Synthesis Paper

Enabling Coherence for Sustainable Land Management and Climate Policy

The analysis, results and recommendations in this paper represent the opinion of the author(s) and are not necessarily representative of the position of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Content

This synthesis paper is a product of two workshops on Upscaling the Potential of Soil Organic Carbon and Sustainable Land Management for Climate Action, organized in April and October 2020 as part of joint collaboration of the Sector Project on Soil Protection, Combating Desertification, Sustainable Land Management implemented by GIZ and funded by the Federal Ministry for Economic Cooperation and Development (BMZ), the Global Program on Soil Protection and Rehabilitation for Food Security implemented by GIZ and funded by the BMZ, the Support Project for the Implementation of the Paris Agreement implemented by GIZ and funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) under the International Climate Initiative (IKI) and the "4 per 1000" Initiative on Soils for Food Security and Climate.

Experts came together in a "Climate-Soil Community of Practice" to disseminate information on successful land management and soil carbon projects, highlight good practices for overcoming adoption barriers and strengthen the case for sustainable land management as a key to effective climate action. This synthesis paper presents the outcomes of the presentations and discussions derived during the events on the linkages between sustainable land management and climate change. It aims to provide guidance on a holistic approach to land use and climate policy processes within the scope of international agendas and national actions. It offers entry points at the national level and presents good practices to current barriers in aligning these two closely interconnected, yet often separately treated processes.

1 The potential of sustainable land management for climate action and food security

Healthy soils are fundamentally important for human livelihoods, economic and social prosperity and for resilient ecosystem services. They are the resource for food, fiber and energy in our ecosystem, while providing nutritious food and being indispensable for biodiversity (Baer & Birgé, 2018; Sanz et al., 2017). However, in addition to playing a vital role, the current food and land use systems are also damaging these indispensable ecosystems e.g. by intensification of agricultural practices and land use changes due to rising per capita consumption. Continued population growth and climate change amplify the processes of land degradation and desertification[1] (IPBES, 2018; Kopittke et al., 2019; Olsson et al., 2019). Globally, about a quarter of land is degraded due to human activity, with climate change

[1] Land degradation is a negative trend in land condition, caused by direct or indirect human induced processes, including anthropogenic climate change, expressed as long-term reduction and as loss of at least one of the following: biological productivity, ecological integrity, or value to humans. (IPCC, 2019)

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH exacerbating this process due to changing temperature and rainfall patterns (IPCC, 2019). In general, land is both a source and a sink of greenhouse gases (GHGs), while at the same time, being vulnerable to the negative consequences of climate change and weather extremes.

Sustainable land management (SLM) comprises “measures and practices adapted to biophysical and socio-economic conditions aimed at the protection, conservation and sustainable use of resources (soil, water and biodiversity) and the restoration of degraded natural resources and their ecosystem functions” (FAO, 2021). They address desertification and land degradation while reducing the negative impacts by climate change by representing a holistic approach to achieve long-term productive ecosystems. Increasing soil organic carbon (SOC) stocks is key to most SLM practices and provide synergies for addressing land degradation and climate benefits (GIZ, 2018). Besides contributing to climate change mitigation by removing CO_2 from the atmosphere, enhancing organic carbon in soils improves soil health and fertility, water and nutrient retention capacity, food production potential and resilience to drought (FAO, 2019; Sanz et al., 2017).

To work towards climate-resilient development, it is important to depict synergies, minimize trade-offs and develop institutional linkages between adaptation and mitigation (Denton et al., 2014; Di Gregorio et al., 2017; Eickhold, 2019). Sustainable land management can contribute both to mitigation and adaptation by also offering multiple co-benefits for land degradation neutrality and food security.

Linkages between land use and climate change

The current land use contributes to a huge share of GHG emissions. The steady increase in demand for food due to increasing population and changes in consumption patterns have led to an intensification of agricultural production and an expansion of areas for agriculture and forestry. The Agriculture, Forestry and Other Land Use (AFOLU) sector is one of the biggest emitters of greenhouse gases with about 23% (12.0 +/- 3.0 GtCO2e yr-1) of total GHG emissions (IPCC, 2019). At the same time, it is one of the most vulnerable sectors to the negative effects of climate change. Changing precipitation patterns, increasing temperatures and greater frequency of extreme weather events affect farmers and vulnerable people, who depend on soil ecosystem services (IPBES, 2018; Olsson et al., 2019).

