



SNOWMAN NETWORK
Knowledge for sustainable soils



2015
International
Year of Soils

Panel discussion

SNOWMAN meeting, March 25th 2015, Paris

Chaired by Prof. Steven Banwart (University of Sheffield, UK) : Prof Steven Banwart is an international leader in the study of reactive processes in soil and groundwater. He leads the U. of Sheffield Cell-Mineral Research Centre (C-MRC), leads the SCOPE international Rapid Assessment Process project on Benefits of Soil Carbon, and is Principal Investigator of the European Commission FP7 Large Integrating Project Soil Transformations in European Catchments (SoilTrEC)

Panelists:

- **Simon Moolenaar (Chair of the SNOWMAN Network)** : Simon worked as a researcher and consultant. He was program manager at SKB (Dutch Center for Soil Management and Quality) until 2014, responsible for the scope of the programme of the SKB Calls that aim for multi-stakeholder innovations, public private partnerships and building new business cases with researchers and end-users like policy makers and private parties. He is now is strategic consultant with Royal HaskoningDHV.
- **Birgit de Boissezon (European Commission, DG Research and Innovation)** : A biologist by training, she coordinated EU research matters at the Danish Ministry for Research and served as research counselor for the Danish government in Brussels, after which she joined the European Commission's research department in 1997 and now is head of the Unit "sustainable management of natural resources.
- **Detlef Grimski (Coordinator of the INSPIRATION project)** : Detlef Grimski is a civil engineer with more than 20 years of professional experience in waste and contaminated land management with the German Federal Environmental Agency. He is now the coordinator of the INSPIRATION project (INtegrated Spatial PlannIng, land use and soil management Research ACTION), a European research program launched in March 2015.
- **Xavier Le Roux (Coordinator and CEO of Biodiversa)** : Xavier Le Roux is a senior scientist in Ecology at the French Institute for Agronomic Research (INRA) where he leads the « Microbial functional diversity» team. He was the Director of the Foundation for Research on Biodiversity

(FRB). He has been the Coordinator of BiodivERsA since 2008. BiodivERsA is an ERA-Net gathering 18 European countries that aims to coordinate and support trans-national research on biodiversity and ecosystem services.

- **Luca Montanarella (Joint Research Center of the European Commission, Chair of the Intergovernmental Technical Panel on Soil, Global Soil Partnership)** : He has been working since 1992 as Scientific Officer in the Joint Research Centre of the European Commission where he currently leads the SOIL Action. He recently became Chair of Intergovernmental Technical Panel on Soil of the Global Soil Partnership. This panel gathers 27 international experts, and aims to provide technical and scientific advice to the Global Soil Partnership, an initiative launched in 2011 by the FAO and the EC that works to improve soil governance around the world.

Question 1: What are, in your perspective, the major scientific challenges related to soil, land use and land management? Which priorities should be set for the INSPIRATION Coordination and Support Action and the future Strategic Research Agenda (SRA) it is set to define?

Simon Moolenaar underlined that soil management has to be linked to sustainable development. In particular, the private sector should be mobilized to improve resource efficiency, the delivery of ecosystem services and the preservation of the natural capital.

He called for a “soil-inclusive” land planning that could better allocate ecosystem services among stakeholders. To this end, among the many difficulties that have still to be overcome, finding the right scales as well as up- and down-scaling methods to take soil heterogeneity into account is one of the most daunting challenge. Also, a major scientific effort should be devoted to the synthesis and aggregation of existing knowledge and uncertainties on the many soil properties that are necessary to build scenarios (combined with socio-economic modeling) for sustainable land management. These scenarios for sustainable land management should be followed by practically designed “experiments” (pilot studies, demonstration projects) that allow for adaptive management and reflexive monitoring.

Xavier Le Roux recalled that the objective of the forthcoming 2015 Biodiversa call was the understanding and the management of the biodiversity dynamics in soils and sediments to improve ecosystem functioning and delivery of ecosystem services. Soil biodiversity management to increase services delivery indeed appears as one of the most challenging scientific objective and will have to be dealt with in a close future.

Concerning land use and land management, it has become more and more obvious from BIODIVERSA projects that key challenges lie in the governance at the landscape scale. Acquiring knowledge on the governance of what is better called, at this scale, « social-ecosystems » is nonetheless terribly challenging because it requires including an extraordinarily wide range of stakeholders.

