

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



Scope of SUMATECS study - “Gentle” remediation techniques for trace element contaminated sites (TECS).

“Hard”
remediation

“Hard”
remediation

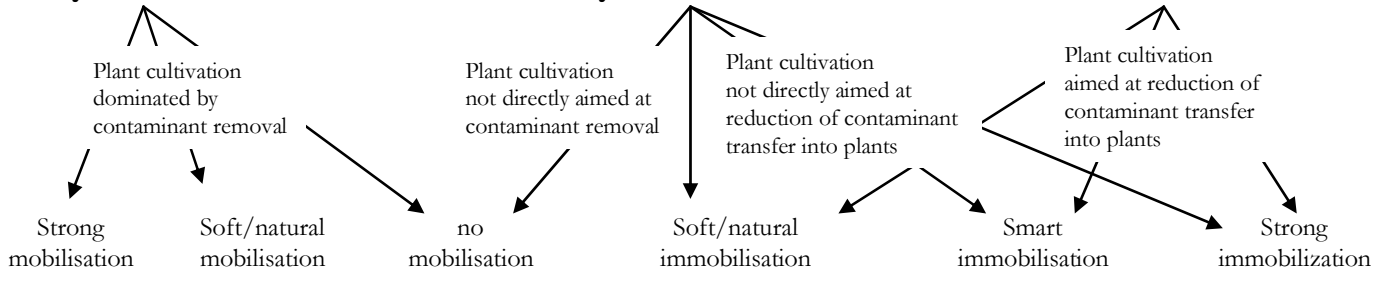
Phytoextraction

Phytostabilization

Immobilization

Chemical
soil wash

Contaminant
cementation



extreme

very high

high
to
medium

medium
to
low

low

very low

Plant concentration and contaminant removal



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)



What are the barriers to uptake?

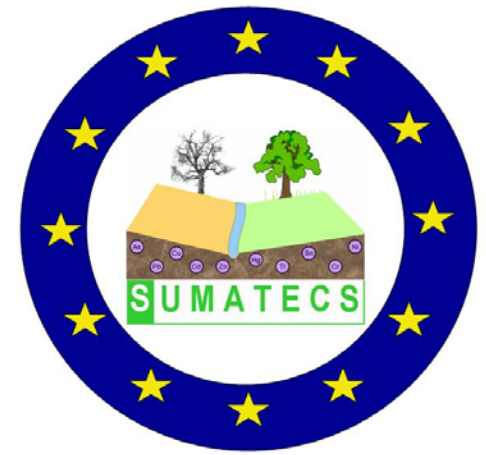
A number of (gentle) *in-situ* remediation options are available, and thus some form of decision support is required to allow the user to make an informed decision on which is the most suitable technique(s) for the site requiring remediation or management.

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.



The SUMATECS project

SUMATECS – **S**ustainable **M**anagement
of **T**race **E**lement **C**ontaminated **S**oils



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).



The SUMATECS project

SUMATECS – **SU**stainable **MA**nagement
of **T**race **E**lement **C**ontaminated **S**oils



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.*



The SUMATECS project

SUMATECS – **S**ustainable **M**anagement
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General aims:

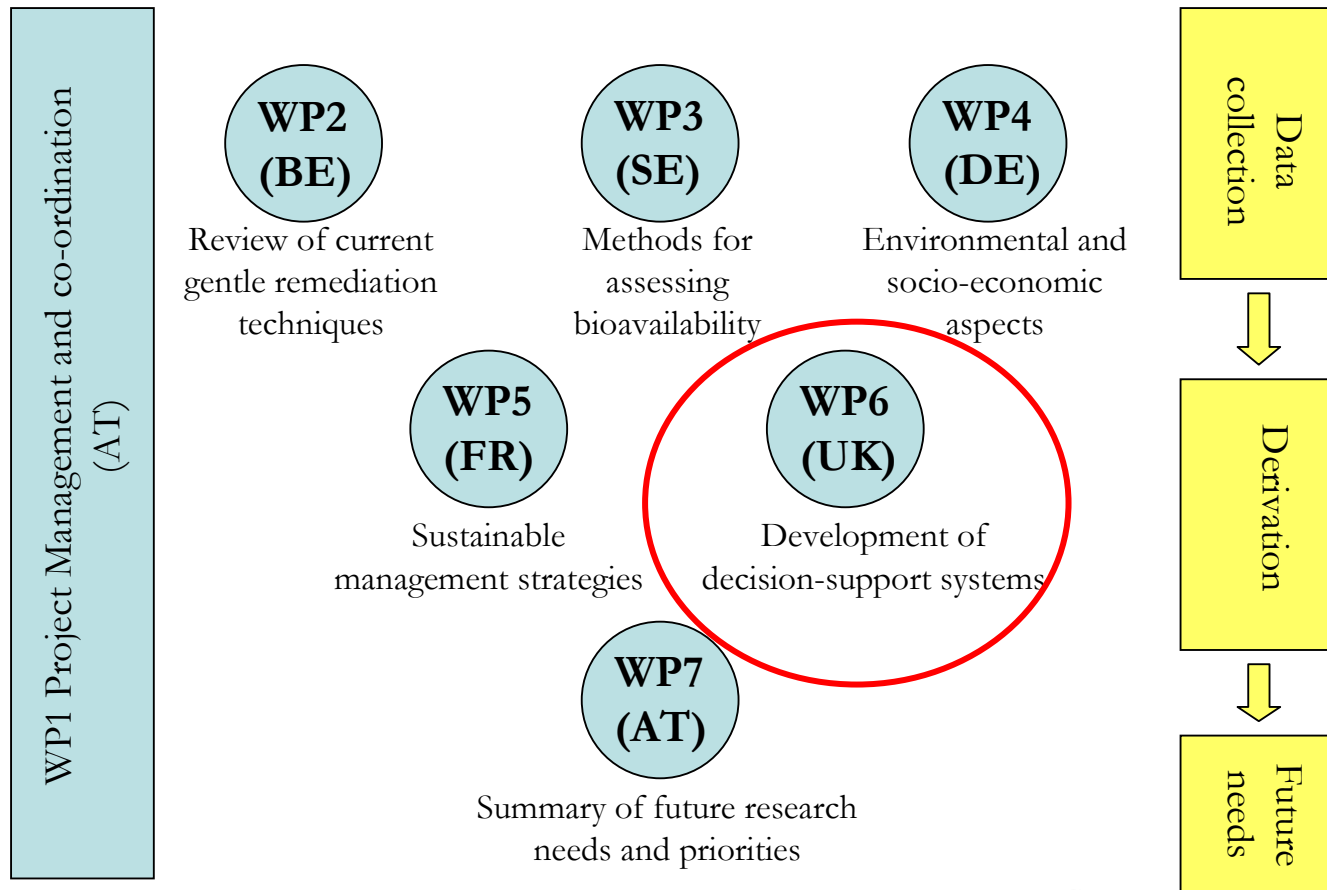
- (i) To derive or recommend decision support systems and remediation scenarios (which include verification, and analysis of environmental, economic and social impacts); and
- (ii) define further research needs and priorities



The SUMATECS project



Figure 2: Project structure



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?



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	✓



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



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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Project Consortium

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INERIS (Institut National de l'Environnement industriel et des RISques) (FR)

INERTEC (FR)

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