

Ecological risk assessment to support management of contaminated soils in rural development

Problem

The 'Krimpenerwaard' is a 12.000 ha polder area in the Netherlands. This rural region is characterized by agriculture (85% of area, mostly dairy farming) and nature conservation areas (2% of area at present, 20% in future). Throughout the peat meadow polder landscape some 5000 ditches have been land filled with an array of waste materials, often containing excessive concentrations of heavy metals, cyanides, PAH or chlorinated hydrocarbons. According to Dutch law, several sites are qualified as 'seriously polluted' and require remediation or clean up. However, the distribution of these waste types in the individual ditches over the entire area is mostly unknown, and the Krimpenerwaard as a whole is treated as a single case of 'serious' soil pollution.

13 stakeholding parties constructed a soil management plan, and a foundation was formed to facilitate its implementation. The soil management plan aims at a 'functional clean up' in view of land use, by means of capping 'suspected' categories of wastes with a 30-cm layer of local type soil.

Objectives

Ecological risk assessment was used to verify assumptions in the soil management plan regarding the existence of undesirable effects induced by the various waste categories and cover materials, and to test the efficiency of remediation by the proposed measure. The assessment was focused on ecological risks for agriculture, nature conservation and development, and recreation, addressing specific goals for land use as defined by local stakeholders.

Approach

Ecotoxicological parameters were selected in view of ecological conditions that are considered essential to realize specific management goals for land use. Ecological risks were assessed following a triad approach in three tiers, including a screening for bioavailable contaminants, a testing for general effects by use of standardized bioassays and field inventories, and a survey of specific effects on natural and agricultural ecosystem services. Further, site specific effects, if demonstrated in lower tiers, were scaled up in higher tiers, focusing on meadow bird populations. Risk assessment criteria were developed and discussed with scientific partners, local authorities and other stakeholders in the Krimpenerwaard region. The aim of these discussions was the development of scientifically sound criteria in accordance with policy views and acceptance of ecological risks in view of land use. The assessment was based on regional references.

Results

Ecotoxicological risks were identified for specific categories of waste materials on the basis of multiple weight of evidence. Specifically aimed remediation capping could then be undertaken, and the risk assessment provided a cost efficient basis for effectively reducing environmental risks of soil contamination in regional planning and development.

Follow-up

Land management and rural development schemes are ongoing. A monitoring programme is being developed to follow ecological developments.



Commissioned by

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