# Threats of Land Use Change and Urbanization on Soil Ecosystem Services

## 2nd Soil Service Workshop

Funded by the EU project **SOILSERVICE**
http://www.kem.ekol.lu.se/soilservice.html
1-2 February 2010
Lammi Biological Station
University of Helsinki
Finland
Organizers: Prof. Heikki Setälä, University of Helsinki, Finland
Dr. Mira Liiri, University of Helsinki, Finland

### Summary of the presentations:

After the arrival to Lammi Biological Field station in the morning, we took an inspection walk in the surroundings especially to the sauna and the lake in daylight. During the early lunch, **Janne Sundell, Director of the station**, welcomed us to Lammi and presented the station briefly.

Thereafter, the workshop was opened by the organizers **Heikki Setälä** and **Mira Liiri**, followed by a presentation round of all the participants. Then **coordinator of Soil Service, Katarina Hedlund**, **Lund University, Sweden**, gave an introduction to the project.

The first speaker of the day was our host **Heikki Setälä, Professor in Urban Ecosystem Studies at the University of Helsinki** with the talk "*Why to bother about urban soils and services- lessons from Lahti*." Setälä explained and presented arguments to why soil eco-system services are important in the urban environment. In addition to some convincing theories he presented results from his own empirical study in the city of Lahti. He discussed how land use intensity affects the ability of a system to provide ecosystem services and the importance of plants for soil ecosystem. He also pointed out that ability to retain water and nutrients is an ecosystem service and that there appears to be a correlation between urban land use intensity and severity of anomalies in hydrological cycles in a given area. These issues are highly relevant in respect to climate change which are predicted to give more anomalies in hydrological cycles.

**Researcher Vesa Yli-Pelkonen** also from **the University of Helsinki** gave with his talk "*What urbanization is all about*?", a brief overview to the concept "urbanization". Yli-Pelkonen defined the term "urbanization", especially with respect to ecology. He also went

through various local, regional and global impacts of urbanisation on issues from bio-systems to climate.

After a coffee-break, the meeting continued with a talk entitled "*Issue of urban economics and environment: forests to cities or people to forests*" by **Heikki A. Loikkanen, Professor of Urban Economics at the University of Helsinki**. His talk considered various economic aspects of urbanization. Topics included history, population densities, travel distances and costs, house prices and much more. Loikkanen finnished with the economic effect of a forest belt in the city.

**Assistant Professor Loren B. Byrne from Biology & Environmental Science at the Roger Williams University in Bristol, RI, USA** gave a talk with the title "*Urban ecosystem services: Linking ecological and social variables through habitat structure management and ecological landscaping*". Byrne pointed out that ecosystem service issues in urban environments have to be put in the socio-cultural context that dominates in the urban landscape planning and management. He presented interesting data on soil traits and biodiversity in parcels, the importance of lawns, mowing, ground covering and effects of a patch in the lawns.

Before dinner, **Ciro Gardi, National expert at the Institute for Environment and sustainability, Land Management and Natural Hazard Unit within the EC, in Italy** talked about "*The relationships between soil sealing (urbanization) and food security*". Gardi talked about soil sealing and its effects on "food security" both on a local and a global scale.

After dinner, it was time for group discussions on "*Conflicts of land use in cities*".

In the evening, we got the opportunity to try a winter-bath with a classical Finnish sauna. Obviously we were a brave collection of scientists since of which the majority jumped into the hole in the ice that had been broken up in the ice-covered lake. And we all enjoyed it!

**Tuesday 2 February**

The second day started with a presentation by **Inkeri Vähä-Piikiö, Researcher at the City of Helsinki Urban Facts Center at the Urban Research Unit**. With her talk "**European Urban Land Use Enhancing Biodiversity**" she gave us an insight into modern hands-on urban planning, with a focus on importance bio- diversity aspects. She also presented her own project "Helsinki MA Meadows Project".

**Bioclimatologist Richard V. Poyat from US Forest Service in Arlington, VA**, **USA** gave a talk entitled "*The Chemical, Physical, and Biological Characteristics of Urban Soils*." He brought us beneath the ground to N-Cu-Pb-levels and earthworm activities in urban areas. He talked about how different factors in urbanization processes affect the soil, both chemically, physically and ecologically.

