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Sustainable Land Use Strategies and Technologies

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ITAS at a Glance

Interdisciplinary scientific institute within the Forschungszentrum Karlsruhe (Research Centre Karlsruhe)

Largest Technology Assessment (TA) unit within Helmholtz Association (HGF), Germany‘s greatest public research organization

Mission: Comprehensive analysis and evaluation of the development and application of technology and its interrelationship with processes of societal change

Currently three research areas:

- Environment and resource management
- Innovation processes and technology impacts
- Knowledge society and knowledge policy

About 90 staff

Operates the TA units of the German Parliament (TAB, since 1990) and the European Parliament (STOA, as part of ETAG consortium since 2005)

Roadmap Environmental Technologies 2020

Carried out by:	Institute of Technology Assessment and System Analyses (ITAS) im Forschungszentrum Karlsruhe
Funded by:	German Ministry of Research and Education (BMBF)
In Cooperation with:	Fraunhofer Institute for Chemical Technology (ICT)
Project Management:	Prof. Dr. Armin Grunwald Jens Schippl (Dipl.-Geographer)
Project Team :	Christian Dieckhoff (Dipl.-Ing. Mechanical Engineer) Nora Gronwald (Dipl.-Ing. Environmental Scientist/Process Engineer) Dr. Nicola Hartlieb (Dipl.-Geoecologist) Juliane Jörissen (Dipl.-Ing. Spatial planning) Ursula Mielicke (Dipl.-Ing. Chemical Engineer) Dr. phil. Oliver Parodi (Dipl.-Ing. Civil Engineer) Dr. Ing. Tim Reinhardt (Dipl.-Biologist) Dr. Volker Stelzer (Dipl.-Geographer)

Roadmap Environmental Technologies 2020

The project „Roadmap Environmental Technologies 2020" aims to explore middle-to long-term developments and pathways in the field of environmental technologies

Overall Objective: Identification of strategic options for research and development activities and for the transfer of technologies into praxis

Important points of reference: “High-Tech-Strategy for Germany”
“Masterplan Environmental Technologies”

Time horizon of the Roadmap will be the year 2020

Structure of the project

The project is carried out in two phases:

Phase I: Scoping-Phase > State-of-the-Art-Report ✓

Phase II: Roadmapping-Phase > Roadmap UWT 2020

How to get to the Roadmap?

In many cases new technologies are a necessary but not a sufficient factor for successful environmental innovations. A wide range of non-technical factors are relevant as well (markets, demand, regulations, social acceptance etc.)

Basically, what is needed for a Roadmapping-Process is a combination of

1. a problem-oriented methodology (“markt pull”)

2. and a technical-oriented approach (“technology push”)

Selected areas of research

- Climate Protection
- Air Protection
- Water Protection
- **Land use for settlement and transportation purposes / Sealing**
- Protection of Limited Resources
- Waste Management
- Biodiversity

Description of the problem

As land is limited and non-reproducible, the various types of utilisation are in competition with each other

A continual trend towards utilisation of land for settlement and transportation is obvious

Expansion of settlement and transportation takes mainly place at the expense of agriculture; this means a loss of fertile arable land

Land Use for settlement and transportation leads to an extensive disturbance of the ecological soil functions

Almost half of the land which is used for settlement and transportation is sealed on average.

Situation in Germany

Sustainable land use takes on greater significance for example in the federal government´s land protection concept (*Bodenschutzkonzeption der Bundesregierung*) and the German national strategy for sustainability 2002 (*Nationale Nachhaltigkeits-strategie*)

Aim: Reducing the daily additional land use rate for settlement and transportation purposes on 30 ha/day by 2020 was postulated for the first

According the latest datas of the German Federal Office of Statistics (*Statistisches Bundesamt*) the daily additional land use rate is about 105 ha/day, that means a light decrease compared to values of previous years (130 ha/day)

This decrease failes to meet the target without the use of efficient political, economical and fiscal measures and instruments

Sustainable Land Use

Strategies

- Promotion of inner urban development (Re-utilisation of brownfields)
- Exhaustion of existing land use potentials
- Conservation or recovery of natural soil functions (Decontamination of sites, Reduction of new sealing)
- Avoiding of further landscape divisions by design of appropriate settlement structures
- Land Saving Settlement Development