Despite being responsible for a great share of GHG emissions globally, the land sector has a great mitigation potential, as a source and a sink of CO_2. It is estimated that in the period of 2007-2016, the land-atmosphere flux led to a net removal[2] of 6.0+/-2.6 GtCO2 yr-1 (IPCC, 2019). Due to its potential to sequester carbon, increasing SOC in soils has been advocated as a solution to mitigate the steady increase of carbon stocks in the atmosphere (Baveye et al., 2020; IPCC, 2019; Minasny et al., 2017; Wiesmeier et al., 2020). The 4p1000 Initiative, launched at COP21 in 2015, advocates that an annual growth rate of 0.4% in the soil carbon stocks in the first 30-40 cm of soil, would significantly reduce the CO2 concentration in the atmosphere related to human activities (4p1000, 2021).

Figure 1 Increasing SOC holds multiple benefits for climate, biodiversity and food security (Source: Aaron Roth/NRCS)

The spatial and temporal magnitude and rate of SOC storage varies widely, and is determined by different factors, including soil type, land use, climatic conditions, topography, management practices and more (Laban et al., 2018; Wiesmeier et al., 2019). There is a high potential to increase SOC on managed agricultural lands and there is a tendency of higher carbon sequestration on croplands with low initial SOC stock that decreases by the time when soils are reaching their equilibrium (Minasny et al., 2017; Sanz et al., 2017). Looking at different management practices which lead to an additional net transfer of carbon from the atmosphere to land (and therefore mitigate climate change), afforestation and conversion of arable land to pasture leads to the highest SOC sequestration rate in the first years (Minasny et al., 2017).

Besides its mitigation potential, increasing SOC co-delivers adaptation and food security while also combating land degradation and desertification (Smith et al., 2019). Increased SOC enhances soil quality, soil fertility and improves soil productivity, therefore holding benefits for a variety of ecosystem services like increased crop yields and higher food production, increased water holding capacity and greater biodiversity (Laban et al., 2018).

[2] Comparing the sum of the net CO_2 removals due to the natural response of land to human-induced environmental changes and the FOLU net CO_2 emissions (IPCC, 2019).

