

International Soil Law and Governance Conference

Thursday, 20 October 2022

Conference Report



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International Soil Law and Governance Conference Report

Editors:

Larissa Jane Houston, Oliver C. Ruppel, Nikolaus Handig and Harald Ginzky

Research Center for Climate Law (ClimLaw: Graz), Faculty of Law, University of
Graz, Austria

Institute of Law of the University of Natural Resources and Life Sciences, Vienna
(BOKU)

German Environment Agency (UBA)

November 2022



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Report compiled in collaboration with partners from:

- Research Center on Climate Change Law (ClimLaw: Graz), Faculty of Law of the University of Graz
- Institute of Law of the University of Natural Resources and Life Sciences, Vienna (BOKU)
- German Environment Agency (UBA)

All contributions have been provided by the speakers and presenters who had participated at the 2022 International Soil Law and Governance Conference.

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Responsible for the content:

Research Center for Climate Law, University of Graz

Attemsgasse 11, 8010 Graz

Contact: larissa.houston@uni-graz.at

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Thursday, 20 October 2022
Online Conference

International Soil Law and Governance Conference

On Thursday, 20 October 2022, the “International Soil Law and Governance Conference” will contrary to prior announcements be conducted fully online. The conference will be organized by:

- Institute of Law of the University of Natural Resources and Life Sciences, Vienna (BOKU)
- Research Center on Climate Change Law (ClimLaw: Graz), Faculty of Law of the University of Graz
- German Environment Agency (UBA)

Cooperation partners:

- United Nations Environment Programme (UNEP)
- Food and Agriculture Organization of the United Nations (FAO)

The one-day conference starts at 10:00 am and concludes at 4:30 pm. No participation fee will be charged. The online event welcomes participants in a freely accessible live-stream via Zoom.

Please find further information about the planned programme in the outline below. Kindly send an email to soil.conference@boku.ac.at to register your participation.

On behalf of the organisers

Daniel Ennöckl

Harald Ginzky

Oliver C. Ruppel

EVENT UPDATE

Programme

International Soil Law and Governance Conference

Thursday, 20 October 2022

10.00 am Official opening

10.15 am Soils: future challenges and good governance

Patricia Kameri-Mbote
Director, Law Division, United Nations Environment Programme

Dirk Messner
President, German Environment Agency

Andrea Vettori
Deputy Head, Land Use and Management Unit, Directorate-General
for Environment, European Commission

Florian Krampe
Senior Scientist, Stockholm International Peace Research Institute

Li Lifeng
Director, Land and Water Division, Food and Agriculture Organization
of the United Nations

12.00 pm Lunch break

1.00 pm Best practices and innovative regulatory approaches

Harald Ginzky
Scientist, German Environment Agency

Oliver C. Ruppel
Director, ClimLaw: Graz, Karl Franzens University Graz
Professor, Stellenbosch University, South Africa

Pamela Towela Sambo
Professor, Department of Private Law, University of Zambia

Qin Tianbao
Professor, Wuhan University, China

Gernot Stöglehner
Professor, Institute of Spatial Planning, Environmental Planning and Land
Rearrangement, University of Natural Resources and Life Sciences, Vienna

2.30 pm Coffee break

2.45 pm Sustainable soil management and climate

Christine Stumpp

Professor, Institute for Soil Physics and Rural Water Management,
University of Natural Resources and Life Sciences, Vienna

Herwig Ranner

Team Leader, Directorate-General for Agriculture and Rural
Development, European Commission

3.30 pm Soil, international cooperation and food security

Natalia Rodríguez Eugenio

Scientist, Land and Water Division, Food and Agriculture Organization
of the United Nations

Barron Joseph Orr

Lead Scientist, United Nations Convention to Combat Desertification

4.15 pm Conclusion



UNIVERSITY OF NATURAL RESOURCES AND
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Summary and Highlights

Session 1 – Soils: future challenges and good governance

Patricia Kameri-Mbote (Director, Law Division, United Nations Environment Programme)

