



EUROSOIL 2021 Connecting People and Soil

Synthesis

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Connecting People and Soil in a nutshell

EUROSOIL is the quadrennial scientific conference of The European Confederation of Soil Science Societies (ECSSS). The ECSSS, under Swiss presidency, has adopted a specific goal for the 20th EUROSOIL congress: to preserve and restore soil resources by identifying and disseminating common strategies through the association of scientists and participants of the different value chains, thereby becoming the soil voice for 2030. Thus, the 2021 edition's structure was based on the Sustainable Development Goals (SDGs). Furthermore, Eurosoil was innovative in the creation of an initiative entitled "Connecting People and Soil" bringing scientists and stakeholders together to work at designing common soil sustainable management, overarching to the SDGs. Eurosoil 2021 took place online between 23rd and 27th August 2021.

To carry out the "Connecting People and Soil" initiative, a series of communications, forums and debates were co-organized by stakeholders and scientists during the EUROSOIL conference. All stakeholders whose activities have an impact on soil (including scientists) were invited to contribute to the identification and dissemination of common strategies in order to preserve and restore the soil resource.

This document summarizes the main conclusions and recommendations that resulted from this initiative.

Connecting People and Soil organisation

Connecting People and Soil encompassed sixteen interactive sessions and twenty keynote lectures, structured around **four key topics**.

1. **To share stakeholders' connections and expectations on soil with the research community in order to define common soil goals:** exploring ways and means to connect stakeholders with the research community towards the design of common soil goals to support the SDGs.

2. **To coordinate the establishment of common road maps in order to protect soil along the food value chain:** setting goals and targets, measurement and guidelines, knowledge gaps and common standards, roadmaps for both public and private sectors.

3. **To acquire common knowledge by rethinking ways of carrying out research:** exploring the ways to improve research in soils with a focus on connecting stakeholders and researchers, acknowledging that there is a gap between farmers and researchers.

4. **To foster common soil education and awareness:** training the next generation of soil scientists, professionals working in other sectors, in farming and beyond, raising awareness of the importance of soils and their management among stakeholders in society such as policy makers and indeed the general public.

On 27th August 2021, the final day of the conference, four wrap-up sessions were organized on each of the four key topics. For each topic, convenors and panelists were identified (see appendix). Convenors' roles during the week were to foster and steer reactions and contributions from any sessions, keynotes or participant that were relevant to their topic and to elaborate the observations and questions to be raised during the wrap-up sessions.

These questions were then addressed to panelists who represented different stakeholder groups, such as farmers, NGOs, investors, policy makers, social and soil scientists and representatives of agri-food businesses.

This is most likely to have been the first time a soil science conference gathered such a panel of stakeholders, in particular investors and representatives of agri-food

businesses whose potential in bringing pressure for soil regeneration is considerable. The initiative was welcomed and acknowledged by the different stakeholders and participants.

Particular emphasis was placed on the "value chains" that depend primarily or have a direct impact on soil functions, such as food, forestry, urban and spatial planning. For instance, in the agri-food industry, the value chain links not only farmers (as food producers) and consumers (as food buyers), but also the whole chain of processors, marketers, food service companies, retailers and supporting groups such as shippers, research groups and suppliers.

The many questions and debates during the initiative are summarized here below, numbers in () indicate in which wrap-up sessions they were addressed:

- Can we identify the stakeholders we need to involve? (1)
- Can we identify common soil goals between all these stakeholders and what is the pathway to those goals? (1, 2, 3)
- What expectations do the different stakeholders have from soil scientists and can these expectations be met? (1, 2, 3, 4)
- Does a forum/body already exist that could assist in bringing these actors together to design common soil goals. Could living labs contribute? (1, 3)
- Soil management is holistic, case-dependent and needs to be approached at farm level. How is this compatible with the expectations and objectives of the other stakeholders in the supply chain? (2, 4)
- How can we support and incentivise farmers right now to achieve all farmers investing in soil management and reach corporate and policy goals on climate change? (2, 3) How can we improve education on soil in all areas of society, from academic institutions down to the general public? (4)

Conclusions and key messages of the stakeholders

Five major conclusions were reached during the discussions of the Connecting People and Soil initiative:

- **Much is already known about soil degradation mechanisms and how to prevent or restore them**, it is time to take action which most stakeholders support.
- Soil management and restoration must be taken in **close collaboration between all actors of the value chains**.
- Technical innovations will help, basic research will be needed, however, the key is to focus on **systemic approaches and social innovation** – fostering dialogue and shared strategies between stakeholders.
- There is a need for **simple relevant facts on the key soil functions**, to define a **common language** and agree on **easy-to-understand indicators of soil quality**.
- There is a need for a **shared global soil protection goal** at an international level, to accelerate the transition and support the implementation of specific local actions.