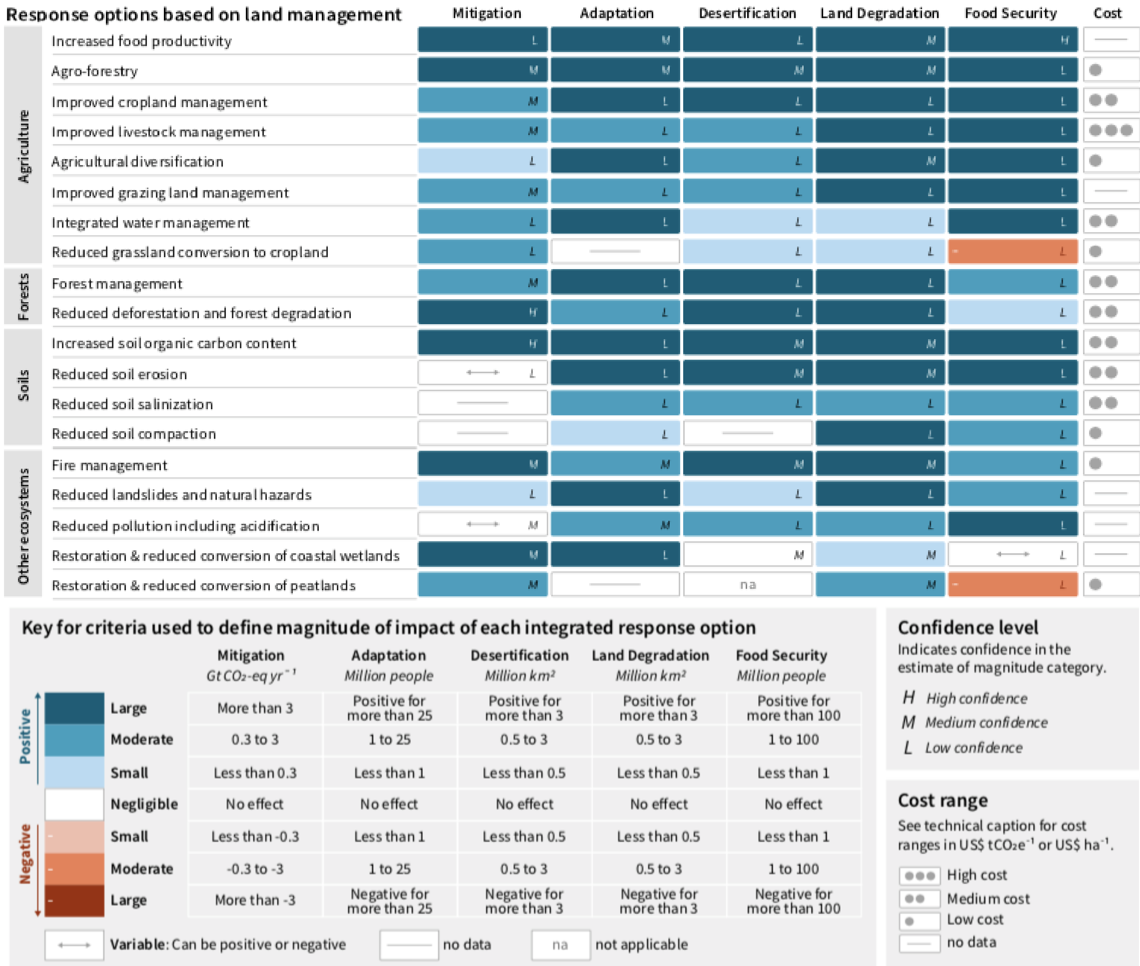

Figure 2 Potential global contribution of response options based on land management to mitigation, adaptation, combating desertification and land degradation, and enhancing food security (Source: IPCC 2019)

Sustainable land management holds multiple benefits for climate action, food security and biodiversity

To unfold the potential of SOC, the right responses need to be put in place. An integrated approach with various co-benefits is sustainable land management (SLM), which consists of a broad variety of measures, protecting, conserving and sustainably using natural resources such as soil or water. SLM generally provides multiple benefits to soil and agriculture, such as preventing and reducing land degradation, maintaining land productivity, enhancing resilience of agricultural systems or enhancing food production (Gabathuler et al., 2009). Many land-based measures contribute to climate change adaptation and mitigation and offer co-benefits to food security and biodiversity (see figure 3), especially the measures which aim to increase SOC (Sanz et al., 2017). Examples include agroecology, conservation agriculture, crop rotation, integrated and landscape approaches and many other (for more examples see [WOCAT SLM database]).

It is difficult to generalize the impact of SLM measures on adaptation, mitigation and other co-benefits, as it depends on the local socio-economic context (IPCC, 2019; Sanz et al., 2017). It is important to consider that each environmental and sociocultural context needs to be assessed to identify the most appropriate ways to achieve multiple benefits and to reduce trade-offs through SLM (Sanz et al., 2017).

More information

- To read more on soil ecosystem services see Baer & Birgé 2018.
- An analysis of practices which co-deliver food security, climate change mitigation and adaptation, and combat land degradation and desertification has been done by Smith et al. 2019.
- For more information on the potential of SLM for adaptation and mitigation see Sanz et al. 2017.

2 Sustainable land management within international agendas and national targets

SLM has a high potential for climate change mitigation and adaptation action, and therefore it is a crucial element to meet the targets of relevant international agendas. Since 2015, there has been an increase in the development of an enabling political environment that would support the adoption of SLM practices, including SOC protection and sequestration. From a climate change perspective, this is reflected in the Paris Agreement (United Nations, 2015), the Koronivia Joint Work on Agriculture (UNFCCC, 2018), and the Intergovernmental Panel on Climate Change's (IPCC) Special Report on Climate and Land (IPCC, 2019) under the UNFCCC.