Professor Kameri Mbote discussed the importance of soils in relation to the neglect of soil even though native communities rely on soil to survive. She stated: “soil is a habitat, a resource and a large carbon sink”. From the perspective of UNEP, soil is critical in addressing the existential crisis of pollution, nature and biodiversity loss and climate change. When looking at pollution it is necessary to acknowledge how soil pollution impacts directly on food and agriculture, especially in the times of food security. There have been limited discussions on soil degradation. Within the United Nations (UN) structures soil is addressed in the UN Convention to combat desertification. Focused discussions on soil have only occurred in relation to land degradation, neutrality and UN Sustainable Development Goal 15.

Soil governance provides an opportunity to bring different players together through governance tools, which include: policies; institutions; guidelines; standards and legal frameworks at the international, regional, national and subnational levels. There is a duty to mainstream soil in existing instruments, for example in the multilateral environmental agreements such as those addressing climate change, biodiversity and chemicals. Within the Law Division of UNEP there have been concerted efforts in ensuring coherence and synergies between different multilateral environmental agreements. Consider the UN Convention on Biological Diversity, which will shortly introduce a Global Biodiversity Framework, there are opportunities to bring in soil considerations. At a regional level, the African Ministerial Conference recently passed a resolution to work on soil governance within the African continent. It is clear that soil can be used as a space for working on increased coherence across all levels.

Dirk Messner (President, German Environment Agency)

The short input addressed the interface of the current situation of multiple crisis and sustainable soil management including the needed soil governance at all levels. The brutal aggression by Russia against the Ukraine in combination with all the other global crisis such as climate change, biodiversity loss and worldwide pollution, the still ongoing pandemic, hunger and poverty has confronted humanity with a new level of challenge. There is a risk that the multiple crisis may cause sort of deprioritization and postponement of actions against climate change and biodiversity loss. In order to get back on the track towards security, peace and sustainability the Global north needs to take on its special responsibility with regard to these challenges first by deepening the ambitions and efforts towards real climate neutrality and sustainability and second by “honest and fair” cooperation with countries of the Global South. Sustainable soil

management is core element in this context. By sustainable soil management food insecurity, hunger and poverty as well as the risk of political and military conflicts could be avoided or at least reduced. Governance solutions must be found with regard to challenges on the ground in the respective states. Although there is no blue print of soil governance for all countries, the following aspects are essential for a good soil governance: First of all, soils need to be recognized by law as natural resource with essential ecological and social function. Secondly, although an effective management of contaminated sites is important, the management of physical and biological aspects of soils are essential for climate change and adaptation as with regard to biodiversity loss. And thirdly, to allow for an effective implementation, binding environmental standards as well as sufficient soil data and information are crucial.

Andrea Vettori (Deputy Head, Land Use and Management Unit, Directorate-General for Environment, European Commission)

Soils are the foundation for 95% of the food we eat, host more than 25% of the world's biodiversity, are the largest terrestrial carbon pool on the planet and play a key role in the circular economy and adaptation to climate change. Unfortunately 60-70% of soil ecosystems in the EU are unhealthy and suffering from continuing degradation resulting in reduced provision of ecosystem services. Soil degradation in the EU costs more than 50 billion EUR per year. The [EU Soil Strategy for 2030](#) sets out a framework and concrete measures to protect and restore soils, and ensure that they are used sustainably, and a vision and objectives to achieve healthy soils by 2050. It will be essential for national authorities in Member States and stakeholders to work on its implementation. Indeed healthy soils are part of the solution to the biodiversity crisis, the climate mitigation and adaptation efforts and to achieve pollution levels that don't undermine human health or the environment. Given that the voluntary actions set in the 2006 EU Soil Strategy were not sufficient to halt and reverse soil degradation, the Commission is currently working on a [new Soil Health Law](#) in 2023, to provide a comprehensive legal framework for soil protection in EU and thus support the efforts done at EU, national, regional and local level on soil protection and sustainable use, with clear definitions, basic obligations adapted to the local conditions, an effective monitoring system and targeted financial support.