Stakeholders operating in different sectors with impact on soils have voiced their needs:

- **Policy makers** need simple reports, data, conclusions that are ready to use in policymaking.
- **Investors** need policy makers to provide clear requests and objectives, in order to submit their investments to clear criteria.
- **Agri-food businesses** claim that soil is the resource they base their business on and that they need to secure it on a long-term basis by supporting farmers in implementing “good practices”.
- **Farmers** are willing to preserve the soil but if asked to change their practices, they need a trustful dialogue and long-term approach. The question of who carries the risk of changing practices should be debated as well as that of financial support.

Main recommendations to move to action and improve dialogue

Improving soil literacy for all and defining a common language

It appears that the main barriers to up-scaling practices which would allow the preservation of soil capital are the low level of soil knowledge in the value chains, the limited common understanding **between the different stakeholders** and **the lack of appropriate input from academics**. There was a general agreement that awareness on soil fragility should be raised in all areas of society. It is essential to consider individually the different actors of each value chain (food, forestry, spatial planning, etc.).

The **rationale based on soil functions** as the contribution of soils to major societal issues such as climate change, water management, biodiversity losses, nutrient flows, food security and land preservation, **has proven to be effective** and should be further developed. Moreover, **good narratives and proposals to engage emotionally** help to involve the general audience. Different examples such as movies, television series, digital games but also bringing people into the field were discussed. Engaging with people in the early years of their education (at school level), particularly through outdoor experiences, increases soil literacy.

Some specific stakeholders, such as landowners, industries, policy makers or investors, have leveraging capacities and should be identified and specifically addressed with targeted messages to accelerate and enforce consideration of soils. They are already looking for scalable methods in soil regeneration, and there is a need for coordination and a sound efficient road map.

The acquisition of **communication skills** is a sometimes-underestimated element in the academic curriculum. Nevertheless, soil scientists must develop the ability to speak with other soil users, with journalists, or other multipliers of the “soil voice”, and to **translate soil complexity into a language that everyone can understand**.

Although it has often already been said, the necessity to build **capacity in knowledge transfer** has been stressed by all participants of the Connecting people and soil initiative. Scientific knowledge should be shared with people involved in practice using their language. Even if farmers and technicians do not need an academic knowledge about soil, they do need to understand its multifunctionality and they need to be able to recognize a “healthy soil”. This is even more necessary as a significant number of farmers (and the technicians who work with them) assume that “soil health” and farm performance (yields, profitability) are conflicting.

Providing simple but relevant facts and agreeing on simple metrics

Scientists are key in providing knowledge, indicators, and specific recommendations that will guide management practices and policy making at all levels (local, national, international).

Scientific research must address soil complexity, while providing **simple but relevant facts and figures on the key function of soils** such as their role in climate regulation, water management, biodiversity preservation and food security. Scientists need to know when to debate and address soil complexity and when it comes to translating and synthesizing complexity into relevant messages.

Farmers and representatives of agri-food businesses, or investors, keep asking the scientific community to help them assess their strategy or new management schemes. They also insist on the need to not only develop **indicators assessing soil quality but also to identify and assess farm management practices**, including traditional ones, which have a positive impact on soil health. These are much easier to monitor and communicate to people working in the field.

Technical innovations will help but the key is social innovation

Different **new technologies** such as remote sensing, aerial photography analysis or using large national databases may greatly help evaluate soil health or monitor the effect of “good” practices. In particular, advanced statistical or stochastic methods allow dealing with uncertainty hence overcoming the issue of data validity when not sampled through a traditional rigorous sampling scheme. This also highlights the necessity to promote **open and citizen science** and to **share and mutualize large data sets**.