Regarding the future work of the Coordination and Support Action, the only advice would be to strive to build synergies between existing European research area bodies and avoid duplication of efforts.

Birgit de Boissezon clarified that the new EU framework programme for research and innovation, Horizon 2020, puts new and strong emphasis on innovation. The 'excellent science' pillar of Horizon 2020, including the European Research Council, research infrastructures and fellowships, funds researcher driven basic research, including in the environment field, whereas the 'societal challenges' pillar, and notably the challenge 'Climate action, environment, resource efficiency and raw materials', does not fund environmental research for the sake of it but invest in the development and deployment of solutions to those challenges. The « sustainable management of natural resources » unit she runs

focuses on the development of nature-based solutions and the deployment of a market (both supply and demand) for them, thus supporting sustainable growth and meaningful local jobs. Such nature-based solutions are, by definition, systemic, involving not only environmental research and technological innovation but also innovation in social, legal and administrative, governance, institutional, business and financing models. Addressing the environmental challenges means in particular that we can't look at soils only but need to integrate all environmental components to develop sustainable solutions, for example for soil degradation. It also means that many different stakeholders need to be involved, ranging from researchers to local and regional communities and authorities, land owners, landscape architects, construction companies, citizens, etc.

Promoting targeted research and development is one of the five pillars of actions of the Global Soil Partnership (GSP). As Chair of the International technical panel on soils (ITPS) of the GSP, Luca Montanarella is currently finalizing the corresponding Plan of action for soil research that will be presented to the GSP plenary in June. Showing that clear research priorities in the soil and land area are not readily defined, this Plan of actions has been particularly difficult to develop compared to the other four Plans of actions that were endorsed in June 2014. As of yet, four topics have emerged from discussion within the ITPS:

1. Food security: The GSP was established as a consequence of the 2008 food crisis, when suddenly people realized that the resource of fertile soils in the world was limited.
2. Food safety: There is growing concern about food grown from extensively contaminated soils. In China, there are clear examples where contaminants are entering the food chain.
3. Climate change: Soils, storing vast amount of carbon that can be modified by land management and land use changes, are a major player in global climate regulation. Organic soil carbon have hence been included in the land use, land-use change and forestry (LULUCF) package of the multilateral climate negotiations.
4. Global soil biodiversity: Soil biodiversity was first put in the agenda by the Convention on Biological Diversity and clearly remains, as Xavier Leroux pointed out, a research frontier where much progress is to be made.

The difficulty to outline clear scientific priorities partially stems from the fact that different research communities approach soils from different angles and do not share the same language. Luca Montanarella explained that there is a huge confusion between soil and land and that the research community is heavily fragmented between pedology, planners, geoengineers, geologists, etc. The FP7 project SOILTREC coordinated by Steven Banwart has aptly started to bring all of them together with the critical zone concept, but there is still a long way to go towards knowledge integration.

The aim of INSPIRATION project that Detlef Grimski coordinates is precisely to establish, with all relevant stakeholders, the future strategic research agenda on soil, land use and land management. As a bottom-up approach is at the heart of this coordination and support action, it would be counterproductive to set *a priori* priorities for the SRA. Nonetheless, as presented earlier, INSPIRATION's framework is structured in 4 integrated axes: *Natural resources*, *Natural capital stewardship*, *Land management*, and *Net impact on global and regional scale*. These themes will help foster new ideas to balance land demand with realistic supply through land use efficiency as it is clear that business as usual is not an option. Echoing other panelists, Detlef Grimski also emphasized that future research will require interdisciplinary perspectives.

The discussion with the room further underscored governance as a major research priority. Luca Montanarella shared that if governance was a recurring concluding theme in scientific meetings on soils and lands, it was most probably because of the nature of soils compared to other goods such as water

and air: soils are private properties even though they deliver services to a wide range of beneficiaries. Addressing the links between soils functions and soil governance is clearly a fruitful avenue of research and policy science and law could be of great help to soil sustainable management.

