, ..). It is important to take the role of the different players into account to determine a sustainable path forward from technical, risk, health, exposure and cost perspective.

A **multidisciplinary approach** and collaboration involving scientists, environmental engineers, regulatory experts, public health officials, and community representatives is essential.

The remediation of diffuse contamination will hardly be feasible, however the conclusion was that mapping of the contamination is useful and needed, not with the prime goal to delineate until non-detect but to **inform people (risk communication)** about their local environment in accordance to the The Aarhus Convention.

Prevention, control of sources, knowledge, risk management and risk communication are key elements in the solution. We go into unknown territory "to boldly go where no one has gone before".