Research questions should be developed with the people who will benefit from the results. Scientists should keep in mind that maintaining or improving soil quality is not only a question of agricultural (or other management) practices but is embedded in a whole social, cultural, economic, and political context. **More than technical innovation, social and political innovations appear to be key to sustainable soil management.**

When developing innovative management systems, all stakeholders of the value chain should be integrated in the dialogue and define common operational indicators together and site or system-adapted threshold values for ecosystem services, separating the “good” from the “not nearly good enough”. In other words, this is a call to combine insights from basic and high-tech research with on-farm systems research to ensure simple, easy-to-use and affordable tools to scale-up the transition. The classical difference between basic and applied research is no longer considered relevant. And some research programs should be developed based on questions identified by practice.

Living labs have been proposed in numerous sessions and talks as a way forward to develop co-construction of knowledge. Living labs are places where researchers, farmers and all stakeholders can interact to develop valuable management schemes and indicators at farm scale. Farmers and researchers have different jobs and knowledge, but they share the value they give to soil. Working together in living labs would offer farmers the opportunity to gain knowledge on soil function and researchers to produce knowledge that is more relevant. Moreover, this offers the opportunity of carrying out research at field scale, not only at plot scale, and using farm machinery which **is necessary to gain the trust of farmers before upscaling practices and management schemes.**

Living labs, but not uniquely, can act as lighthouse farms, fostering the dissemination of farmers' and scientists' co-developed knowledge. Lighthouse farms have an important role in raising awareness among the general audience, offering the opportunity to develop good narratives additionally for people to reconnect with soils and agricultural practices. Finally, living labs also offer great opportunities for educational purposes, in particular for students to practice in the field and to be involved in an interdisciplinary approach.

Sharing global soil protection goal at an international level

To date, existing conventions (e.g. UNCCF, CBD, UNCCD), directly or indirectly relevant to soils, have proven not to be enough to preserve soil quality. Even if many changes have taken place over the last decade(s), such as the Sustainable Development Goal 15 "Life on land" and its target "15.3 Land degradation neutrality", **international soil governance remains fragmented and is clearly not sufficient.** Despite the transboundary effects of soil degradation, land and soil represent state sovereignty, which hinders the dialogue between states on common soil protection goals.

In the short or medium term, it is **unlikely that a standalone soil international agreement would be successful.** However, the effort to move towards a global soil protection goal would still be beneficial in **raising or maintaining the focus on soil awareness.**

New business models: developing public-private blended funding to support farmers' work and knowledge transfer

Funding for ecosystem services through measure-based payment (e.g. CAP) has raised questions about its effectiveness, compared to result-based payments. Ongoing pilot projects suggest that a **hybrid scheme, based on a mix of measures and results,** or even a "pure" results-based scheme, would allow the transition to an agroecological model, with the right level of compromise between the objectives of the stakeholders, an overall

impact on the agro-eco-environmental system and the management of the financial risk.

Included in a socio-economic system that shapes their practices, farmers are ultimately responsible for ensuring soil quality and fertility conservation, biodiversity preservation, C sequestration, water filtration, erosion mitigation, landscape diversity (...) and food production. They should therefore be properly recognized and compensated for their efforts. The European PAC already provides this but its implementation depends on the individual state. In Switzerland, agricultural policies also offer payment for ecosystem services. This should be **reinforced and oriented toward result-based financial retributions.**

Public and private bodies should collaborate and create innovative blended funds to join forces and pull the rope in the same direction. This would avoid conflicting incentives and would allow considerably more efficient and cost-effective strategies. Those would include technical assistance and financial counterparts. The support may compensate the change of soil management practices, taking into account their impact on soil quality and their consequences on yield and income. Another important factor is long term security where buyers have a role in securing contracts for at least 2-3 crop circles when requiring a change of practice from a farmer.

Issues specific to the market need to be considered while trying to enforce new management schemes and push for result-based incentives. The structures, drivers and barriers are not the same in fast moving markets as they are in established ones. Fast moving emerging markets are composed of many very small producers who could be ready to change their practices. But to engage with them, it is necessary to identify leveraging stakeholders that have the capacity and the legitimacy to ask for such changes. As in established markets, dealing with only one large producer may lead to the same quantitative impact. But large sized farms and industries require much longer time scales to adapt, due to their technical and economic structure.

