

## **NOVA – Soil and Society (SOILSOC) NETWORK**

### **REPORT**

FROM THE FIRST MEETING 2.3. 2006 AT VIKKI BIOCENTER,  
UNIVERSITY OF HELSINKI, FINLAND

### **PURPOSE OF THE NETWORK**

In order to increase and improve the Nordic interaction in the field of soil science, we decided establish a NOVA network for the purpose. The aim of the SOILSOC network will be the organisation of courses, benchmarking of graduate studies and other issues that we feel are important. The name Soil and Society (SOILSOC) indicates that soils are essential for human existence and thus the well-being of society. New developments in society also affect soils.

The hosts of the first network meeting were Kristina Lindström and Markku Yli-Halla, Department of Applied Chemistry and Microbiology, University of Helsinki. Faculty of Agriculture and Forestry. The invited participants were selected to cover all NOVA university departments with an interest in the topic. (Invitation letter Appendix 1).

### **PARTICIPANTS**

The participants of the meeting are listed in Appendix 2. The 16 participants represented all NOVA countries and among them were professors and teachers in soil science and microbiology. Post doctoral scientists and graduate students from the host institution attended as well. The participants covered nicely different types of soil environments and various aspects of teaching and research.

### **MEETING OUTCOME**

The items to be discussed during the meeting are listed in the invitation letter. They were discussed in smaller groups. A summary of the ideas and suggestions are given in Appendix 3.

The group also decided to make a list of courses available at the participating institutions that students from other institutions could take (Appendix 4).

Finally, it was decided that the network should aim at establishing a Nordic Master's programme and a corresponding degree in Soil Science. For the purpose, a proper NOVA Network should be formed and funding applied for in order to hire a coordinator with responsibility to set up a website and develop the programme in collaboration with the participating institutions.

### **SETTING UP A PROPER NETWORK**

We aim at setting up a NOVA network according to the guidelines given by NOVA. This network might be merged with the network on BIOREMEDIATION (coordinator Kristina Lindström), which was established mainly in order to organise the Bioremediation course in Helsinki in 2005.

## A NORDIC MASTER'S DEGREE

The final aim of the network will be to establish the M.Sc. degree. This goal will be achieved by successive steps, depending on the active participation of the members and on the possibility to hire a coordinator.

## NEXT SOILSOC MEETING

Our Icelandic partner has invited us to have our next meeting on Iceland. We shall make plans for that.

## NOVA MEETING ON THE FAROES

The next big NOVA-meeting will be held on the Faroe Islands in May. KL will there promote our activities.

## SOILSOC NETWORK PLAN – FINAL PLANNING PHASE

(according to instruction given in the NOVA document about NNP funding)

1. The already existing Bioremediation Network (coordinator) is extended and the name is changed, since Bioremediation is part of Soil Science in the scope we envision
2. One representative from each participating institution is elected to serve as network nodes.
3. Local nodes (e.g. soil chemistry, microbiology....) are named
4. A project plan is formulated according to NOVA rules (can partly be done by e-mail). This contains: - clear and measurable goals; - plans and milestones; - timeframe; -personal responsibilities for achieving results; - budget; -report periods.
5. One milestone is a meeting on Iceland to finalize plans.

Preliminary schedule:

Milestone	Network established	Goals specified	Meeting on Iceland	Final plan	Nordic M Sc degree
Time	April 2006	May 2006-04-05 (NOVA meeting)	Autumn 2006	January 2007	January 2008

## APPENDIX 1

### SOILS AND SOCIETY NORDIC NETWORK MEETING

Dear colleagues - Bästa Nordiska kolleger

In order to increase and improve the Nordic interaction in the field of soil science, we are going to establish a NOVA network for the purpose. The aim of the SOILSOC network would be the organisation of courses, benchmarking of graduate studies and other issues that we feel are important.

We would like to invite you to the meeting or, in case you cannot come, another good representative of your field of interest for a first networking meeting here in the Viikki Campus in Helsinki. The date for the first meeting is Thursday March 2nd, 2006, starting at noon and finishing with departure the next day. For the location, see:

<http://viikki.helsinki.fi/english/index.htm>, "how to get there". You may take a bus from downtown or come by taxi from the airport.