In 2020, the Paris Agreement marked five years. Countries whose first Nationally Determined Contributions (NDCs) timeframe ends in 2025 or 2030 were requested to submit new or updated NDCs (Fransen et al., 2019). Overshadowed by the global Covid-19 pandemic, many countries are developing an updated or new NDC. The Climate Action Tracker shows that 53 countries (plus EU) submitted new NDCs by April 2021 (Climate Action Tracker, 2021).

In their initial NDCs (as of December 2019), about 28 countries referred directly to SOC or targets which are related more broadly to SOC, wetlands and peatlands in their NDCs. Also, numerous countries refer to agricultural practices which would sequester carbon without explicitly mentioning SOC (Wiese-Rozanova et al., 2020). Several countries intend to include SLM and forestry in the current round of NDC formulation, as country requests to the NDC Partnership show, even though only a minor percentage referred to SOC specifically (Chorover & Martini, 2020). Prior data indicates limited coverage of SOC for adaptation and mitigation in NDCs, even though its potential is increasingly recognized for net zero emission goal. The share of SOC-related measures in the 2020-2021 NDC updating round, still needs to be analysed.

By including soil and land-related actions in national climate targets, the challenges of planning and implementing of SLM and especially SOC projects has to be considered right from the start. The potential of SOC sequestration differs depending on climate and topography as well as local conditions. Additionally, it is difficult to monitor or verify improvement in SOC due to poor data and lack of capacity to collect and analyze data for calculating the sequestration potential, which is also limiting implementation. These limitations also prevent countries to set SOC-related targets in their NDCs. Countries that do not address SOC in their NDCs specifically, usually consider SOC in other significant national policies and actions (Verra, 2020; Wiese-Rozanova et al., 2020). It is therefore necessary to address these challenges already in the planning process and involve all relevant stakeholders.

SLM and SOC play a prominent role within other international agendas (see figure 2), such as the United Nations Convention to Combat Desertification (UNCCD) and its Strategic Framework (2018-2030), with a particular focus on soil management. As of October 2020, more than 80 countries have set targets to achieve Land Degradation Neutrality (LDN), while over 120 countries have committed to LDN (UNCCD, 2020). LDN also plays a key role for achieving the Sustainable Development Goals (SDG). Especially target 15.3, aims to "combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world" (SDSN, 2021). Soils host a quarter of our planet's biodiversity and provides essential ecosystem. The UN Convention on Biological Diversity (UNCBD) under its Cross-cutting Initiative for Conservation and Sustainable use of Soil Biodiversity aims to increase the recognition of the essential services provided by soil biodiversity across all production systems (CBD, 2012).

As seen above, all the listed agendas consider SLM, emphasizing its cross-cutting character and showing its potential to reach multiple targets. Policy coherence of targets and action is crucial to strengthen synergies and align conflicting goals in the implementation of these agendas. (Shawoo et al., 2020). Moreover, linking the various efforts in achieving these different targets, can lead to multiple benefits at all levels of government (GIZ, 2018).

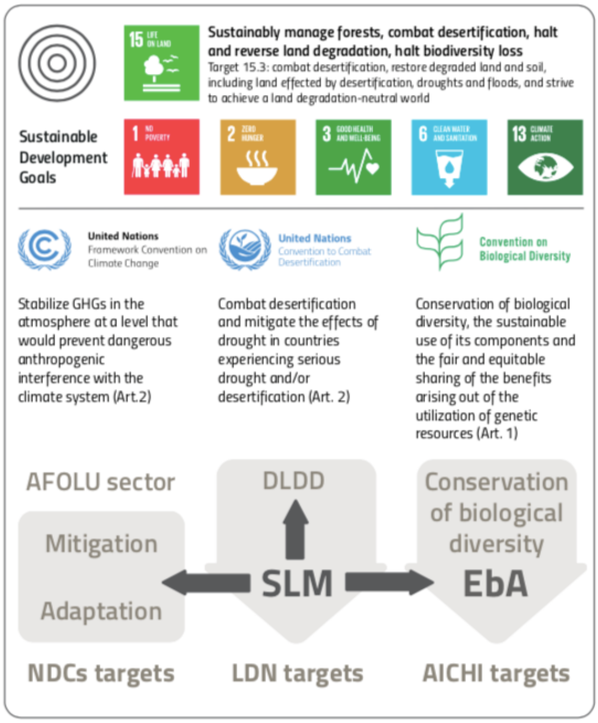

Figure 3 SLM as a holistic vehicle to achieve the objectives of several international agendas (Sanz et al. 2017).

