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# POLICY BRIEF

DECEMBER 2022

SERIES 04

## Including soil organic carbon into nationally determined contributions: Insights from Mali

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### Introduction

Healthy soils are the foundation of sustainable and regenerative food systems and provide several vital ecosystem services. Sequestering carbon in agricultural soils, for example, can have mutual benefits for climate change mitigation and adaptation, food and nutrition security, biodiversity, and water resilience. Despite these benefits, there are few policies that incentivize farmers to invest in maintaining and improving soil health.

This policy brief highlights **opportunities for the inclusion of soil health and soil organic carbon (SOC) into the National Determined Contributions (NDC) as a key step for governments to support farmers to invest in their soil.** This activity builds on recent assessments including a paper that extensively reviewed the first-round of 184 NDCs concluding that only 28 countries referred to SOC, peatlands or wetlands (Wiese et al., 2021). This review and the subsequent interviews with experts (n=5) indicated the importance of understanding the impact of land management on SOC storage and dynamics (Wiese et al., 2021). As a follow-up, Rose et al (2022) focused on the updated NDCs and found that the number of countries that included SOC in their updated NDC increased compared to the first-round NDC process (Rose et al., 2022). This review also highlighted that 19 countries highlighted the need for financing for SOC and related measures (Rose et al., 2022).

This set of policy briefs focus on the action countries in Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA)<sup>1</sup> (Ethiopia, Kenya, Ghana, Mali, Senegal and Zambia). We interviewed several key informants in each country involved in the NDC process to:

1. Understand the process for the developing the NDC targets;
2. Understand why policy makers did or did not include soil in their target; and
3. Identify opportunities going forward to improve the process including the target setting.

<sup>1</sup> <https://aiccra.cgiar.org/>

## Summary

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The Nationally Determined Contributions (NDCs) initiated under the Paris Agreement propose a country's contribution to global mitigation efforts and domestic adaptation initiatives. This policy brief aims to better understand the challenges and opportunities of integrating soil organic carbon (SOC) into the NDCs in Mali. We conducted individual interviews following semi-structured questionnaires with five experts/key informants who offered informed perspectives on the NDC process in Mali. We extracted qualitative data from the transcripts of these interviews. The respondents recommended the following:

- The technical and financial capacity of the country's NDC reporting team and partners should be strengthened so an action plan to reduce greenhouse gas (GHG) emissions and monitor of SOC contributions to climate change mitigation and adaptation can be executed;
- Learning across countries – to develop SOC-related targets, policies and measures – should be formalised;
- SOC targets should be included in future versions of the NDC;
- An appropriate data collection and reporting system should be established, and research should be undertaken to generate evidence on the integration of SOC into NDCs; and
- The long-term low-carbon strategy that will define the different levels of GHG emission reduction should be developed through the National Adaptation Programme of Action, which provides the strategic orientations to consider for future NDCs.

## Background and policy nexus

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Mali has committed to addressing climate change by signing the United Nations Framework Convention on Climate Change in December 1994 and the Kyoto Protocol in January 1999 (MEADD, 2018). In the same way, the 2015 Paris Agreement introduced NDCs as a mechanism for countries to set ambitious, voluntary mitigation aims and priority actions for adaptation (United Nations, 2015).

The Special Report on Climate and Land recognises the critical roles SOC plays in mitigating and adapting to climate change, in several other ecosystem functions and in enhancing food and nutrition security (Chotte et al., 2019). Soils contains the largest terrestrial carbon pool, which is why it plays a critical role in mitigating and adapting to climate change. SOC provides several other co-benefits, such as combating desertification and land degradation, halting biodiversity loss, and enhancing food security. For example, the United Nations Convention to Combat Desertification uses SOC trends to monitor land degradation neutrality (Sustainable Development Goal 15.3).

The Ministry of Environment, Sanitation and Sustainable Development (MEADD, 2018) has the responsibility to elaborate on and implement environmental policies, including the NDC. It actively collaborates with two other ministries: Agriculture and Rural Development, and Higher Education and Scientific Research.

Since its inception in 2011, a national committee on climate change has consulted, orientated and mobilised the country's actors to update and suggest areas for inclusion in the NDC. This committee is regularly consulted to support the teams preparing the NDC, particularly through its thematic groups. The NDC includes five thematic areas: forestry, waste, energy, agriculture and livestock. Mali's NDC is well aligned with key related policies including:

1. National Plan of Adaptation to Climate Change;
2. Agricultural Orientation Law;
3. Mali Climate Fund; and
4. National Policy for Environmental Protection.

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2 <https://www.climatewatchdata.org/ndcs/country/MLI/full>

3 <https://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/laws/8121.pdf>

In its previous NDC, Mali committed to reducing GHG emissions by 31% in the energy sector, 29% in agriculture and 21% in land use change and forestry<sup>4</sup> by 2030 compared to the baseline scenario. In 2022 NDCs, the country updated its commitment, to reducing emissions by 31% in energy, 25% in agriculture, 39% in land use change and forestry, and 31% in waste<sup>5</sup> by 2030 compared to the baseline scenario. In addition, the waste sector was added to the new NDC.

All of these commitments have considered gender during development as well as implementation and are also aligned with the Sustainable Development Goals.

