

EU research on contaminated land: what have we achieved, where do we have to go?

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	Area	Subject
1.1	Integrated management and sustainable use of water resources at catchment/river basin scale	
	1.1.1	Strategic planning, integrated management tools at basin scale
	1.1.2	Socio-economic aspects of sustainable use of water
	1.1.3	Operational management schemes and decision support systems
1.2	Ecological Quality of freshwater ecosystems and wetlands	
	1.2.1	Ecosystem functioning
	1.2.2	Ecological quality targets
1.3	Treatment and purification technologies	
	1.3.1	Management of water in the city
	1.3.2	Waste water treatment and re-use
1.4	Pollution prevention	
	1.4.1	Abatement of water pollution from contaminated land, landfills and sediments
	1.4.2	Combating diffuse pollution
1.5	Surveillance, early warning and communication systems	
	1.5.1	Pollution surveillance and control
	1.5.2	Improved flood and drought forecasting
1.6	Regulation of stocks and technologies for arid and semi-arid regions and generally water deficient regions	
	1.6.1	Improving knowledge on water resources use and management
	1.6.2	Prevention and mitigation of saline water intrusion
	1.6.3	Technological development and management tools for water conservation
1,7	Pre-normative, co-normative research and standardisation	



1. 4 Pollution prevention

1.4.1 Abatement of water pollution from contaminated land, landfills and sediments: 33.5 M€ 26 projects

1.4.2 Combating diffuse pollution: 7.2 M€ 5 projects

1. 5 Surveillance, early warning and communication systems

1.5.1 Pollution surveillance and control: 13.8 M€ 16 projects

Networking activities:

SENSPOL, CABERNET, SEDNET

Information and supporting activities:

IMAGE-TRAIN, JOINT, SOWA and EUGRIS

Key Action 1 - Soil contamination issues

Main topics

- ⊕ Risk assessment
- ⊕ Monitoring
- ⊕ Site characterisation
- ⊕ Remediation
- ⊕ Integrated management
- ⊕ Diffuse pollution

Key Products


- ⊕ Risk assessment methodologies, software and guidelines
- ⊕ Decision Support Tools
- ⊕ Hardware (sensors, test apparatuses, full-scale pilot areas, reactors)
- ⊕ Databases

FP5 conclusions

- ⊕ A considerable investment of financial resources was put on contaminated land research
- ⊕ It served to develop a broad science and engineering community and to reach very high quality of the scientific production – which is no longer second to other parts of the world
- ⊕ Many good results, but scattered
- ⊕ A lot of efforts were put in trying to disseminate better, to synthesise and to promote the results
- ⊕ Several methodologies/techniques were developed (frequently very site-specific), with difficulties of harmonisation, not easy to transfer into broad applications

FP6 – GLOBAL CHANGE AND ECOSYSTEMS

GLOBAL CHANGE AND ECOSYSTEMS

AREA I	IMPACT AND MECHANISMS OF GREENHOUSE GAS EMISSIONS AND ATMOSPHERIC POLLUTANTS ON CLIMATE, OZONE DEPLETION AND CARBON SINKS
AREA II	WATER CYCLE, INCLUDING SOIL-RELATED ASPECTS 
AREA III	BIODIVERSITY AND ECOSYSTEMS
AREA IV	MECHANISMS OF DESERTIFICATION AND NATURAL DISASTERS
AREA V	STRATEGIES FOR SUSTAINABLE LAND MANAGEMENT, INCLUDING COASTAL ZONES, AGRICULTURAL LAND AND FORESTS
AREA VI	OPERATIONAL FORECASTING AND MODELLING INCLUDING GLOBAL CLIMATIC CHANGE OBSERVATION SYSTEMS
AREA VII	COMPLEMENTARY RESEARCH
AREA VIII	CROSS-CUTTING ISSUES: SUSTAINABLE DEVELOPMENT CONCEPTS AND TOOLS
AREA IX	SPECIFIC SUPPORT ACTIONS

Water cycle and soil-related aspects

the objective was to understand the mechanisms and assess the impact of global change and in particular climate change on the water cycle, water quality and availability, as well as soil functions and quality to provide the bases for management tools for water systems to mitigate the impacts.

