



## **The GREENLAND project: gentle remediation of trace element contaminated land**

Markus Puschenreiter

University of Natural Resources and Applied Life Sciences - BOKU, Department of Forest and Soil Sciences, Vienna, Austria  
(markus.puschenreiter@boku.ac.at)

Gentle remediation options (GRO) include various and in general plant-based approaches to remediate trace element contaminated soils at low cost and without significant negative effects for the environment. Although GRO comprise very innovative and efficient technologies, they are still not widely used as practical site solution due to several reasons of hindrance. Greenland will solve the remaining problems and make GRO ready for practical application.

Contamination of soils with trace elements (TE) is worldwide still one of the major environmental problems. Conventional technologies for soil remediation are usually very expensive and may negatively affect or destroy soil structure and functions. Gentle soil remediation options (GRO), however, comprise environmentally friendly technologies that have little or no negative impact on the soil. The main technologies are phytoextraction, in situ immobilization and assisted phytostabilization. Although major progress has been achieved on the lab scale, success stories obtained on the field are still limited, in particular for phytoextraction. Also, the issue of valorization of the potentially contaminated plant biomass has insufficiently been addressed so far. Furthermore, further development is needed regarding the adequate determination of endpoints of GRO. Finally, the application of GRO as practical site solution may be hindered by legal frameworks and by insufficient knowledge of the decision makers. Therefore, an EU-FP7 (KBBE-2010-4) has been launched on January 1 2011 to address these issues and to make GRO ready for use as practical site solution. The project includes the following work packages:

- \* Sustainable management adapted to TECS and deployment of GRO at field scale (WP1)
- \* Valorisation of plant biomass produced on TE contaminated sites (WP2)
- \* Harmonization of methods to assess the bioavailability of TE and development of a tool set to monitor the sustainability of GRO (WP3)
- \* Improving GRO through plant selection and modifications in soil TE bioavailability (WP4)
- \* Appraisal of current GRO practice, and development of implementation guidance and decision support frameworks (WP5)

The GREENLAND consortium: 1 Markus Puschenreiter, University of Natural Resources and Life Sciences, Vienna (Coordinator); 2 Jaco Vangronsveld, Universiteit Hasselt; 3 Jurate Kumpiene, Luleå tekniska universitet; 4 Michel Mench, Institut National de la Recherche Agronomique; 5 Valerie Bert, Institut National de l'Environnement industriel et des Risques; 6 Andrew Cundy, University of Brighton; 7 Petra Kidd, Consejo Superior de Investigaciones Científicas; 8 Giancarlo Renella, University of Florence; 9 Wolfgang Friesl-Hanl, Austrian Institute of Technology; 10 Grzegorz Siebielec, Instytut Uprawy Nawożenia i Gleboznawstwa – Państwowy; 11 Rolf Herzig, Phytotech-Foundation; 12 Ingo Müller, Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie; 13 Jannis Dimitriou, Sveriges lantbruksuniversitet; 14 Xose Quiroga Troncosa, Tratamientos Ecológicos del Noroeste SL; 15 Ryszard Bajorek, ATON; 16 Patrick Lemaitre, Innoveox; 17 Cyril Aymonier, CNRS-ICMCB.