Jiayi Zhou (Researcher in the Conflict, Peace and Security research, Stockholm International Peace Research Institute)

Soil is an essential basis not only almost all global agriculture, but also for sustaining quality life, both human and non-human, in many other ways beyond immediate provisions. It is precious, largely non-renewable – and yet tremendously neglected in most corridors of power, in most parts of the world. Getting soil governance on onto a crowded policy agenda, coordinating different layers of stakeholders in different

sectors, and managing competing use-values and demands on the earth around us — is difficult enough in peacetime. But soil and indeed environmental governance takes even more of a backseat in situations of armed conflict. War sees active and deliberate destruction, not only of opposing military forces, but also very often the very environment — to include soils — with all the direct and indirect impacts to soils' physical, chemical and biological properties and sustaining ecosystem functions and services. Today, we are witnessing large-scale ground warfare in Ukraine, indeed territorial conflict, with more than a third of Ukraine has been subject to direct military aggression. That land constitutes both some of Europe's most ecologically diverse and sensitive, and includes the world's most fertile soils. But it also includes some of the most industrialized, hazardous and toxic sites that have not been spared or protected from shelling. It is all very well to say that the “the nation that destroys its soil destroys itself” as Franklin D. Roosevelt stated almost a century ago, but when the destruction becomes a military and political objective — what then are the prospects for SSM? Fortunately, there have in the past few years been something of a watershed of positive developments in the normative and indeed even legal regime around acknowledging, preventing, and managing the negative fallout on the environment of armed conflict. The rub, however, is in implementation of recent global-level agreements and guidelines. These ongoing developments remind us that SSM is by no means a technical or scientific endeavour, but a deeply political one; successful SSM therefore requires broad-based political work, even in times when politics breaks down.

Li Lifeng (Director, Land and Water Division, Food and Agriculture Organization of the United Nations)

“Sustainable soil management and food security”

With the world's population expected to grow by 2 billion people in the next 30 years demanding more nutritious and safe food, and with major environmental challenges ahead, the issue of protecting soil resources and strengthening soil governance is more topical than ever. Between 2018 and 2021, the number of people affected by crises in countries where conflict was the main driver of acute food insecurity increased by a staggering 88 percent, to just over 139 million.

As the world had begun to recover from COVID-19, another conflict with far-reaching effects broke out. The war in Ukraine revived concerns of historically high food and energy prices and their impacts across the world. The war has disrupted exports and logistics and seriously affected food availability. In February 2022, the FAO Food Price Index reached a new historical record, 21 percent above its level a year earlier, and 2.2 percent higher than its previous peak in February 2011. According to FAO latest scenarios, it could increase chronic undernourishment by an additional 18.8 million people by 2023 (FAO, 2022).

Soil is an essential natural resource for food production, well-functioning of ecosystems and for human wellbeing. However, about 33 percent of global soils are degraded to some extent due to unsustainable management practices (FAO and ITPS, 2015). Conventional unsustainable agricultural practices are accelerating soil degradation processes and exacerbating food insecurity and social inequalities worldwide.

On a global scale, an annual loss of 75 billion tonnes of soil from arable land is estimated to cost about USD 400 billion each year in lost agricultural production. In this regard, FAO has developed and published the Voluntary Guidelines for Sustainable Soil Management (VGSSM) (FAO, 2017) as a reference document for technical guidance and policy development on sustainable soil management (SSM) for a wide range of stakeholders. The adoption of SSM practices provides farmers and land users with greater benefits in the short, medium and long term, increasing their productivity while reducing their dependence on external inputs and the environmental impacts of their activities, and providing ecosystem benefits for society as a whole.

The protection and sustainable management of soils is therefore of utmost importance to ensure the conservation and restoration of healthy soils for sustainable development, as well as intergenerational equity. In this perspective, ensuring healthy soils must be a core aspect that new agri-environmental policies and laws need to integrate at the global, regional and national levels to ensure a good global soil governance. Furthermore, soil degradation caused by land take, infrastructural projects, industrial facilities, mining and urban sprawl needs to be minimized to this end.

