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Pollution of Elbe River flood plains and consequences for future research

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The presented investigations are part of a research cluster which is focused to the evaluation of damages caused by the extreme flood event of the Elbe river in August 2002, sponsered by the BMBF.

The german Elbe river flood plains measures nearly 80.000 ha. Almost 70 % were agricultural used. Results will be presented about the contamination of topsoils and plants in flood plains along the river Elbe from the Czech-German border up to investigation sites in Lower Saxony. Heavy metals, dioxins and the amount of pathogenes were analysed. It was the first time, that one sampling strategy for topsoils along the hole river course was realised. The sites were arranged in cross sections through the flood plains, taking always the same typical morphological positions into account. The sites were marked for future investigations.

The results confirm, that large parts of flood plains are highly contaminated with heavy metals and organic contaminants and they are enriched with pathogens. The measurements of contaminants in high flood sediments and topsoils show, that in general the flood event in August 2002 did not change the status of topsoil pollution. The exceedance of topsoil action values of the Federal Soil Protection and Contaminated Site Ordinance is common along the hole river Elbe (Figure 1) and the exceedance of threshold values for fodder, according to European guideline 2002/32/EG, can not be excluded (Figure 2).

Future research activities should focus on the development for a sustainable agricultural management for the contaminated areas. Following points should be considered:

- Is a regionalisation of contamination about all morphological forms inside the flood plains possible?
- Which are the main mechanisms controling heavy metal uptake of plants in flood plains in times without flooding?
- Do heavy metals have any indicator function for organic contaminants?
- Which are the main mechanisms for contaminants to enter the human food chain?
- Which alternative forms of land use are possible?
- Development of a scaling system for pathogens in flood plain soils.

