The SUMATECS project:

Sustainable management of trace element contaminated soils -

Development of a decision tool system and its evaluation

Aims and objectives

The development of "gentle", in-situ remediation technologies (i.e. phytoremediation, in situ immobilisation, etc.) has been under intensive research over the last few decades (see Figure 1). A great deal of progress has been achieved at the experimental level, but the application of these technologies as practical solutions is still at its early stage. On the one hand, methods for determination of the trace element (metals and non-metals) fractions relevant for their ecotoxicology (i.e., the bio available fraction) still have their limitations since they may insufficiently reflect the potential risks. On the other hand, a number of in-situ remediation options are available and thus a decision tool system has to be developed allowing to choose the most suitable technique. TECS (trace element contaminated soils) management moved into a new century where environmental decisions must be 'socially-robust' within a context of sustainable development & is a part of the conceptual framework "Risk-based land management". All efforts need to ensure management and/or remediation is affordable, feasible, effective & sustainable.

Additionally, further aspects that are closely related to the remediation process were previously only partly covered by research projects. These aspects include the potential impacts on the local environment (soil processes and functioning, socio-economic impacts on the local population, etc.), but also the principal question on the sustainability of the remediation process and its target.

The aim of this project is to make a literature and project-based review (including country specific state of the art and current procedures) to identify the current status of research and application in Europe and to (i) derive decision tool systems, remediation scenarios including the potential impacts on the local environment and (ii) define further research needs.

About SUMATECS

Dear readers,

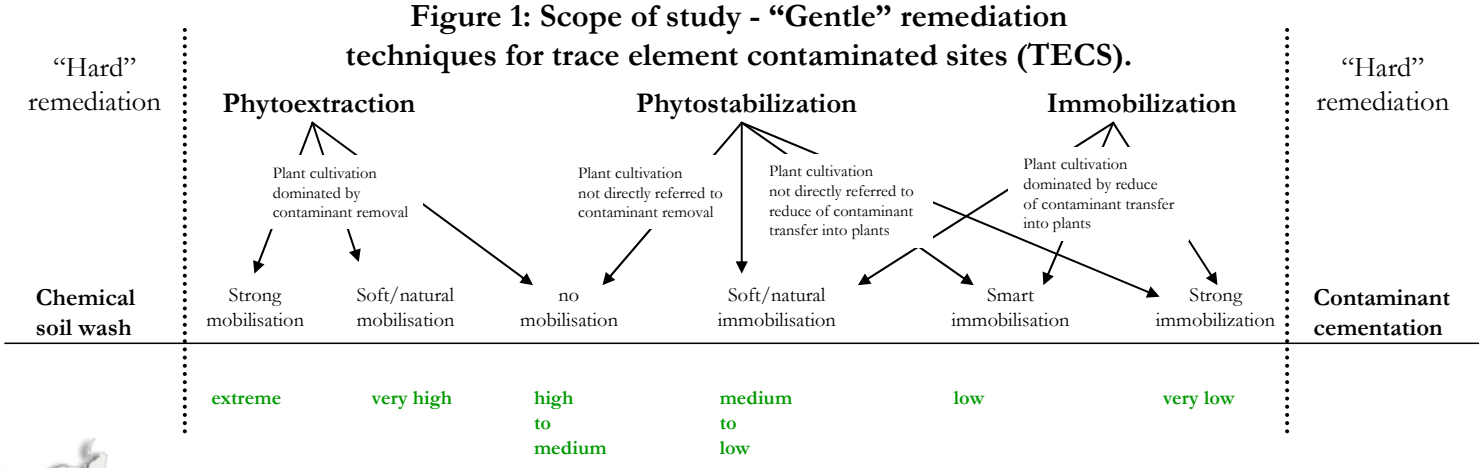
the contamination of soils with trace elements is still a major environmental problem. These contaminants may enter the food chain via food and fodder crops, water supply or direct ingestion by children. Many soil remediation technologies are very expensive and destroy soil structure and function. Gentle remediation were considered as new low-cost and environmentally friendly options for a sustainable management of contaminated soils.