For the food value chain, traceability is key. Customers want to know what they eat, where and how it was produced, and **suppliers will need to be able to provide this traceable information** otherwise they will lose the market. Moreover, **maintaining soil quality should be an access to the market, not a bonus or a factor of differentiation.**

There is also an issue regarding **commodity market of the supply chain that should be reconsidered** in order to ensure that the investment in hardware, software and capacity building filters down to the farm.

Finally, scientists' career paths depend on the impact factor and production of scientific publications rather than on communication and dissemination activities. For these reasons, **funds should be specifically dedicated to the dissemination** and financing work of people who are tasked to ensure knowledge transfer and communication.

People involved in the initiative

Steering committee of Connecting people and soil

- Pascal BOIVIN, President of the ECSSS and of EUROSIL 2021
- Elena HAVLICEK, Scientific officer, Swiss Federal Office for the Environment
- Ruedi STAEHLI, Scientific officer, Swiss Federal Office for the Environment
- Johan BOUMA, Emeritus professor of Soil Science, Wageningen University and Research
- Léa LUGASSY, Pour une Agriculture du Vivant
- Bastien SACHET, CEO, Earthworm Foundation
- Frederic THOMAS, Farmer – Co-founder Agriculture de Conservation

Wrap-up session 1: to share stakeholders' connections and expectations on soil with the research community in order to define common soil goals

CONVENORS

- Jean-Luc CHOTTE, IRD (Institut de Recherche pour le Développement)
- Maylis DESROUSSEAUX, National Conservatory of Arts and Crafts
- Paul MURPHY, Assistant Professor of Soil Science, University College Dublin

PANELISTS

- Philippe BILLET, Director of the Institute of Environmental Law – University of Lyon
- Bridget EMMETT, Head of Soils and Land Use, UK Centre for Ecology and Hydrology
- Andrea VETTORI, Deputy Head of the Land Use & Management Unit, DG Environment of the European Commission
- Benjamin WARE, Nestrade SA

Wrap-up session 2: to coordinate the establishment of common road maps in order to protect soil along the food value chain

CONVENORS

- Ken GILLER, Professor of Plant Production Systems, Wageningen University
- Anne TROMBINI, Managing director of Pour une Agriculture du Vivant

PANELISTS

- Melchior de MURALT, Pury Pictet Turrettini & Co Ltd

- Kerstin ROSENOW, 'Research & Innovation' Unit in DG AGRI, European Commission
- Bastien SACHET, CEO, Earthworm Foundation
- Piet van ASTEN, Olam International Ltd.
- Gerald SCHWARZ, Thünen Institute of Farm Economics
- Max SCHULMANN, Farmer

Wrap-up session 3: to acquire common knowledge by rethinking ways of carrying out research

CONVENORS

- Johan BOUMA, Emeritus professor of Soil Science, Wageningen University and Research
- Lucy CROCKFORD, Senior Lecturer in Soil and Water Management, Harper Adams University
- Léa LUGASSY, Pour une Agriculture du Vivant

PANELISTS

- Paolo BARBERI, Professor in Agronomy and Field Crops, Scuola Superiore Sant'Anna (SSSA)
- Claire CHENU, INRAE
- Nicolas DERUNGS, Scientist at sanu durabilitas
- Frederic THOMAS, Farmer – Co-founder Agriculture de Conservation

Wrap-up session 4: to foster common soil education and awareness

CONVENORS

- Yves COQUET, Professor of Soil Science and Hydrology, AgroParisTech
- Matthieu ARCHAMBEAUD, Icosystem
- Boris JANSEN, Associate Professor in Soil Chemistry, University of Amsterdam
- Jennifer VEENSTRA, University of Sheffield

PANELISTS

- Rachel CREAMER, Chair of the Soil Biology Group, Wageningen University
- Florence JEANTET, Managing Director, OP2B
- Thomas SCHOLTEN, Professor of Soil Science and Geomorphology, University of Tübingen
- Karen VANCAMPENHOUT, Associate Professor, KU Leuven