The schedule on Thursday, March 2, 2006 will be as follows:

12.00 Gathering of the participants in the hall of Viikki Science Library (the rounded building, address: Viikinkaari 11 A – Viksbågen 11 A, 00710 Helsinki). Optional lunch.

12.50 Gathering of the rest of the participants in the hall of Viikki Science Library (the rounded building, address: Viikinkaari 11 A – Viksbågen 11 A, 00710 Helsinki).

13.00 Start of the meeting at the section of Microbiology, Biocenter 1 (address: Viikinkaari 9 – Viksbågen 9). The outline of the meeting is as follows:

- Presentation of the participants
- What does each participant see as the future challenges of graduate studies in the field of soil science?
- What has each participant or his/her organization to offer to others for the MS or Ph.D. level education in Soil Science?
- What does each participant hope to gain from the Nordic network for the MS or Ph.D. level education in Soil Science?
- What can we do together in order to enhance the MS or Ph.D. level education in Soil Science in the Nordic countries?
- How shall we achieve these objectives?
- How shall we organize ourselves for the future?

The meeting will continue until around 17.30.

After the meeting, we take you to the hotel/university guest house. You don't need to make hotel reservations yourselves. After accommodation, there will be an informal dinner in a restaurant close-by, where we can continue the discussion and further planning.

NOVA has agreed to pay the travel and accommodation expenses of this meeting, up to the total of 5000 Euro. You should book your flights, or whatever other means of transportation you may have, and after the trip you should send the ticket and travel bill to us for reimbursement. Only Tourist class tickets will be reimbursed. We book the accommodation and take care of that bill.

The lunch and coffee during the meeting on March 2 will be served free of charge. However, you need to pay the dinner yourself individually, but you are entitled to a daily allowance of 30 Euro.

Please inform us whether you will participate or not and if somebody else will come as a replacement. What will be your time of arrival? Please tell us also of any special meal requests and whether you should not need an accommodation arranged by us. We would like to get all this information by February 16, at the latest.

Looking forward to seeing you in Helsinki!

Helsinki 2.2. 2006

*Kristina and Markku*

*Please, reply to one of these:*

[Kristina.Lindstrom@Helsinki.Fi](mailto:Kristina.Lindstrom@Helsinki.Fi)  
[annakristinalindstrom@hotmail.com](mailto:annakristinalindstrom@hotmail.com)