More information

- Further reading on SOC in NDCs see [Wiese-Rozanova et al. 2020](#).

3 Enhancing sustainable land management within climate policy processes at the national level

To achieve the national commitments under the aforementioned international agendas, countries need to mainstream SLM and SOC in their national strategies i.e. overarching development plans, National Adaptation Plan (NAP) processes, National Biodiversity Strategy and Action Plans as well as sub-national and sector-specific plans. Given that land management decisions are made from farm level to national scales, and both climate and land policies have a cross-cutting character, soil and SLM measures are often incorporated into a variety of policies, plans and programs on food security, agricultural development, climate and sustainable development (GIZ, 2018; IPCC, 2019). Enhancing and prioritizing SLM within these policies and strategies will likely be an effective way to meet the multiple national commitments. Moreover, mutually supportive climate and land policies have the potential to save resources, create efficiency and effectiveness while fostering engagement and collaboration between multiple stakeholders (Dazé et al., 2018; IPCC, 2019). It is therefore important to acknowledge co-benefits and trade-offs when designing land and food policies to overcome barriers to implementation. This can be done by strengthening the engagement of multiple levels of government and stakeholders in a coherent and adaptive manner, (IPCC, 2019).

Mainstreaming and alignment provides the foundation and motivation to create functional linkages between these different planning and policy processes and including SLM in national strategies. Actions can be coordinated to effectively use resources while contributing to the achievement of several targets and facilitating implementation (Bouyé et al., 2018). To minimize the risk that different agenda targets and strategies undermine each other, it is important to identify synergies and trade-offs among sectoral and national priorities as well as expected outcomes.

SLM and SOC activities should be integrated in the corresponding national strategies which serve as operating vehicles for national commitments. The national strategies depend on the individual country's context but can refer to National Adaptation Planning Processes (NAPs), Long-term strategies (LTS), National Biodiversity Strategies and Action Plans (NBSAP), national development strategies, relevant sector plans (e.g. agriculture) as well as rural development programs.

However, there is still limited understanding of practical approaches to create coherence within national contexts and how to operationalize linkages between climate and land use targets and strategies (Dazé et al., 2018). While a lot of literature focus on the synergies with regard to content, actors still face difficulties at the institutional level.

Challenges actors face in designing coherent climate and land use strategies[3]:

i. *Awareness & Political will*: The interlinkages between SLM and climate change are often not fully recognized by national actors, leading to absence of political will to align activities and create synergies. In some countries there is insufficient alignment of NDCs and sectoral plans as well as a perceived lack of political will to support NDC implementation (Emmrich et al., 2020).

ii. *Institutional and power dynamics within governments*: Climate change is still not perceived as a cross-sectoral issue but rather as an environmental problem. Additionally, the potential of land use responses for climate action is still not fully recognized by climate actors, making it difficult to ensure political buy-in by relevant stakeholders. Additionally, power dynamics often hinder ongoing and open exchange between different actors, hindering necessary cooperation and coordination across ministries.

iii. *Capacities to coordinate across different sectors and levels of government*: Capacities are often limited, which makes it difficult to communicate and coordinate among diverse stakeholders. Creating coherence and synergies between processes requires all of the involved actors "to speak the language" considering their respective interests and objectives. This can be often difficult due to limited communication and exchange. Also, actors face coordination fatigue as this is done in an ad-hoc and unorganized form, creating additional burden on the government institutions.

iv. *Limited human, financial and technical capacities:* Identifying synergies and trade-offs need human as well as financial resources, which are often limited. Resources are needed to guarantee ongoing exchange, communication and coordination.

More information

- For further reading on aligning the implementation of 2030 Agenda and the Paris Agreement see Bouyé et al. 2018. For aligning NDC and NAP see overview brief series by the NAP GN.