FP6 - Water cycle and soil-related aspects

1	Hydrology and Climate processes	
	1.1	Climate modelling at catchment-regional scale
	1.2	Climate variability, floods and droughts
2	Ecological impact of global change, soil functioning and water quality	
	2.1	Ecological impact of global change on surface water bodies, ecosystem, health indicators and remediation strategies
	2.2	Water-soil systems functioning and management
3	Integrated management strategies and mitigation technologies	
	3.1	Integrated water management at catchment scale
	3.2	Integrated urban water management and mitigation technologies
	3.3	Management of water under scarcity and mitigation technologies
4	Scenarios of water demand and availability	
	4.1	Scenarios of water demand and availability at 25-50 y perspective

FP5 : ~62.5 M€/year

FP6: ~47 M€/year

FP6 – Soil contamination –related aspects

Results vs. Calls and topics

N°	WATER CYCLE AND SOIL RELATED ASPECTS AREA / TOPIC		EU CONTRIB. (€)	INSTR.	2002	1st call
					2003	2nd call
					2005	4th call
2 Ecological impact of global change, soil functioning and water quality						
505428	AQUATERRA	Understanding river-sediment-soil-groundwater interactions for support of management of waterbodies (river basin & catchment areas)	12.999.992	IP		
3998	BIOTOOL	Biological procedures for diagnosing the status and predicting evolution of polluted environments	1.800.000	STREP		
511254	SEDBARCAH	SEDiment bioBARriers for Chlorinated Aliphatic Hydrocarbons in groundwater reaching surface water	1.098.691	STREP		
4017	STRESOIL	In situ stimulation and remediation of contaminated fractured soils	1.100.000	STREP		
3985	EuroDemo	European Platform for Demonstration of Efficient Soil and Groundwater Remediation	988.899	CA		
36938	RISK-BASE	Coordination action on risk based management of river basins	1.612.304	CA		
37081	RAMWASS	Integrated decision support system for riskassessment and management of the water-sediment-soil system at river basin scale in fluvial ecosystems	1.665.040	STREP		
			21.264.926			

- ⊕ **A large integrated project on river/soil/groundwater interactions, AQUATERRA**
- ⊕ **Three smaller projects (SEDBARCAH, BIOTOOL and STRESOIL) and one co-ordination action (EURODEMO) on selection and demonstration of the most promising soil remediation technologies**
- ⊕ **One ERA-NET initiative for the co-ordination of national research programmes on soil protection: SNOWMAN**
- ⊕ **Two new projects on risk assessment (one a CA), just started**

FP6 conclusions

- ⊞ The Programme privileged an integrated approach
- ⊞ Several river-basin projects considered soil as a component
- ⊞ The river-basin integrated approach lead to make the problems “settling” on the one hand, but on the other hand lead to a considerable reduction of the site-specific work
- ⊞ Considerations were made that, after FP5, we should exploit the results first
- ⊞ Was remediation really a mature field? Is it sufficient to implement existing techniques?

FP7 2007 – 2013 Specific Programmes

***Cooperation* – Collaborative research**

***Ideas* – Frontier Research**

***People* – Human Potential**

***Capacities* – Research Capacity**

+

JRC (non-nuclear)

JRC (nuclear)