**Professor Franco Ajmone-Marsan, from the University of Torino, Italy,** talked about analyses of soil samples from different European cities in his presentation "*Methodologies for the Environmental Evaluation of Urban Soils*". The focus was on pollution and content of contaminants in the samples. Ajmone-Marsan gave us insight into the project URBSOIL which compares contamination in urban soils in different European countries. He also presented different aspects of functions of soil, evaluation parameters of soil quality and talked about the project TUSEC-IP which develops a method for evaluation of soil quality in urban environments.

After lunch, **Michell Pavao-Zuckerman, Associate Scientist and Assistant Professor at University of Arizona, Tucson, USA** presented his talk "*Limits and opportunities for soil quality and ecosystem functions in remnant and designed urban ecosystem patches*". He made comparisons between urban, sub-urban and rural soils traits, discussed food webs in urban ecosystems and effects of tree lines in cities. His research focuses primarily on nematodes. Pavo-Zuckerman also presented examples on treats to decrease negative effects of sealed soils in cities, for example "Rain gardens" in the dry Arizona. He discussed our role, as humans, in ecosystems, not only in urban ones and compared the different human forces in ecosystem services in agricultural and urban landscapes.

The last talk was given by **Professor Nicholas Dickinson, from John Moores University in Liverpool**, **UK**, "*Urban Soil Renaissance: Ecological Problems and Opportunities with Brownfield Land Remediation in Post-industrial England*". He talked about the project of restoring the "Woolstone New Cut Canal", that was constructed during the 1820s in a site with several industries, contaminating the area. In the 1970s, the canal was "fallen into disrepair", with no waterflow into the canal any more. A thorough research together with a restoration program has now transformed the area to "Woolstone Urban Ecology Park". Finally he informed us more about the soil part of the projects.

After dinner, the groups from yesterday reported on their discussions on "*Conflicts on Land Use in Cities*".

The task was to brainstorm around a statement (different for each group), come up with some answers/opinions/suggestions and to think about the outcome as a take-home-message for the stakeholders and policymakers.

Group 1, (Heikki Loikkanen, Richard Poyat, Mark Brady, Lisa Björnlund Strandmark and Richard Bardgett) discussed around "Ecosystem services are important in cities vs. ecosystem services may hinder the economic development of cities"

Trade-offs to balance economic development and environmental quality are needed. We also need to consider costs of lost ecosystem services in city planning.

Suggestions:

Economic incentives (water taxes, subsidizes for planting trees)

Information to change perception (Real men don't mow their lawn)

Integrating ecology with urban design to build in ecosystem services

Group 2 consisted of Inkeri Vähä-Piikkiö, Ciro Gardi, Helene Brach-Jörgensen, Stefanos Sgardelis, Klaus Birkhofer, Mira Liiri

"Urban planners should apply ecological know-how into their practices vs. economic and other displace nature values in urban planning. Are ecosystem services more functional in densely built cities or cities with a loose structure?"

Existing city centres are a more or less untouchable in most European Cities. Which leads to little room for promoting biodiversity/ecosystem services.

Group 3: Franco Ajmone Marsan, Mitchell Pavao-Zuckermanm, Lia Hemerik, Stefan Hotes, Ayu Touyota, Franciska de Vries. "Urban soils can provide important ecosystem services for city dwellers vs. urban soils are artificial systems that have lost their ability to provide ecosystem services." "Where is the truth?"

The important thing is to clarify whether humans actually are a part of the system or not and IF a city IS an ecosystem.

Group 4 Loren B. Byrne, Vesa Yli-Pelkonen, Sören Christensen, Katarina Hedlund, Peter de Ruiter, Karolina Uteseny, Simon Mortimer. "Is it possible to enhance ecosystem services in cities? How do you do it?" Katarina kan fylla I här.

Group 5. Nicholas Dickinson, Heikki Setälä, Jan Frouz, Wim van der Putten, Maria Tsiafouli, Elisa Thebaoult, Joseph Tzanopoulos. "Urban biodiversity and invasive species in relation to ecosystem services –a relevant question for building sustainable cities vs. an academic exercise"