[3] These challenges only present a handful of barriers that actors described within the frame of policy coherence and which were discussed during the event in April.

4 Recommendations and good practices to unfold the full potential of SLM and SOC

During the two events in April and October 2020, first ideas were put together on how to overcome the identified barriers to unfold the full potential of SLM and SOC. These are, by no means, exhaustive and present some first recommendations gathered by climate and soil experts from international institutions, private sector and civil society during an interactive workshop.

Communicating the benefit of SLM and SOC for climate action

To increase awareness and political will, it is important to communicate the potential of SLM for climate targets and strategies, putting at the center the multiple benefits (mitigation, adaptation, food security, biodiversity etc.) which should be clearly communicated to politicians and decision-makers. Within the climate community, the great potential of soil for reaching the climate targets (NDC) should be highlighted. The soil community could take advantage of the urgency and visibility that the issue of climate change offers, as well as the opportunity for attracting funding for upscaling soil management practices.

Facilitate communication between different levels and sectors

To overcome institutional and power dynamics, it is important for actors to speak a common language. Actors should highlight the multiple benefits of SLM and SOC for reaching a variety of climate and environmental targets. Moreover, all levels of government, including different sectors and actors are needed to address climate change as a cross-sectoral problem.

Installing cross-sectoral structures

To create awareness about the synergies of linking climate and land use processes, setting up intersectoral committees which coordinate and support climate policy making can promote collective awareness and information across government. Especially setting up of an NDC coordination mechanism, helps to overcome institutional and power dynamics by emphasizing the inter-disciplinary nature of climate change and climate policy solutions. Multi-sectoral engagement and inter-ministerial coordination, ideally inclusion of private sector and NGO's, can reduce duplication of efforts and better streamline processes. Here it is important to create incentives, define clear responsibilities and mandates, which has the potential to create ownership of different stakeholders involved.

High-level commitment

Linking SLM and SOC to national development priorities and global commitments (e.g. SDG, NDC etc.), has the potential to raise awareness of their role and importance to reach national commitments. By helping political leaders to identify the synergies and handle the trade-offs, climate policy can be viewed with a more holistic and integrated approach and could create a narrative that works for them politically. Moreover, one could focus on countries that show a strong political will for transformation and can eventually serve as role models.

Share evidence

It is important to share the evidence and the opportunities for linking soil and climate policy, also from the economic perspective. This includes showcasing the benefits of SLM and SOC for addressing climate change impacts and mitigate greenhouse gas emissions to reach climate targets, as well as emphasizing the potential of climate action to facilitate the implementation and upscaling of soil practices. Different tools (e.g. EX-ACT tool) show the potential of SLM and SOC to mitigate greenhouse gas emissions. It is important to do a clear stocktaking exercise in early stages, to identify the existing knowledge and practices, to learn about the challenges and how to overcome them, and to avoid overlapping activities .

Peer-to-peer exchange

To increase awareness, improve knowledge and develop human capacities there are different approaches and process that can be used: science-policy-interfaces, peer-to-peer learning and south-to-south-exchange foster learning between countries with similar problems and with common socio-economic, biophysical and climatic circumstances.

Using international processes that are already in place

Showcasing international processes and consortia within the climate-soil nexus (e.g. the Koronivia Joint Work on Agriculture, 4p1000 Initiative etc.) can help to make a stronger case for linking activities and strategies.

Making use of climate finance mechanism for SOC and SLM

By recognizing the importance of healthy soils for climate change mitigation as well as adaptation, there is an opportunity for upscaling SLM activities through international climate finance mechanisms. Some of the main sources of funding SLM activities through climate finance include the Global Environment Facility (GEF), the Green Climate Fund (GCF) as well as the Adaptation Fund (AF) besides other national donors (GIZ, 2018). The proportion of investments in agriculture, forestry and land use in public climate finance is still relatively low, especially in mitigation, lacking behind other sectors like transport or energy. Nevertheless, investments are increasing: more than doubling in the area of mitigation to $11 billion in the period of 2017-2018 and still rising in the field of adaptation up to $7billion (CPI, 2019). In comparison, $94 billion were invested in low-carbon transport in the same period. Additionally, integrating SOC in existing climate mechanisms such as (voluntary) carbon markets has the potential to increase financing for carbon sequestration through selling of carbon credits (VERRA, 2020). Article 6 of the Paris Agreement provides option for countries to reduce their GHG emissions using international carbon markets. Specifically, Article 6.2 allows countries to set up bilateral and voluntary agreements to trade or transfer carbon credits between countries (Lo Re, 2019). However, the rules and guidelines for implementing Article 6 i.e. setting up an accounting system of traded emissions between countries are still being discussed. Major points of concerns is to avoid double counting, ensuring additionality and increasing NDC ambition (Kizzier et al., 2019; Nugent, 2019).