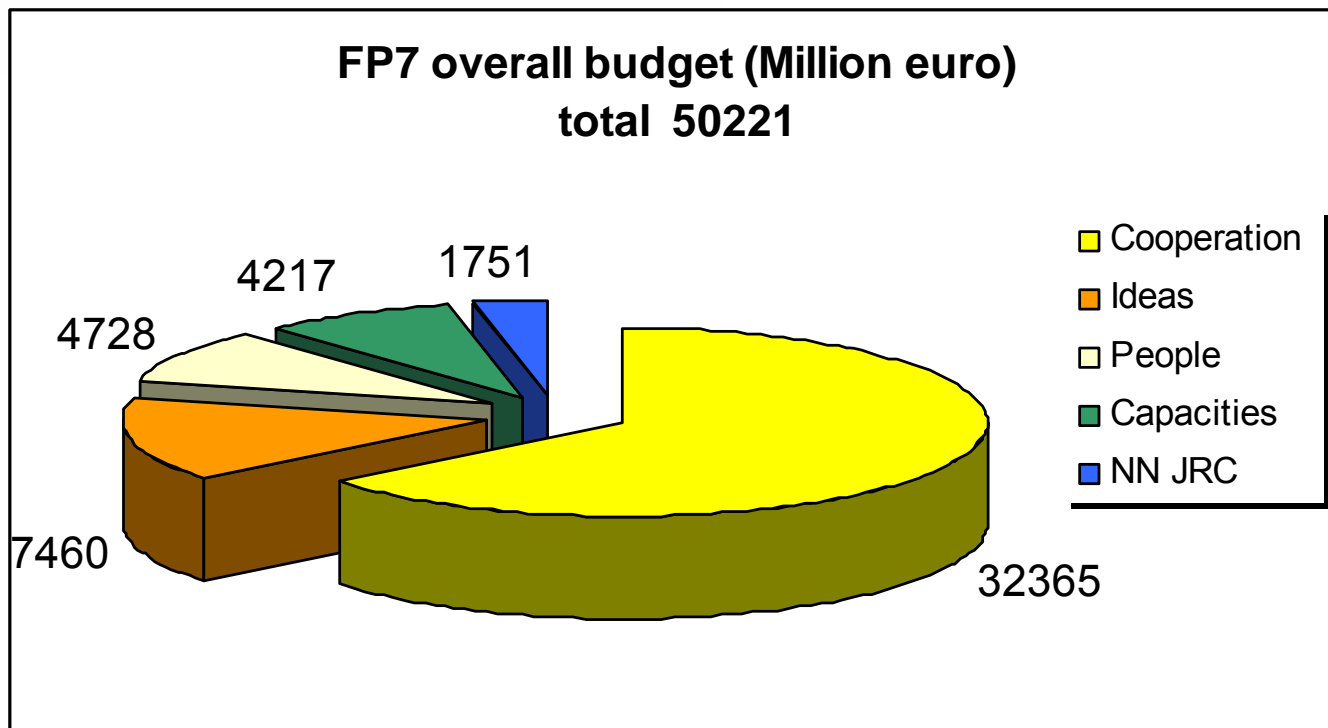
Euratom

FP7 (2007-13) - What's new ?

Main new elements compared to FP6:

- ⊕ 7 years duration, instead of 4
- ⊕ Annual budget increased (from EUR 5 billion ► 10 billion in 2013)
- ⊕ Basic research (~ EUR 1.0 billion per year)
- ⊕ Simplification of procedures
- ⊕ No more cost models but 75% of real costs for public bodies and SMEs, 50% to private entities and for demonstration
- ⊕ Other candidate States associated
- ⊕ Technology Platforms: research for European Competitiveness

FP7 overall budget



The FP7 overall budget

The figures are based on the EU Council political agreement (July 2006) for FP7 and are subject to modifications.

FP7 - Cooperation – Themes

Cooperation	32.365
Health	6.050
Food, agriculture and biotechnology	1.935
Information and communication technologies	9.110
Nano-sciences, nano-technologies, materials and new production technologies	3.500
Energy	2.300
Environment (including climate change)	1.900
Transport (including aeronautics)	4.180
Socio-economic sciences and the humanities	610
Space	1.430
Security	1.350

The FP7 thematic budget

The figures are based on the EU Council political agreement (July 2006) for FP7 and are subject to modifications.

