

Chapter 42

Translating Soil Science Knowledge to Public Policy

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Abstract A lot of scientific knowledge is available on soils in Europe and in the world. Yet, only a fraction of this knowledge reaches policy makers and is actually used in the national and global soil policy development processes. Despite the plethora of soil data and information generated by the soil science community, only a fraction of this information is actually policy relevant. Soil information, in order to be policy relevant, needs to respond to societal needs and address issues of relevance to the general public. Too often soil data and information generated by scientists are only relevant to a very small scientific community and not of relevance to the public policy development process. The establishment of an effective science-policy interface, the Intergovernmental Technical Panel on Soils (ITPS), and the results of the first comprehensive assessment of global soil resources, the Status of World's Soil Resources report, provide the first steps toward a more effective global soil policy for protecting this limited, nonrenewable, natural resource.

Keywords Soil protection • Sustainable development • Science • Policy

42.1 Science to Policy

Translating scientific results in operational policy decision-making processes has always been difficult. Appropriate science policy interfaces are required that can produce the necessary aggregation of data and scientific evidence that can be translated in relevant information for policy makers. Typically these processes are performed by organizations with a political mandate but formed by high-level scientists.

Probably the best-known and most successful example is the Intergovernmental Panel on Climate Change (IPCC), recently awarded with the Nobel Prize for peace.

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Following the success of IPCC, also the other “Rio Conventions,” the Convention on Biodiversity (CBD), and the United Nations Convention to Combat Desertification (UNCCD) have been striving toward the establishment of similar science-policy interfaces. The recent establishment of the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) and the Science-Policy Interface (SPI) of UNCCD are examples of this new development of institutional mechanisms for translating scientific results into operational policy recommendations.

Soil science has been experiencing an exponential increase in recent years of scientific publications and results (Hartemink and Mc Bratney 2008). Nevertheless this increased scientific output has found only limited application in the policy-making processes at national, regional, and global scales. Existing panels, like the IPCC, the IPBES, and the SPI, have only very limited expertise in soil science and often soils are completely neglected in the high-level, policy-relevant, assessments they produce.

In order to improve the policy relevance of the large body of scientific evidence available within the soil science community, a specific science-policy interface, the Intergovernmental Technical Panel on Soils (ITPS), has been created within the Global Soil Partnership (GSP) (Montanarella and Vargas 2012). The ITPS is composed by 27 members, nominated by the governments represented in the GSP (all FAO Members) according to a regional and gender balance. The members of the ITPS are recognized soil scientists nominated by governments and tasked with the mandate of providing the needed policy-relevant advice to the GSP and also to all relevant UN bodies, like FAO, UNFCCC, UNCCD, etc.

One of the main results of the first 2 years of activity of the ITPS has been the successful completion of the first comprehensive assessment of the Status of the World’s Soil Resources (SWSR). This assessment has been compiled in a similar manner as the assessments produced by the IPCC, involving possibly the entire global soil science community.

About 200 soil scientists from 60 countries contributed directly to the report. Their assessment has synthesized the scientific knowledge embodied in more than 2000 peer-reviewed scientific publications. The report provides a global perspective on the current state of the soil, its role in providing ecosystem services, and the threats to its continued contribution to these services. The specific threats to soil function considered in the report are erosion, compaction, acidification, contamination, sealing, salinization, waterlogging, nutrient imbalance (i.e., both nutrient deficiency and nutrient excess), and losses of soil organic carbon and of biodiversity.

Experience has shown in Europe that communicating scientific results to policy makers and the wider public requires a large degree of simplification, possibly distilling the scientific evidence in order to present only the key messages that need to be taken into account by concerned stakeholders.

The four main key messages emerging from the SWSR are the following:

1. Sustainable soil management can increase the supply of healthy food for the most food insecure among us. Specifically we should minimize further degradation of soils and restore the productivity of soils that are already degraded in those regions where people are most vulnerable.

2. The global stores of soil organic matter (i.e., soil organic carbon (SOC) and soil organisms) should be stabilized or increased. Each nation should identify locally appropriate SOC-improving management practices and facilitate their implementation. They should also work toward a national-level goal of achieving a stable or positive net SOC balance.
3. Compelling evidence exists that humanity is close to the global limits for total fixation of nitrogen and regional limits for phosphorus use. Therefore we should act to stabilize or reduce global N and P fertilizer use while simultaneously increasing fertilizer use in regions of nutrient deficiency. Increasing the efficiency of N and P use by plants is a key requirement to achieve this goal.
4. The regional assessments in the SWSR report frequently base their evaluations on studies from the 1990s based on observations made in the 1980s or earlier. We must improve our knowledge about the current state and trend of the soil condition. An initial emphasis should be on improving observation systems to monitor our progress in achieving the three priorities outlined above.

The possible translation of those messages into policies that provide solutions to the identified problems needs then to happen at national level. In order to provide guidance to policy makers and other stakeholders on the needed actions, a revised World Soil Charter has been released by the ITPS and submitted to FAO's governing bodies for endorsement and implementation. The revised World Soil Charter is the best example of successful translation of scientific knowledge into policy recommendations.

As a next step, the 3rd GSP Plenary Assembly in June 2015 has further recommended the ITPS to develop Voluntary Guidelines on Sustainable Soil Management to be adopted by each country. The next biennium of the ITPS activities 2015–2017 will be dedicated to the development of such guidelines. The guidelines will allow translating in concrete action on the ground the principles and recommendations endorsed by all countries in the world within the World Soil Charter. The development of such guidelines will closely match the adoption of the new post-2015 sustainable development agenda and the related Sustainable Development Goals (SDG).