FAO and its Global Soil Partnership are joining forces with experts and key stakeholders to strengthen soil governance by providing legal guidance for the development and strengthening of regulatory frameworks affecting soil as well as strengthening and developing capacities to monitor the state of soil and better plan its use and management.

Session 2 – Best practices and innovative regulatory approaches

Harald Ginzky (Legal Adviser German Environment Agency)

“A new soil law for Germany – challenges and conceptual approaches”

The presentation informed about the challenges and the conceptual approaches with regard to the planned “new soil law” in Germany. The new Government of last year committed itself to further develop the “German soil protection act” of 1998 in order to adapt it to the challenges of climate mitigation and adaptation as well as of biodiversity loss taking into account the various uses. The current act has very much focused on the identification, assessment and rehabilitation of brownfields of which in Germany about 450.000 exist. The current law is however quite vague with regard to physical and ecological properties of soils and does not foresee mechanisms to minimize negative effects on soils before an activity starts. Finally, the competent authority currently mainly in charge with regard to the brownfield management only have a quite weak role with regard to other sectoral provisions which are relevant for sustainable soil management, for example legal provisions with regard to construction, mining, agriculture and what is more. Thus, by the redrafted act, these shortcomings should be overcome. To this end, it is considered to establish an ex-ante control mechanism, to determine quality standards of legally binding nature for physical and biological properties and to empower the competent soil authorities to have a stronger position in all soil relevant procedures.

Pamela Towela Sambo (Professor, Department of Private Law, University of Zambia)

“African Soil Legislation: Results of African Project’ focussed on the study conducted in three African countries – Cameroon , Kenya and Zambia from 2018 to date”

At this conference, my presentation entitled ‘African Soil Legislation: Results of African Project’ focussed on the study conducted in three African countries – Cameroun¹, Kenya² and Zambia³ from 2018 to date; and has led to several

¹ CF Tamasang, (2022) Land tenure legislation and soil security concerns in Cameroon, Soil Security, Volume 6, <https://www.sciencedirect.com/science/article/pii/S2667006221000289>; CF Tamasang et. al (2020) Country Report on Soil Law for Cameroon <https://www.nomos-elibrary.de/10.5771/9783748908043-53/country-report-for-cameroon?page=74>

² P Kameri-Mbote et. al. (2020) Country Report on Soil Law for Kenya <https://ielrc.org/content/a2103.pdf>; R. Kibugi (2022). Assessment of the African Union, FAO, and UNCCD Roles in Enhancing Soil Governance in Africa Through the Lens of Agriculture Policy Actions. In: , et al. International Yearbook of Soil Law and Policy 2020/2021. International Yearbook of Soil Law and Policy, vol 2020. Springer, Cham. https://doi.org/10.1007/978-3-030-96347-7_10

³ PT Sambo, (2021). Prospects and Challenges for Soil Protection Law in Zambia. In: , et al. International Yearbook of Soil Law and Policy 2019. International Yearbook of Soil Law and Policy, vol 2019. Springer, Cham. https://www.researchgate.net/publication/350366531_Prospects_and_Challenges_for_Soil_Protection_Law_in_Zambia; PT. Sambo et al (2020) Country Report on Soil Law for Zambia <https://www.nomos-elibrary.de/10.5771/9783748908043-295.pdf>; PT. Sambo (2020-2021) Sustainable Soil Management Threats Resulting From the COVID-19 Pandemic, International Yearbook of Soil Law and Policy <https://www.springerprofessional.de/en/sustainable-soil-management-threats-resulting-from-the-covid-19->

publications relating to sustainable soil management (SSM) initiatives in the three countries.

