Selecting Gentle Remediation Approaches – the SUMATECS project

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Plan:

What is "gentle remediation"

What are the barriers to uptake?

The SUMATECS project

Developing decision support systems for selecting gentle remediation approaches

Conclusions

What is "gentle remediation"

Contaminated land remediation or stabilisation using *in-situ* techniques that do not significantly impact soil function or structure, such as phytoremediation, *in-situ* immobilisation, etc.

Subject of intense R&D for a number of years

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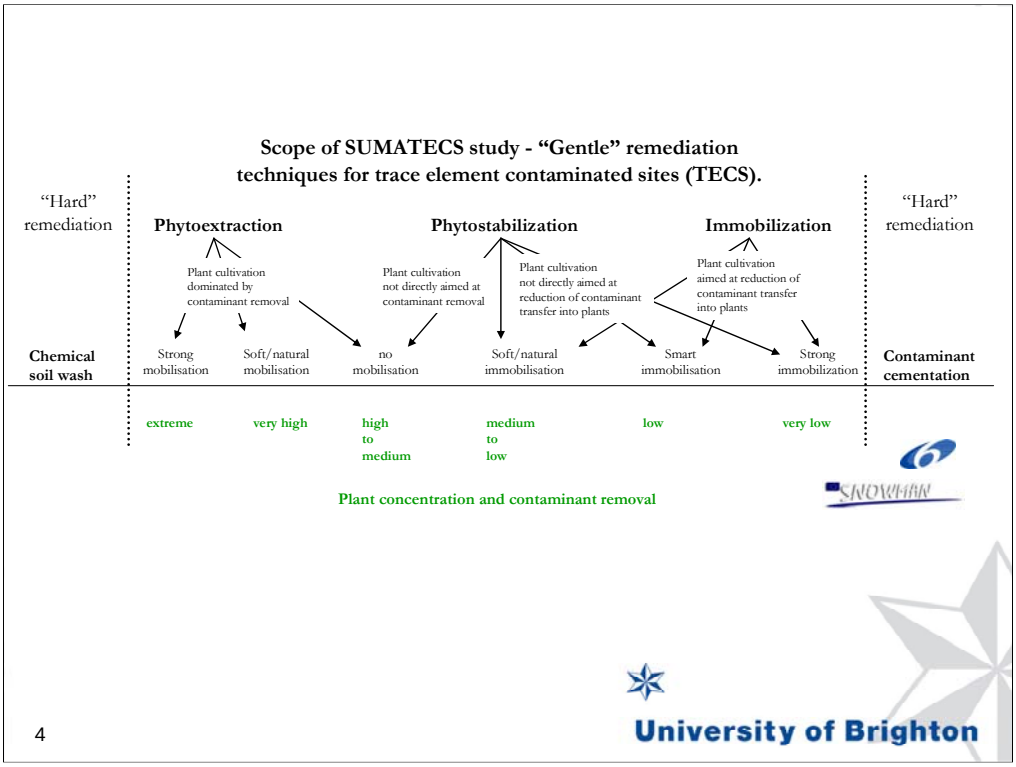
Scope of SUMATECS study - "Gentle" remediation techniques for trace element contaminated sites (TECS).
"Hard" remediation
Phytoextraction
Phytostabilization
Immobilization
"Hard" remediation
Plant cultivation dominated by contaminant removal
Plant cultivation not directly aimed at contaminant removal
Plant cultivation not directly aimed at reduction of contaminant transfer into plants
Plant cultivation aimed at reduction of contaminant transfer into plants
Chemical soil wash
Strong mobilisation
Soft/natural mobilisation
no mobilisation
Soft/natural immobilisation
Smart immobilisation
Strong immobilization
Contaminant cementation
extreme
very high
high to medium
medium to low
low
very low
Plant concentration and contaminant removal
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What is "gentle remediation"

Great deal of progress achieved at laboratory or bench scale, plus field pilot scale, but application as practical site solutions still in relative infancy.

Considerable differences in the adoption and promotion of these technologies between different EU member states.

What are the barriers to uptake?

Include:

Timescales required for remediation

Need for long-term site monitoring

Uncertainties in what is bioavailable, and how to measure this

Industry confidence (generic issue for novel in-situ techniques)

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What are the barriers to uptake?

A number of (gentle) *in-situ* remediation options are available, and thus some form of decision support is required to allow the user to make an informed decision on which is the most suitable technique(s) for the site requiring remediation or management.

Site management and/or remediation should also be affordable, feasible, effective & sustainable, factors which also need to be built in to the decision support process.