It was remarked that a great knowledge basis has already been developed but putting it into practice will require the identification of governance bottlenecks and factors facilitating social innovations. It will also take a systemic reshaping of the science – policy interface and in particular changing from a linear model of knowledge transfer to a deeper interaction between scientists and stakeholders. Neither should there be a separation between knowledge holders and knowledge demand, nor should stakeholders be considered as the only legitimate ones to set identify research priorities.

Transdisciplinary research was thus widely considered as the way forward and the role of knowledge brokers between science and practice brought forward. Yet, true transdisciplinarity is still the exception rather than the rule. Simon Moolenaar commented that it may stem from the international policy targets, which are all framed in a negative way (no net biodiversity loss, no net land take, etc.) and may thus limit practitioners engagement.

The discussion also stressed that scientific effort should be devoted to the practical ways, the possible paths to achieve desired outcomes such as food security, food safety or climate change mitigation as research priorities. As shown earlier in the day, The FP7 project VOLANTE identified shared desired visions of land use that are not becoming realities.

Question 2: How can soils, land use and land management SRA help to address the grand societal challenges? Which tools/ways to structure the European research area may help to meet these challenges? Should any other “research infrastructure” be developed at the EU level?

There are two needs for the future: ensure new knowledge generation and implementation. Xavier Le Roux stated that there was then three possible approaches: creating (i) two separate tools for implementation and generation hopping for synergies between the two, (ii) a unique big tool or (iii) a landscape of interconnected tools. Following Simon Moolenaar’s suggestion to concentrate knowledge hubs by building soil and land related stakes within existing initiatives like JPIs, Xavier Le Roux favoured the third solution for efficiency, modularity and practicality to deal with cross-cutting issues. The discussion with the room confirmed that integration of soil stakes in existing ERA initiatives was a potential way forward. It was notably announced that the FACCE and Water JPIs were preparing an Eranet Cofund proposal for Water – Agriculture related approaches and solutions that includes a soil component. Nonetheless, it was felt that a wide array of existing instruments makes it is hard to understand where a particular project has the best chances to be funded. A specificity of the soil and land topics is that private companies, unlike in other domains, are not likely to fund observatories and that public funding does not seem adequate given the research needs expressed today.

The challenge for an ERA-tool such as BIODIVERSA is clearly to demonstrate that solutions do exist, while keeping “sustainability” and “long term view” as the key guiding principles. In this respect, Xavier Le Roux insisted that soil issues can’t always have a win-win outcome. Scientists should work on trade-offs and synergies without being afraid of studying trade-offs between the 3 pillars of sustainability and between the stakeholders interests.

Birgit de Boissezon agreed that possible trade-offs should be made explicit and transparent. She made the point that on front of the current different perceptions and definitions of soils and lands, it is

important for solutions to be found to ensure that the various stakeholders come together to share language, data and understanding. Picking the right and varied stakeholders and a wide range of views is thus of crucial importance in this domain and will have to be carefully carried out in the INSPIRATION project when consultation of stakeholders is to be made before establishing the Strategic Research Agenda.

Detlef Grimski suggested also taking the wider societal and economic aspects beyond short term creation of jobs and growth into account when discussing societal challenges related to soil and land use issues. Several research projects of the German Environment Agency comprehensively analyzed longer term social, economic and environmental effects of land use strategies. These strategies were based on inner urban brownfield regeneration on one hand compared to Greenfield development and soil sealing on the other hand. In the view of many politicians the development of greenfields promises the quick delivery of jobs and growth. However, on a longer time scale necessary investments of the public sector for local infrastructure investments and maintenance measures should also be considered. Furthermore, urban restoration generates additional economic and social benefits for the community. As a result of several case studies in Germany comparing brownfield and greenfield development it can be concluded that – as a rule – the restoration of brownfields provide more societal benefits in social, environmental and economic terms; in other words: Brownfield redevelopment is more sustainable.

Luca Montanarella suggested that one should turn the question around. Policy makers have clearly identified the grand societal challenge : growth and jobs. We have strong evidence that soil sealing generates growth and creates jobs. Adding evidence that sealing is bad for the environment will not be enough and will ultimately be of little service to sustainable soil use. If there is still little research on these topics, a greater light should be cast on the growth and job potential of land and soil restoration. We have for example impressive advances in technosols and other technologies to restore heavily degraded land, including mines. These create growth. Linking soils and land to growth and jobs is best way to serve the soil stakes.