Undertaken as a baseline study for developing soil health in Africa, the study takes advantage of traditional practices peculiar to each country. The key thematic areas that were identified for assessing SSM in the three countries are agriculture, mining, tourism, manufacturing, energy, construction and urbanization.⁴ Some of the findings in respect of all three countries are that:

- (a) In respect of the agricultural sector, the “Africa feeding itself” narrative which entails spirited efforts towards agriculture has introduced insurmountable pressure on soils with increased chemical use to enhance productivity and consequently leads to harmful soil effects;
- (b) All the three countries have vast and rich mineral deposits that are mostly exploited by foreign (non-African) investors. Despite the economic benefits ordinarily associated with mining activities, there are a number of negative impacts exerting enormous pressure on land and soil resources as well as wholesome environmental degradation.
- (c) Rapid urbanization is among the top drivers of soil degradation in all the three countries, which in turn threatens food security. The ensuing pressure on all the natural resources and the environment further weakens soil sustainability.

It has been planned to spread the study to other regions of the continent through various fora. Soil is life and transcends all spheres of life, therefore there is need for a highly consultative approach towards SSM at local, national, regional and global levels.

Qin Tianbao (Professor, Wuhan University, China)

“A Combined Approach for China's Legal Protection of Soil in the Context of Ecological Civilization”

Ecological civilization is a set of values and development concepts for a green and prosperous future. In an unprecedented fashion, this phrase links the primacy of ecological factors to other development elements. One of key elements of ecological civilization is to protect the ecological environment with the strictest system and the most rigorous rule of law. In such circumstance, China takes a combined approach for its legal protection of soil. On one hand, China use the mode of specific law to protect its important soil resources, farmland, in order to ensure long-term national food security and to maintain ecosystem balance. China is enacting its Farmland Protection

[/23216618](https://www.sciencedirect.com/science/article/pii/S2667006222000065); M. Chipasha (2022) Soil governance and the control of mining pollution in Zambia <https://www.sciencedirect.com/science/article/pii/S2667006222000065>

⁴ H. Ginzky and OC. Ruppel (2022) Soil Protection Law in Africa: Insights and recommendations based on country studies from Cameroon, Kenya and Zambia, Soil Security, Volume 6, available at <https://www.sciencedirect.com/science/article/pii/S2667006221000290>

Law which designates permanent basic farmland and restricts the conversion from farmland to industrial land. In addition, China has enacted its Black Land Protection Law to provide special protection to black land which is a rare and precious resource endowed by nature to human beings and is characterized by high quality, scarcity, and easy to be eroded. And the latter law stipulates protection requirements and principles, government responsibilities and coordination mechanisms, planning, resource investigation and monitoring, scientific and technological support, quantity protection measures, quality improvement measures, responsibilities of agricultural producers and operators, financial security, incentive measures, assessment and supervision, legal responsibilities, etc.. On the other hand, China, upholding the spirit of "mountains, rivers, forests, farmlands, grassland are a life community", takes a holistic way to protect soil in comprehensive laws. More recently, the Yangtze River Protection Law, the drafting Protected Areas Law, and the drafting Qinghai-Tibet Plateau Ecological Conservation Law all aim at protect certain geographic areas with a complete ecosystem. These laws regard soil as one of indivisible component of the ecosystem to provide a holistic protection with regulatory, economic and participatory means.

Gernot Stöglehner (Professor, Institute of Spatial Planning, Environmental Planning and Land Rearrangement, University of Natural Resources and Life Sciences, Vienna)

“Soil protection via integrated spatial and energy planning”

Gernot Stöglehner presented approaches to soil protection and tackling the climate crisis via integrated spatial and energy planning. Key problems in Austria's spatial planning are an increasing population and an over-proportionate rise in land consumption accompanied by the so called “donut effect”, which describes the population moving out of city centers to the suburban ring, leaving empty town centers. One instrument to counteract these developments is the Austrian sustainability strategy to reduce land consumption and CO₂ emissions. An example of its successful implementation is the city of Tulln, where compact settlement development was introduced to facilitate district heating and climate friendly mobility.