## APPENDIX 2

## SOILSOC MEETING 2.3. 2006 HELSINKI VIIKKI

NAME	E-MAIL	AFFILIATION	FIELD OF INTEREST
Tarja Lehto	tarja.lehto@joensuu.fi	University of Joensuu, Faculty of Forestry	Forest soils, roots, mycorrhizas, micronutrients
Mike Starr	mike.starr@helsinki.fi	University of Helsinki, Dept. of Forest Ecology	Forest soils (and peatlands, organic soils), forest ecosystem biogeochemistry and carbon sequestration, hydrology, soil classification and formation
Anu Mikkonen	anu.s.mikkonen@helsinki.fi	Dep. of Appl. Chem. and Microbiology	M.Sc. student in Microbiology (environmental microbiology, environmental soil chemistry)
Kristina Lindström	<a href="mailto:kristina.lindstrom@helsinki.fi">kristina.lindstrom@helsinki.fi</a>	Dept Appl Chem Microbiol	Microbial diversity, rhizosphere communities, plant-microbe interaction
Katarina (Lotta) Björklöf	katarina.bjorklof@ymparisto.fi	Finnish Environment Institute	Bioremediation and human impacts on microbial communities in soil
Ole Nybroe	oln@kvl.dk	Royal Veterinary and Agricultural University (KVL)	Soil and rhizosphere microbiology
Ole K. Borggaard	okb@kvl.dk	Inst. Natural Sciences. Royal Vet. & Agric. Univ.	Soil chemistry, pedology, environmental chemistry
Lara Valentin Carrera	lara.valentincarrera@helsinki.fi	University of Helsinki. Dept. Applied Chemistry and Microbiology	Bioremediation of soils. Degradation of organic pollutants. Fungi and bacteria in soils. Environmental analytical chemistry.
Olafur Arnalds (Oli)	oa@lbhi.is	Agricultural University of Iceland	Soil formation, classification, erosion, desertification, restoration, soil conservation
Trond Borresen	<a href="mailto:trond.borresen@umb.no">trond.borresen@umb.no</a>	Norwegian University of Life Sciences	Soil physics. soil tillage, compaction. erosion. soil quality
Sara Hallin	Sara.Hallin@mikrob.slu.se	Dept Microbiology, SLU	Micobial diversity, bacterial communities, molecular ecology, nitrogen cycling, denitrification, ammonia oxidation
Åsa Frostegård	Asa.Frostegard@umb.no	Norwegian University of Life Sciences	Molecular microbial ecology, soil microbial communities, pollution, degradation, N- cycle, gene transfer
Erik Karlton	<a href="mailto:erik.karlton@sml.slu.se">erik.karlton@sml.slu.se</a>	Dept. Forest Soils, SLU	Effects of different land-use on soil properties (carbon sequestration, soil acidification, nutrient management)
Marja Tuomela	Marja.Tuomela@Helsinki.fi	University of Helsinki. Dept. Applied Chemistry and Microbiology	Bioremediation of soils. Degradation of organic pollutants in soil. The impact of pollutants to soil ecology and chemistry
Leena A. Räsänen	Leena.A.Rasanen@helsinki.fi	University of Helsinki. Dept. Applied Chemistry and Microbiology	Plant-microbe interaction, microbial diversity microbial ecology
Markku Yli-Halla	markku.yli-halla@helsinki.fi	University of Helsinki, Dept. Applied Chemistry and Microbiology	Soil chemistry, pedology, plant nutrition

## APPENDIX 3

### FUTURE ACTIVITIES IN SOILSOC

A summary based on reports from three working groups

Group 1	Group 2	Group 3
Ole Nybroe, DK Oli Arnalds, IS Katarina Björklöf, FI Tarja Lehto, FI	Lara Valentin Carrea, FI Marja Tuomela, FI Åsa Frostegård, NO Leena Räsänen, FI Erik Karlton, SE	Trond Børresen, NO Sara Hallin, SE Kaisa Wallenius, FI Markku Yli-Halla, FI Ole Borggaard, DK

### PROBLEMS TO BE SOLVED

Many small communities of soil science have problems in offering sufficient and high-quality courses for their graduate students of soil science. In small scientific communities, there are few teaching staff and few students specializing in a particular field of soil science. PhD students may have reasonable opportunities to find courses in other universities, and these courses are mostly arranged as intensive courses with the duration ranging from one week to a few weeks. Instead, courses for Master student level are mostly arranged as regular courses extending throughout the whole semester or half a semester (7 to 10 weeks). When going to another university as a visiting student, he or she should be able to collect a sufficient course load in order to get the regular number of credits during that semester. Therefore we find it particularly challenging to coordinate the courses offered for visiting Master level students so that they can build a good program for their semester.

Courses which attract visiting students are likely not evenly distributed among the Nordic universities with soil science curricula. Today this is substantially linked to the number of courses which are taught in English. The popular universities/departments may not be able/willing to take all the visiting students who would like to come. On the other hand, in small units it may be difficult to arrange sufficient amount of courses (taught in English) suitable for visiting students.

The information about the courses suitable/available for visiting students is quite spread out. It is difficult to find out what courses there are in different universities and at what time they are given.

### WHY A NORDIC NETWORK? – Justification

- Agricultural education is getting weaker
- Land use changes call for improved basic training and complementary (postgraduate) education
- We have to face new EU soil protection strategies – and meet Agri-Environmental knowledge requirements (educate people)
- Carbon sequestration, large field of increasing importance
- Soil as poorly exploited resource
- Soil as a hiding place for unwanted organisms or functions

- The soil as a filter for protection of ground water resources
- We do not even have decent soil maps in the Nordic countries