The process of putting soils on the post-2015 development agenda and the SDGs provides the opportunity to address soils within the frame of a wide set of sustainable development issues, i.e., with a nexus approach. Soils are one of the main elements of sustainable development (Montanarella and Lobos Alva 2015) and are highly interlinked with the achievement of food, water, and energy security, among others. The role of soils for sustainable development was recognized by article 206 of the Rio+20 Outcome Document “The Future We Want” in the agreement to “*strive to achieve a land degradation neutral world in the context of sustainable development*”.

As a limited and (in human terms) nonrenewable natural resource, we need to manage soils in a sustainable way for future generations. It is therefore imperative that these resources are coherently integrated across the SDGs. The Open Working Group formed to draft SDGs agreed on a set of 17 goals and 169 targets. Soils and land will underpin the achievement of the SDG agenda as a whole and play a direct role in at least seven of the proposed SDGs.

42.2 Sustainable Development Goals (SDGs)

These have been adopted by the United Nations in September 2015, highlighting the SDGs with a direct link to soils and land (in bold):

1. **End poverty in all its forms everywhere**
2. **End hunger, achieve food security and improved nutrition, and promote sustainable agriculture**
3. Ensure healthy lives and promote well-being for all ages
4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all
5. **Achieve gender equality and empower all women and girls**
6. **Ensure availability and sustainable management of water and sanitation for all**
7. **Ensure access to affordable, reliable, sustainable, and modern energy for all**
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all
9. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation
10. Reduce inequality within and among countries
11. **Make cities and human settlements inclusive, safe, resilient, and sustainable**
12. Ensure sustainable consumption and production patterns
13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
15. **Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source: United Nations Department of Economic and Social Affairs (2014)

Soils and land are addressed, among others, under goals for food security, sustainable agriculture, and the protection of terrestrial ecosystems. The goals address, for instance, the need to ensure equal access and control over land, especially for poor and vulnerable populations. Issues of soil quality and halting land degradation are covered but will need to be managed together with targets that aim to double agricultural productivity, which could lead to an intensified use and to further degradation.

The protection of soils in the SDGs can at the same time support goals, for instance, for climate change through the conservation of soil carbon stocks, for biodiversity conservation, for water availability, and for poverty reduction through the support of livelihoods of people working in agriculture. These resources are found across the agenda, but there will be potential conflicts and trade-offs that should be addressed in a crosscutting manner. Furthermore, addressing soils in the SDGs will require knowledge-based development of appropriate indicators that can be applied locally without increasing the data collection burden of member states. But beyond indicators, which can be very costly and difficult to monitor, there is the need for innovative monitoring systems around the world. It will be crucial for this process to include different stakeholders and scientific disciplines.

Several initiatives are advocating for soils to be a part of the post-2015 development agenda. This issue has been highlighted, for example, in the communication of the European Commission (EC) outlining Europe's development aspirations for the new SDGs. The Institute for Advanced Sustainability Studies (IASS) in Germany and partners has been working for the integration of soils and land in the SDGs with a "people-centered" and transdisciplinary approach. Several country governments are also supporting the issue, for instance, Namibia and Iceland formed an informal interest group called "friends of desertification," which aims to maintain the momentum generated by Rio+20 around desertification, land degradation, and drought in the context of post-2015 development agenda. In order to have an impact on the official post-2015 process, it will be crucial that these organizations and groups cross-reference and present coordinated proposals, including collaboration with other stakeholders and initiatives.

42.3 Conclusions

Soil resources are covered across the Rio Conventions either in the text or through the implementation of actions prescribed by the conventions. This has contributed to increasing the momentum to speak about soils at the global level. However, even with the implementation of the conventions, we are still dealing with major challenges related to the degradation of land and soil resources. This is in part due to a lack of a crosscutting and integrated approach.

The SDG process further highlights the need for an integrated approach as soils and land are found across several goals and will play a key role for the achievement of the agenda. The underpinning role soils and land will play across the SDGs needs to be recognized. Putting soils on the agenda of the existing MEAs and the post-2015 development agenda requires a major shift in the discussion around soils as a limited, nonrenewable, natural resource. There is the need to recognize that soils are underpinning a wide range of services crucial for sustainable development and should, therefore, be protected for future generations.

The recently established Global Soil Partnership and its Intergovernmental Technical Panel on Soils have been highly instrumental in moving forward the rel-

evance of soils on the political agenda. The recently adopted World Soil Charter and the comprehensive assessment of the Status of World's Soil resources provide further elements for rapidly moving toward sustainable soil management at all levels. Achieving the proposed SDGs by 2030 will require the rapid adoption of guidelines for sustainable soil management by all countries in the world.

The main difficulty in introducing soils within such a global sustainability agenda is that soils are in large majority in private ownership and are perceived by most countries of the world a topic strictly limited to national sovereignty. Accepting globally binding targets and regulations affecting national soil resources is still perceived by some governments as a major interference. The transnational dimensions of soil protection and sustainable soil management are still not sufficiently understood, and the objective evidence of such interlinkages is still limited (SERI 2011). Some of the first considerations around the bioenergy debate in relation to Indirect Land Use Changes (ILUC) have triggered some research into the interlinkages between national decision-making and their effects on the soil resources of other nations, but detailed data are still lacking for a comprehensive assessment of such interlinkages.

Moving forward, there is a need to focus on improving the implementation of the Rio Conventions with regards to soils. This will include further developing and strengthening synergies among the conventions. Additionally, soil scientists need to exchange with different stakeholders from other scientific disciplines, policy-making, and civil society to link soils to key sustainable development issues such as water and food security and sustainable agriculture, climate change, biodiversity, and ecosystem protection. Concerted efforts for advocacy within the post-2015 development agenda need to focus on keeping soils and land on the agenda and looking beyond 2015 toward an effective implementation and monitoring of the SDGs.

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