According to Stöglehner, another example is the province of Styria, where an action research process was introduced to identify priority areas for development settlement. After the creation of a database, methodological planning and guidance as well as a capacity building program for municipal decision-makers and planners a spatial planning provision was implemented. Other provinces have adopted the concept and are currently in a development stage to enhance changes towards sustainable spatial planning.

Session 3 – Sustainable soil management and climate

Christine Stumpp (Professor, Institute for Soil Physics and Rural Water Management, University of Natural Resources and Life Sciences, Vienna)

“Sustainable soil management and climate - A soil physics perspective”

Christine Stumpp¹, Giuseppe Brunetti¹, Alba Canet-Marti², Gunther Liebhard¹,
Reinhard Nolz¹, Marleen Schübl¹, Stefan Strohmeier¹

¹Institute of Soil Physics and Rural Water Management, University of Natural Resources and Life Sciences, Vienna, Austria

²Institute of Sanitary Engineering and Water Pollution Control, University of Natural Resources and Life Sciences, Vienna, Austria

Meteorological extreme events, such as floods and droughts cause pressure on soil and water resources requiring adaptation of management strategies to mitigate soil loss, increase plant available water in agricultural areas and secure water resources. For sustainably managing water and soil resources, the understanding of soil physical processes and how they are impacted by climate change and management are fundamental. Green infrastructures in urban areas can be used to increase the water retention and evapotranspiration and improve water quality by reuse of wastewater (Brunetti et al. 2021). In agricultural areas, the combined assessment of plant and soil water status is beneficial for optimizing irrigation (Morales-Santos et al. submitted), particular for areas facing more droughts in future. Additionally, information about the soil water balance and quantification of fluxes (Schübl et al. 2022) as well as new approaches based on water stable isotopes for partitioning evaporation and transpiration (Liebhard et al. 2022a,b) or for quantification of water fluxes (Canet-Martin et al., submitted) can help to assess the impact of management options on available water resources for agricultural production. Land degradation through erosion is among the global key challenges for soil productivity. A combined use of long-term experimental studies (Klik and Rosner, 2020; Klik et al. 2018) and modelling (Addis et al. 2016) can help to assess the impact of tillage practices and identify areas most vulnerable to erosion by water. For generally improving the understanding of climate change impact on soil and water resources globally, long-term research infrastructures are required in combination with innovative methods. Particular emphasis should be placed on studying fundamental processes, but also on working with stakeholders to jointly develop and implement adaptation strategies for sustainable management of soil and water resources.

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Herwig Ranner (Team Leader, Directorate-General for Agriculture and Rural Development, European Commission)

“Agriculture in the UN Climate Change Negotiations -The Koronivia Joint Work on Agriculture”

Herwig Ranner started his presentation with an overview of the climate negotiations led by the European Commission. Key areas are the European Green Deal and the

facilitation of different areas of activities as the farm to fork strategy. The EU aims to be a global leader when it comes to handling climate change and the protection of the environment, which is why legislation aiming to reduce greenhouse gas emissions by 55 % by 2030 and reach climate neutrality by 2050. Another part of these efforts is international communication and cooperation to achieve results on a global level.

Furthermore, Ranner explained the function of the conference of the parties (COP) as main decision-making body of the UNFCCC. One quite substantial decision that the COP managed to bring about was the creation of an agricultural agenda. After difficult discussions from 2012 to 2017, the work program “Koronivia Joint Work on Agriculture” was established. This program recognizes the unique potential of agriculture in tackling climate change and bears the possibility to work on the interrelated issues of soil, nutrient use, water, livestock, methods for assessing adaption, and the socioeconomic and food security dimensions of climate change across the agricultural sectors.