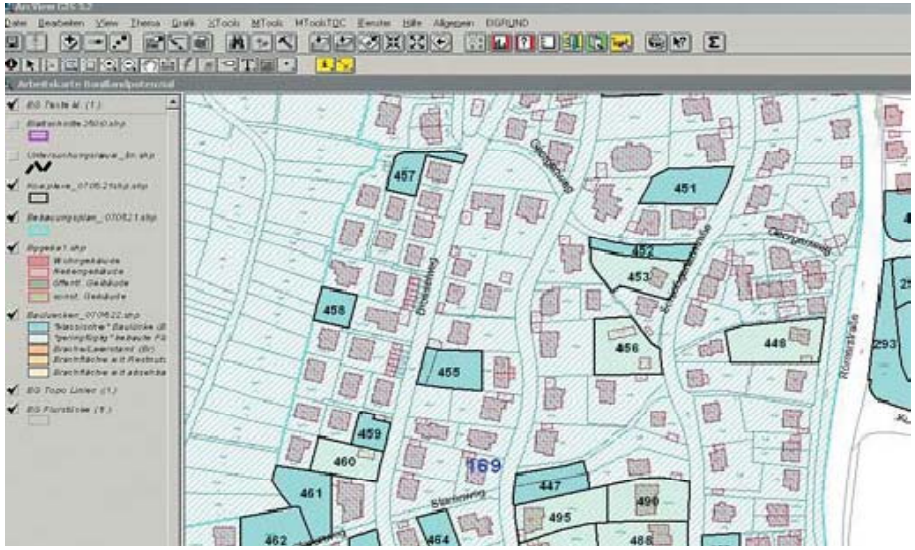
⇨ Reduction of the land use rate needs efficient political, planning and economic instruments, Environmental Technologies are mainly used in …

Geotechnologies

Ground Penetrating Radar

Geomagnetik

Ambient Vibration Testing



Soil and Land (Use) Monitoring

Quellen (Fotos): www.geodetic.com, www.ncree.gov.tv, www.terra.ch, www.refina.de, www.ruhr-uni-bochum.de and www.heinzebauoffice.de

Decontamination and Redevelopment Technologies I


Surface Covering


Waterproofing Wall


Soil Cleaning Plant


Thermic Soil Treatment


Biological Treatment


Groundwater Treatment

Decontamination and Redevelopment Technologies II

Natural Attenuation

Phytoremediation

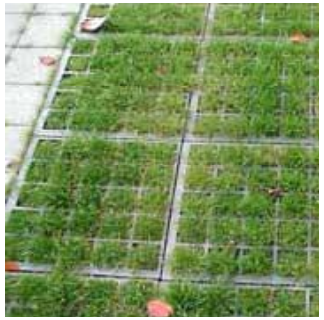
Quellen (Fotos): www.lwgb.bayern.de and www.ufz.de

Technologies in the field of Unsealing

Permeable and semipermeable surface paves

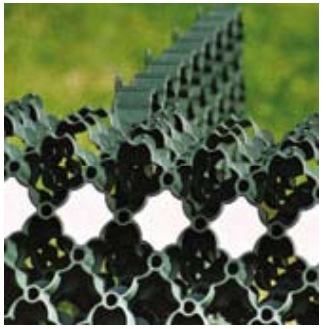
Grass paver

Lawn case paver



Cell greening

Gravel lawn



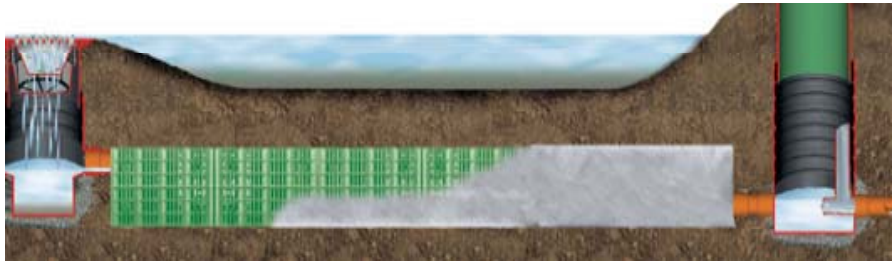
Grass combs

Rain Water Management

Green Roof Surface Area

Surface Seepage

Trough Seepage



Trough-Trench-System

Quellen Fotos: www.lwgb.bayern.de, www.herne.de, www. aco-online-magazin.de and www.heinzebauoffice.de

Concluding Remarks

Despite of all previous efforts a continued high land use for settlement and transportation purposes has to be noticed: A trend reversal is not visible

We need a step-by-step realization of sustainable spatial and settlement development by an effective policy-mix of regulatory, planning and economic instruments, which integrates actors of various administrative levels as well as different political sectors

Environmental Technologies was brought mainly in relation with redevelopment and reuse of urban brownfields, decontamination of sites and unsealing into effect

Thank you for your attention!

Inner Urban Development

Land Saving Settlement Development