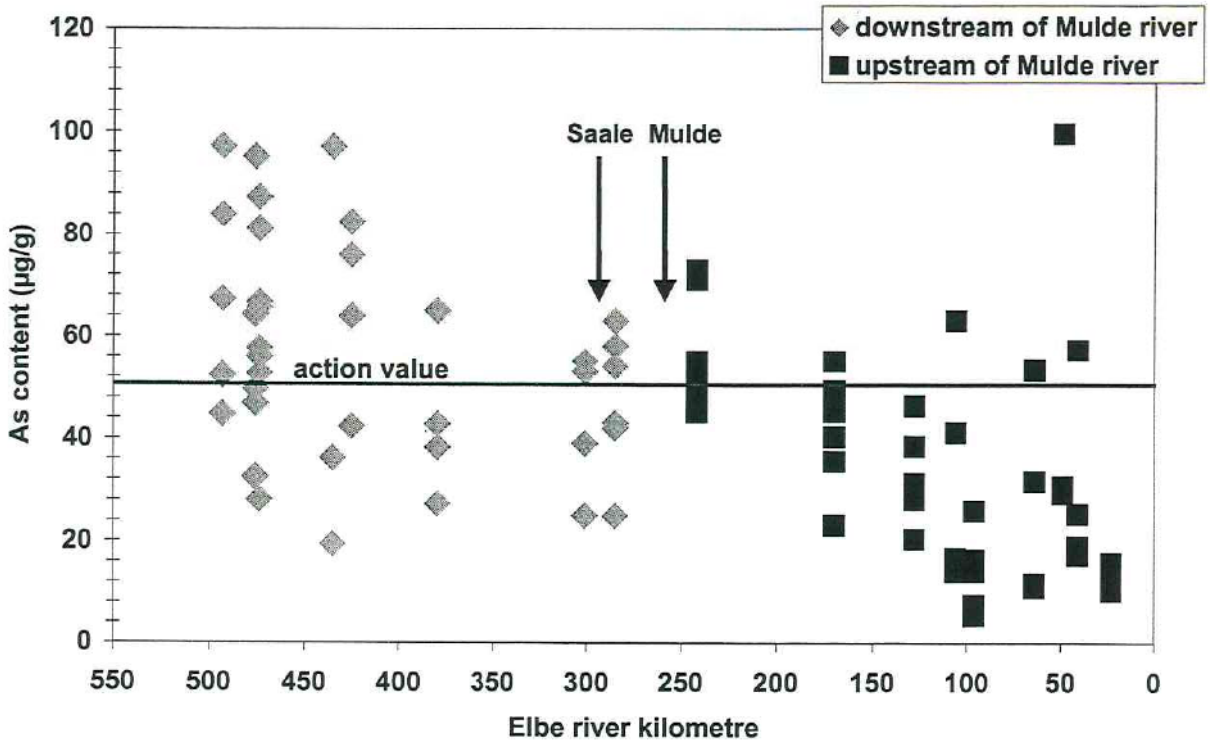

Figure 1: Arsenic contamination of Elbe river flood plain topsoils in comparison to the action value of the Federls Soil Protection and Contaminated Site Ordinance (BBodSchV).

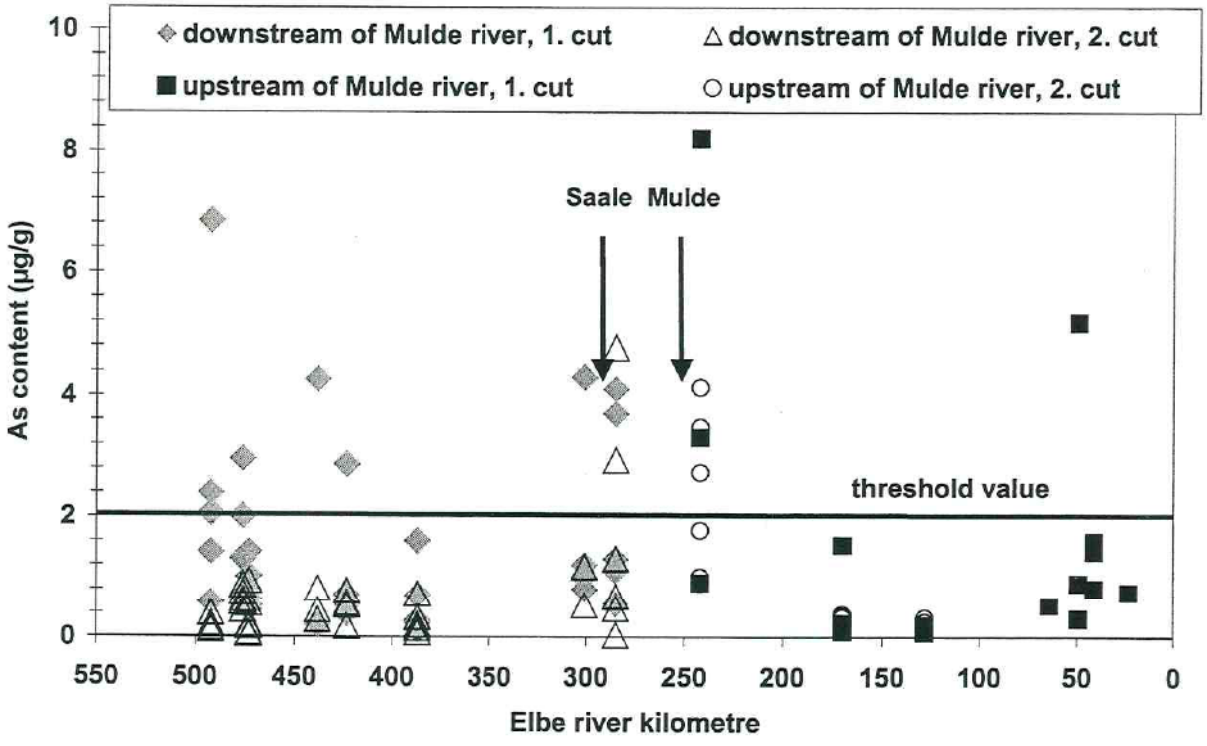

Figure 2: Arsenic contamination of grassland fodder in Elbe river flood plains at two harvesting times in 2003 in comparison to the threshold value of the European guidline 2002/32/EG.