For more information on integrating SOC into VCM see synthesis paper on "Integrating SOC in Voluntary Carbon Markets" by Wiese (2020).

5 Selected actors working on the soil-climate nexus (*not exhaustive*)

With the **Koronivia Joint Work on Agriculture**, the topic of agriculture and soil is structurally anchored within the political climate sphere. As an addition to NDCs and National Adaptation Plans they seek to drive transformation within food and agricultural systems. Fostering agriculture as a solution for climate change mitigation and adaptation, they support a sustainable management of soils to help communities to be more resilient and sequester carbon. The subsidiary bodies report on the progress at the upcoming COP26 in 2021 (FAO, 2020a).

The **4 per 1000 Initiative** was launched at COP21 in 2015 alongside the Paris Agreement to demonstrate that agriculture and particularly agricultural soils play a crucial role where food security and climate change are concerned. The initiative aims to increase SOC sequestration through the implementation of agricultural practices adapted to local environmental, social, and economic conditions. It encourages stakeholders (public, private sector) to transition towards a productive, resilient agriculture, based on the appropriate management of lands and soils. It advocates that an annual growth rate of 4‰ in the soil carbon stocks, in the first 30-40 cm of soil, would significantly reduce the CO2 concentration in the atmosphere related to human activities.

The **Global Soil Partnership** (GSP) is a globally recognized mechanism established in 2012. The mission is to position soils in the Global Agenda through collective action. The key objectives care to promote Sustainable Soil Management and improve soil governance to guarantee healthy and productive soils and support the provision of essential ecosystem services towards food security and improved nutrition, climate change adaptation and mitigation, and sustainable development (FAO, 2020b).

The **National Adaptation Plan (NAP) Global Network** supports developing countries to advance their NAP process to help accelerate climate change adaptation efforts around the world. The Network was established in 2014 at the 20th session of the Conference of the Parties (COP 20) in Lima, Peru, initiated by adaptation practitioners from 11 developing and developed countries. Today, the NAP Global Network connects over 1,200 participants from more than 140 countries working on national adaptation planning and action.

The CGIAR Research Program on Climate Change, Agriculture and Food Security (**CCAFS**) seeks to address the increasing challenge of global warming and declining food security on agricultural practices, policies and measures through strategic, broad-based global partnerships.

6 Abbreviations

AFOLU	Agriculture, Forestry and Other Land Use
CCAFS	Climate Change, Agriculture and Food Security
FAO	Food and Agriculture Organization of the United Nations
GHG	Greenhouse Gas
GSP	Global Soil Partnership
IPCC	Intergovernmental Panel on Climate Change
LDN	Land Degradation Neutrality
NAP	National Adaptation Plans
NDC	Nationally Determined Contribution
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SOC	Soil Organic Carbon
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Diversification
UNFCCC	United Nations Framework Convention on Climate Change
VCM	Voluntary Carbon Markets

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Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of
Federal Ministry
for Economic Cooperation
and Development

On behalf of:
Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

of the Federal Republic of Germany

Published by:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

Address
Friedrich-Ebert-Allee 40
53113 Bonn, Deutschland
T +49 228 4460 - 0
F +49 228 4460 – 1766

Dag-Hammarskjöld-Weg 1 – 5
65760 Eschborn, Deutschland
T +49 6196 79 - 0
F +49 6196 79 - 1115

E info@giz.de
I www.giz.de

Bonn, 2021

Author:
Alannah Hofemeier

Design:
GIZ

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