Soil contamination issue: from FP6 towards FP7

Previous programmes outcomes

Soil Thematic Strategy (adopted September 2006)

Soil contamination is one of the 8 main threats to the soil highlighted by the STS, and has a negative impact on many soil functions.

The concern refers both to contamination of soil in itself and to danger for other compartments, mainly water and food production.

Soil is a complex system interacting with other environmental compartments; relationships and interactions with boundary systems, surface and ground water, and sediments, are affected by the same impacts and should be addressed in integrated research activities.

Actions will be supported in FP7 dealing with: a) technologies for acquiring reliable soil data, both for better understanding processes influencing soil functions and for assessing the status; b) technologies for sustainable management; c) technologies for mitigation of threats and impacts and eventually for restoration

Soil contamination and remediation

- ☺ scientific interest about remediation and mitigation techniques more and more shifted towards “in situ” sustainable techniques
- ☺ highly site specificity of such techniques (several examples of remediation failure due to inappropriate design and/or operation)
- ☺ facing at contamination issues taking into account soil as a natural system is essential in many environmental processes and functions, which are threatened by contamination
- ☺ impact of remediation techniques on soil (multiple) functions

Data collecting

- ☞ Tools for investigation and monitoring should be improved including combinations of geophysics systems, chemical analysis, statistical analysis, biomarkers and/or modelling.
- ☞ Site-specific investigation and monitoring tools (spatial-temporal variability)
- ☞ Detection of local, primary and secondary, sources

Data analysis and processing

- ☞ Risk analysis procedures based on site-specific processes and technologies.
- ☞ Relationships between attenuation mechanisms (physical, chemical and biological) and site-specific environmental conditions to improve predictive multi-process modelling.

Soil contamination and remediation

Measures implementation

- ✎ In-situ and source-oriented remediation technologies
- ✎ Improvement of sustainability of current and new remediation technologies
- ✎ Sustainability/persistence vs. Effectiveness/robustness (cost effectiveness)
- ✎ Impact on soil potential functions and services
- ✎ Quantification of natural rehabilitation processes and improvement of soil functions as basis for further development of natural attenuation
- ✎ Possible risks of secondary contamination (including under natural attenuation conditions)

Soil contamination and remediation Environmental Technologies Road map: 2007

Soil contamination assessment and site characterization, towards sustainable remediation

Technologies and tools for investigation and monitoring of contaminated soils with particular attention to less-invasive and depth-oriented tools, to spatio/temporal heterogeneity of soils, and to bio-availability of contaminants. Tools for individuation of local, primary or secondary, towards development of more source-oriented sustainable remediation technologies.

Soil contamination and remediation Environmental Technologies Road map: 2008 or later

Innovative technologies for sustainable soil remediation

Remediation technologies effective both in decontaminating and preserving soil quality and functions. Innovative techniques (including “new frontier” promising technologies) integrating existing knowledge on biological techniques, quantifying the natural rehabilitation potential of the soil, and other in situ remediation treatments. Different remediation technologies should be assessed according to their sustainability/persistence and effectiveness/robustness

Soil contamination and remediation Environmental Technologies Road map: 2008 or later

Emerging threats for soil/groundwater contamination in Europe: available technologies and research needs

A number of projects have been funded in previous FPs. Based on the outcome of ongoing projects on emerging environmental contaminants affecting soil and groundwater, actions for addressing most threatening contaminants should be developed, focussing on the behaviour of the soil as a natural and dynamic system.

Risk-based management

- ⊕ Research will be promoted through the Environment activity “Sustainable management of resources” on the basis of the output of AQUATERRA and of the two recently selected projects RISK-BASE and RAMWASS

Soil contamination and remediation

- ⊞ *Integrated research activities to take into account soil as a natural, complex system interacting with other environmental compartments*
- ⊞ *Cost effectiveness and ...*
- ⊞ *Environmental effectiveness ...*
- ⊞ *Commercial implementation of technologies*

More information about FP7 on CORDIS:

<http://www.cordis.lu/fp7/home.html>

Thank you for your attention!