## **CURRENT SCIENTIFIC ISSUES**

- Soil chemistry and physics
- Soil microbiology
- Plant & soil nutrient management in forestry and agriculture
- Soil formation and pedology
- Effects of land use on soil properties and water protection (carbon sequestration, acidification etc.)
- Remediation of polluted soils
- Sociopolitical issues
- Soil management in developing countries

## **NEW ISSUES THAT WE NEED TO VITALISE SOIL SCIENCE**

- Soil erosion
- Soil functions, agricultural and societal importance
- Reuse of polluted soil
- Archaeological soil science
- “Intelligent design” of screening strategies for novel potential and of cultivation procedure to get access to novel organisms
- Ecosystem restoration – land reclamation (and desertification remedies)
- Increased emphasis on soil as a resource for novel organisms and any enzyme or metabolite produced by these that can be exploited to the benefit of society
- Increased emphasis on soil as a reservoir for pathogenic organisms and antibiotic resistance genes that may pose a risk to human health

## **MEANS**

- Mapping of expertise. What do each unit have to offer at the MS, Ph.D. and complementary teaching level
- Before arranging new courses, the possibilities for a more effective utilization of the existing soil science courses within the Nordic universities needs to be investigated.
- Information about the courses suitable/available to visiting students in the Nordic universities needs to be collected in one web page with links to the pages of the respective universities/departments and, if possible, including the timing of the courses.
- Organization of short lab courses open for Ph.D. and M. Sc. students
- Organization of short summer schools open for Ph.D. and post graduates
- Exchange of M.Sc. students, e.g. training visits to different labs for specific method training (short term mission)
- A combination of the above (theoretical part in common + part that is spent in different labs depending of interest)
- Funding of course participation (even for courses not organized by the network)
- Nordic degree in soil science (NOMAS), or more narrow sub disciplines. The willingness to student mobility may be enhanced by developing a Nordic degree of Soil Science, conferred jointly by the relevant universities.

- Student mobility may be promoted by explicitly building different lines of specialization involving courses from different universities. This requires that teachers commit themselves to investigating the alternatives available for a particular specialization in different universities.
- Nordic research school in Soil science (NORES), or more narrow sub disciplines
- Networking of soil scientists of the north (provide opportunities for “us” to meet on a regular basis to exchange ideas and develop novel courses and strategies)
- Contact network (website, e-mail lists, listing competence of network participants)
- Measures to market the relevance and need of research in our area (show good examples of where PhDs end-up after the exam, activities in public debate)
- A NOVA NETWORK of SOILS needs to be established
- A coordinator should be hired to make the web page of the NOVA NETWORK of SOILS and to collect the above information.
- In addition to student mobility, teacher exchange needs to be encouraged. Those universities/departments which don't themselves arrange courses suitable for visiting students can contribute by sending a teacher to take care of (part of) a course in another university within the NOVA network.



## APPENDIX 4

### LIST OF COURSES AVAILABLE FOR NORDIC STUDENTS

#### SLU

##### **“Molecular techniques in environmental microbiology” (2 points, 3 ECTS)**

###### *Aim*

The aim of the course is to graduate students an overview of currently used molecular techniques for environmental microbiology. The graduate students will also have a chance to discuss these methods and relate them to their own work with some of the best teachers and scientist in molecular microbial ecology.

###### *Target group and prior knowledge requirements*

Graduate students in microbiology (also soil science, plant pathology, limnology, marine biology etc with a microbiological profile) at Swedish, Nordic and Baltic universities.

###### *Course organizer*

Sara Hallin, Department of microbiology, SLU, phone: +46 18 67 32 09,

Sara.Hallin@mikrob.slu.se

Within the Focus on Soils graduate school at SLU

###### *Time and place*

Five days December 2006 (dates not set) at the Biocenter at SLU (the former Genetic Center).

#### UH-AF

##### **Soils courses given in English for advanced undergraduates, MSc and PhD students and interested post doctorates given by the Department of Forest Ecology, University of Helsinki:**

ME311: Forest Soil Sampling and Analysis Of Soil Physical and Chemical Properties

ME310 : Soil Formation and Classification

ME413 : Biogeochemistry of Boreal Forest Ecosystems and Soils

ME414 : Forest Soil Hydrology and Water Balance

ME446 : Carbon and Nutrient Dynamics in Peatland Ecosystems (31/7-10/8/2006)

Also of interest:

*Integrated biogeochemistry of small, forested catchments: concepts, field methods and techniques, data analysis and modelling.* A PhD course funded by NordForsk and held at Gårdsjön, approx. 50 km north of Göteborg, Sweden, 29 September-6 October 2006.

