

Evaluation and management of arsenic contamination in agricultural soil and water - AgriAs

Arsenic contamination in European agricultural soils, water and crops

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AgriAs Task 1.2 Assessment of As contamination in European agricultural soils has summarized areas with enhanced arsenic concentrations in agricultural soil or surface water that can be recognized from European-wide mapping projects. There are no European-wide data on As concentrations in crops. The anomalous As concentrations in soils and stream water were studied based on the results of the GEMAS project's dataset (Reimann et al. 2015) and on the FOREGS Geochemical Baseline Mapping Programme's dataset (Salminen et al. 2005).

According to the GEMAS results, the anomalous arsenic concentrations in European soils are explained by geology. The concentrations of As in the soils of northeastern Europe are up to three times lower than in the south-west of Europe. The break in concentrations occurs along the southern limit of the last glaciation. Reimann and others (2017) have calculated the threshold values for As concentrations in topsoil separately for northern Europe (17 mg As/kg) and southern Europe (38 mg As /kg) based on the Tukey inner fence (TIF) value. These values are feasible to use in assessing areas with anomalous As concentrations.

Arsenic concentrations in stream water do not follow the geology as clearly as in soils, and concentrations may markedly differ between areas and countries and vary considerably over short distances. Thus, the threshold values for assessing the anomalous As concentrations in stream water need to be based on the results of regional mapping with an adequate density of sampling.

However, elevated arsenic concentrations in soil or surface water above background levels do not directly indicate a risk or even a need for risk assessment. The need for risk assessment should be based on toxicological evidence and guidelines based on ecotoxicological data or data on concentrations that might be harmful for human health.

In addition, the AgriAs project's target areas in Freiberg, Saxony, in Germany and Verdun in France and their arsenic history are presented.

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Appendices

Appendix 1. Background data for the Freiberg study site in Germany.

Appendix 2. Background data for the Verdun study site in France.



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