Session 4 – Soil, international cooperation and food security

Natalia Rodríguez Eugenio (Scientist, Land and Water Division, Food and Agriculture Organization of the United Nations)

“The role of the FAO and the Global Soil Partnership on strengthening the links between soils and food security”

The number of people facing acute food insecurity and undernutrition continues to grow at an alarming rate. FAO estimated that between 720 million and 811 million people in the world faced hunger in 2020, an increase of 24 percent from 2019 (FAO et al., 2021). Nearly 2.37 billion people did not have access to adequate food in 2020. These figures increased by a further 40 million people in 2021 (FSIN, 2022). No region of the world has been spared. The high cost of healthy diets and persistently high levels of poverty and income inequality continue to keep healthy diets out of reach for around 3 billion people in every region of the world.

Conflicts, climate change and extreme events, economic downturns and pandemics are putting great pressure on soils in countries that have seen their agri-food imports limited. The urgency to bring these soils into production to meet local food demand is leading to the adoption of intensive agriculture and unsustainable practices that will lead to irreversible soil degradation and the loss of these resources in the medium and long term, seriously threatening food security. Conflict remains the single greatest driver of hunger.

In the current context of widespread soil degradation and rising fertilizer costs, soil fertility management must be addressed from an integrated approach that improves soil health and increases the efficiency of nutrient use by plants, as stated in the International Code of Conduct for the Sustainable Use and Management of Fertilizers (FAO, 2019). However, soil degradation is neither an isolated phenomenon nor a local problem. It represents a transboundary issue where all stakeholders need to engage responsibly to ensure that soils are managed sustainably and that the goals of the 2030 Agenda for Sustainable Development are met.

It is therefore of utmost importance that soil governance is strongly addressed and that mechanisms and actions are strengthened at local, national, regional and global levels. Soil governance requires international and national collaboration between governments, local authorities, industries and citizens to ensure the implementation of coherent policies, promoting practices and methodologies that regulate the use of soil resources to avoid degradation and conflicts between users for present and future generations. The Global Soil Partnership proposes collective actions to strengthen soil governance at national, regional and global level.

Francis Tetteh (African Soil Partnership and CSIR-Soil Research Institute, Ghana)

“Soils, International Cooperation and Food Security”

At present, 23% of the population are hungry. 40% of children under the age of five are malnourished. Current trends indicate that only 13% of food need will be met by 2050. 3.3% of agricultural GDP is lost every year. Only 4% of cultivated land is irrigated. Per capita arable land continues to fall by about 76m² per year. These are startling statistics. Africa Soil Partnership (ASP), established in 2013, is a partnership where sub-regional soil issues, identified in the statistics above, are discussed and addressed by multiple stakeholders. The ASP is an interactive consultative process with national soil entities to discuss and promote issues related to sustainable soil management and use of soil as natural resource.

Soil fertility, or lack thereof, remains the fundamental biophysical cause of the declining per capita food production in the sub-region. This is evident from huge gap between actual and potential crop yields. During the past 30 years, soil fertility decline has been estimated at an average of 660 kg N/ha, 75 kg P/ha and 450 kg K/ha for over 200 million hectares.

Climate is another challenge faced by millions of poor farmers in Sub-Saharan Africa. There are frequent severe droughts, especially in the dry, semi-arid Sahel region, and rising sea levels leading to flooding across numerous regions. The net loss due to climate change in Sub-Saharan Africa could be as high as US \$133 billion with agriculture bearing most of the brunt (Butt et al. 2005). It is estimated that because of projected yield declines and loss of forages, Mali, a country situated in West Africa, will suffer economic losses in the range of US\$ 70-\$142 million.

This then leads to the question: How has Sub-Saharan Africa adjusted to climate change? There have been four key areas of focus: production practices; technological innovation; policy interventions and constraints to climate change adaptation. But what is the way forward? There must be a greater movement to disseminate information and knowledge on soils. Emphasis should be placed on the importance of sustainable soil management to avoid impairing key soil functions. There should be an effort to incorporate the principles and practices of sustainable soil management into policy guidance and legislation at all levels of government, leading to the development of a national soil policy. And lastly, governments should be assisted, on request, to establish appropriate legislation instruments and processes to enable them to implement and monitor appropriate sustainable soil management practices.