A lot of research efforts have been put on the development of such alternative techniques in many European countries. In order to evaluate the high load of existing information this project consortium has been created under the umbrella of SNOWMAN. The results of our work will be a major step forward into practical application and evaluation of sustainability and other effects for environment and society. This will be an important contribution to the restoration and protection of our environment.

Yours sincerely,

Dr. M. Puschenreiter, project coordinator

Figure 1: Scope of study - "Gentle" remediation techniques for trace element contaminated sites (TECS).



SUMATECS facts

SUMATECS is a research project trans-nationally funded under the SNOWMAN umbrella by:

Austria, **Flanders** (Belgium), **France**, **Germany**, **Sweden** and **United Kingdom**.

The Czech Republic and Italy are involved as additional partners from non-SNOWMAN countries enlarging the project's funding budget by additional resources.

The project partners are:

- **BOKU**; University of Natural Resources and Applied Life Sciences, Vienna/Austria
- **ARC**: Austrian Research Centers GmbH, Seibersdorf/Austria
- **HAU**: Hasselt University, Diepenbeek/Flanders
- **LTU**: Luleå University of Technology, Luleå/Sweden
- **LfUG**: Saxon State Agency for Environment and Geology, Dresden/Germany
- **RUB**: Ruhr-University Bochum, Bochum/Germany
- **INRA**: Institut National de la Recherche Agronomique, Villenave d'Ornon/France
- **INERIS**: Institut National de l'Environnement industriel et des Risques, Verneuil-en-Halatte/France
- **INERTEC**, Nanterre/France
- **UTC**: Université de Technologie de Compiègne, Compiègne/France
- **UoB**: University of Brighton, Brigthon/UK
- **CULS**: Czech University of Life Sciences, Prague/Czech Republic
- **UniFi**: University of Florence, Florence/Italy

Project duration: 12 months

Project start: 29.10.2007

SUMATECS Context

Contamination of soils with trace elements is a worldwide problem. Various remediation techniques are available, but many of them are very invasive, costly and destroy soil structure and functions. As an alternative, several gentle remediation techniques have been developed in the last decades. These new approaches are broadly based on the use of plants to clean up the polluted soils, partly assisted by the use of various amendments, or the use of other in-situ methods such as novel absorbents, immobilisers etc.

Research and development of gentle remediation techniques and related aspects has been carried out in many European countries. In some cases, multi-national projects were carried out and great deal of information has been published. However, also a number of national projects have been implemented, and it seems that a lot of information remained unpublished. So far, some European initiatives were launched, such as the COST actions 837 and 859, which were a big push towards better exchange of information and coordination of research work.

To further enforce this process, SUMATECS is a new initiative that will collect, integrate and evaluate the current state of the art in the field of gentle remediation techniques and all related aspects, such as the management of any remediation options, the development of a decision tool system, environmental and social impacts, soil processes, the valorization of plant biomass and others. As an overall thematic bridge, the sustainability and certainty of all measures will be evaluated.

Perspectives

This project is a unique opportunity to make an intensive review of existing information on the topic of gentle soil remediation techniques. For this evaluation, not only peer-reviewed scientific papers, but also non-published information (e.g., project reports) will be included. An additional major contribution to this overview will be interviews with experts, engineers, stakeholders, government members etc. A major aim is also to establish pedagogical didactics to interact with students associate a classroom in each participant country to follow and feed back the project progress and results. In general, not only the direct effects of remediation (i.e., removal or stabilisation of and to contaminants), but also the indirect effects on environment and society will be evaluated in detail.

The results of this project will be the basis for a major step forward to an intensified implementation of gentle remediation technologies. New information will be published in international scientific journals, but will be also made available for national environmental agencies, local authorities, stakeholders, etc. Additionally, major research needs will be summarized in order to strengthen future research efforts that will close remaining knowledge gaps.

SUMATECS contact

Homepage:
www.rhizo.at/sumatecs

Coordinator:
Dr. Markus Puschenreiter

Phone: +43 / 1 47654 3126
E-Mail: markus.puschenreiter@boku.ac.at

SNOWMAN contact

Homepage:
http://www.snowman-era.net

Secretariat:
Mr. Arnd Wieland (UBA, Germany)

Phone: +49 / 340 2103 3026
E-Mail: secretariat@snowman-era.net