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SUMATECS – SUstainable MAnagement of Trace Element Contaminated Soils

The need to further develop decision support systems for selecting gentle remediation approaches, and assess

(a) the use of these technologies as more sustainable remediation tools, and

(b) the current barriers to their adoption,

has been recognised by the funding of the SUMATECS project (SUstainable MAnagement of Trace Element Contaminated Soils).

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The SUMATECS project

SUMATECS – SUstainable MAnagement of Trace Element Contaminated Soils

Project launched in Oct 2007 under the umbrella of SNOWMAN*

Focussing initially on trace element contaminated sites, the project is undertaking a literature and project-based review (including a country-specific state of the art and current procedures review) to identify the current status of research and application of "gentle" remediation technologies across Europe

** one amongst more than 70 ERA-Nets (European Research Area – Networks) being funded by the European Commission's 6th Framework programme for Research and Technological Development.*

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The SUMATECS project

SUMATECS – SUstainable MAnagement of Trace Element Contaminated Soils

General aims:

(i) To derive or recommend decision support systems and remediation scenarios (which include verification, and analysis of environmental, economic and social impacts); and

(ii) define further research needs and priorities

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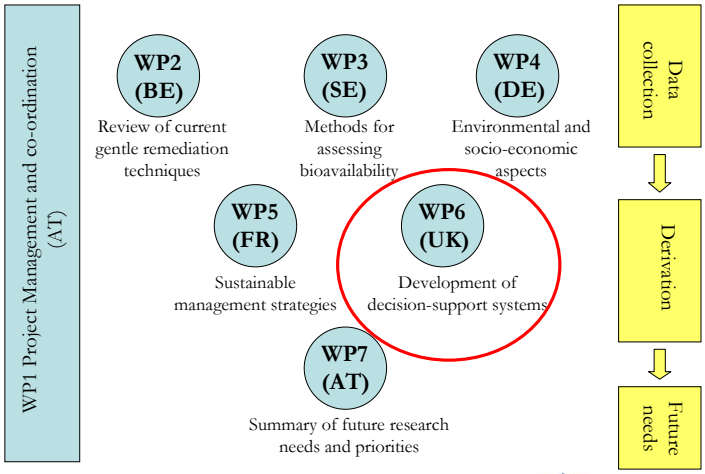
The SUMATECS project

Figure 2: Project structure



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Developing decision support systems for selecting gentle remediation approaches

Literature review and critical analysis of existing decision support systems, in terms of their application to "gentle" remediation technologies

Project questionnaire, to assess stakeholder opinions and needs

Are current tools fit for purpose?

What input parameters input parameters / site knowledge (e.g. depth and type of contamination, local geology, depth to groundwater) do we need for a workable decision-making tool?

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Developing decision support systems for selecting gentle remediation approaches

e.g. in UK, CLR-11 (Model Procedures for the Management of Land contamination) provides a systematic decision support tool, with good cost-benefit analysis BUT little on selection criteria for gentle remediation techniques

REMEDIATION OPTION APPLICABILITY MATRIX: INORGANIC SUBSTANCES AND EXPLOSIVES

Remediation option	Applicable media	Applicable substances				
		Heavy metals	Non-metals	Asbestos	Cyanides	Explosives
CIVIL ENGINEERING METHODS						
Containment – cover systems	S	√	√	√	√	√
Containment – hydraulic barriers	W	√	√	√	√	√
Containment – in-ground barriers	S, W	√	√	√	√	√
Excavation and disposal	S	√	√	√	√	√
BIOLOGICAL METHODS						
Natural attenuation	W	√	√	x	x	√
Biopiles	S	x	x	x	x	√

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Developing decision support systems for selecting gentle remediation approaches

Initial results from questionnaire survey indicates lack of stakeholder knowledge both on potential and application of gentle remediation methods, and of decision support tools that can be used to support gentle remediation approaches.

Tools need to be easy to use, incorporate sustainability measures, and consider potential use of gentle remediation technologies as part of integrated site solutions i.e. in combination with other methods, using zoned approach?

Longer-term work focussed on producing "bolt-on" tool to be run in conjunction with CLR-11 and existing national decision support tools / frameworks

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Conclusions

Gentle remediation technologies can form part of sustainable, affordable and effective site clean-up, in combination with other more traditional methods.

Many current barriers to uptake are similar to other *in-situ* technologies

Project results expected end October 2008 – disseminated via web portals, journal papers and trade articles…etc.

www.rhizo.at/Sumatecs

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