## Curriculum: Environmental soil science

MAA360 Laboratory practical, 10 credits

Contents: Principal methods of soil, plant and water analysis

Duration: The first part of spring semester

Prerequisites: Principles of inorganic chemistry (including laboratory practicals), Principles of Soil Science and Plant Nutrition

Literature: L.P. van Reeuwijk (toim.): Procedures for soil analysis. 6. painos. Technical Paper 9. ISRIC, The Netherlands

## Bioremediation of boreal soil, Department of Applied Chemistry and Microbiology

Course period	June 5-15, 2006
Location	Viikki Biocenter, University of Helsinki
Course credit	5 ECTS
Deadline for application	15 April, 2006
Course abstract	The course will bring together Nordic students (graduate and master's) and top teachers interested in bioremediation for a thorough overview and update of the field. Lectures, excursions, laboratory work and seminars will be organised in such a way that the students are confronted with practical problems and guided through the process of dealing with them in a multidisciplinary fashion. Thus, the course program involves appropriate sampling, soil and pollutant chemistry, appropriate ecology and hydrology, and of course microbiology and molecular biology. Emphasis will be on monitoring the bioremediation process. The course is organised in collaboration with the NordForsk funded network MECBIO (Microbiology and bioremediation in cold climate, coordinator prof. Vigdis Torsvik, University of Bergen).
Teachers	-
Link to course homepage	<a href="http://www.honeybee.helsinki.fi/~asmikkon/">http://www.honeybee.helsinki.fi/~asmikkon/</a>
Language	English
The course is intended for	PhD and M.Sc. level students
Max no of participants	25
Special prerequisites	-
Course organization	Department of Applied Chemistry and Microbiology, University of Helsinki
Course leader	Kristina Lindström
Postal address to course leader	Biocenter 1, Viikinkaari 9, FIN-00014 University of Helsinki
Phone to course leader	+358-9-19159282, +358-40-7075205
Fax to course leader	+358-9-19159322
E-mail to course leader	<a href="mailto:kristina.lindstrom@helsinki.fi">kristina.lindstrom@helsinki.fi</a>
Registration to	Kristina Lindström
Other courses in the course series	Not yet.

## PLANNED COURSES

### **Iceland**

We would like to establish graduate course open for Nordic students in soil erosion, desertification and land reclamation (in English). Such course would be very useful for those intending to work with developing countries, and also if Nordic schools have programs for students coming from developing countries dealing with such problems.

A possible course could also be soils and geomorphology (nowhere better to do, because of active nature).

### **Finland**

We would like to plan a multidisciplinary, problem based course in soil science at M.Sc. level. The idea would be to sample a piece of land (contaminated, forest, field, meadow...) and do different kinds of studies with the samples. The work would involve experimental planning, sampling, physical, chemical, biological and molecular assays, data treatment, reporting, in fact an approach similar in its approach to this year's course in Bioremediation.

### **Sweden**

The following courses are offered by Focus on Soils at SLU in 2006

#### **Soil and water chemistry modelling – 18/4 - 28/4 2006**

Contact person: Jon Petter Gustafsson ([gustafjp@kth.se](mailto:gustafjp@kth.se))

#### **Soil quality – in October 2006**

Contact person: Annemieke Gärdenäs ([annemieke.gardenas@mv.slu.se](mailto:annemieke.gardenas@mv.slu.se))

#### **Soil microbiology and molecular techniques – December 2006**

Contact person: Sara Hallin ([sara.hallin@mikrob.slu.se](mailto:sara.hallin@mikrob.slu.se))

More information is found on Focus on soils homepage:

<http://www.mv.slu.se/focusonsoils/index.htm>

**FOR MORE COURSES SEE NETWORK HOMEPAGE:**

<http://www.honeybee.helsinki.fi/users/lindstro/NOVASOIL/index.htm>