Six experts were involved in the development of the NDCs in Mali. They are experts on:

1. Gender, society and the private sector;
2. Agriculture adaptation and local development;
3. Mitigation/adaptation and energy;
4. Mitigation in agriculture;
5. Waste mitigation; and
6. Meteorology and technology transfer.

## NDC Target-setting

According to the feedback from the interview experts, the NDC targets are set by the international climate negotiation process under the United Nations Framework Convention on Climate Change (UNFCCC). Thus, a participatory approach (Figure 1) was adopted starting with regional consultations culminating with national consultation, taking into consideration the gender dimension. A diversity of stakeholders participated to these consultations including universities, government technical services (agriculture, livestock, water and forestry, hydraulics, and sanitation), civil society, local communities, private sector, NGOs, and a national committee on climate change. In addition, these stakeholders participated in the planning process as well as in the definition of the NDC objectives. Then the committee from the three ministries (Agriculture, Higher Education and scientific research and Environment) further defined the way forward.

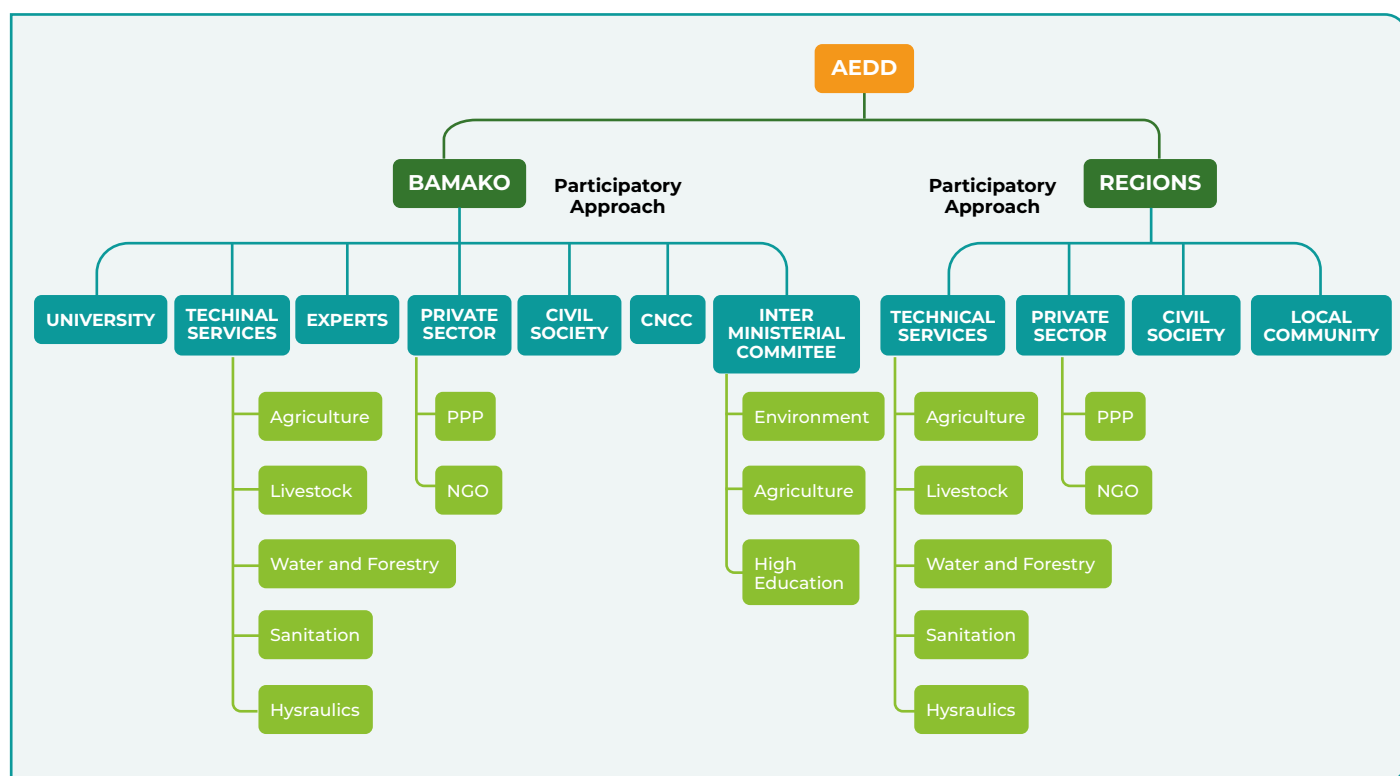
The priority needs of local communities were captured during the consultations held in the regions of the country (Kayes, Sikasso, Koulikoro, Segou and Mopti) and then consolidated at the national level (District of Bamako). Due to insecurity reasons, the consultations in the three regions of north of the country (Gao, Timbuktu, and Kidal) were conducted remotely. The draft NDC document was further reviewed during a national consultation, to make sure its content corresponded to the expectations of the different actors.

According to the interviewed experts, to improve the next NDC planning process, there is a need to develop the long-term low-carbon strategy that will define the different levels of GHG reduction mechanisms. This will could be realized through the implementation of climate change adaptation and mitigation projects with multiple partners.

4 [CDN FINAL- mars 2016.pdf](#)

5 [Mali Second CDN Avril 2022.pdf](#)

**Figure 1:** The various actors involved in the NDC process at both regional and national levels in Mali.



## Integration of SOC into NDCs

Interviews were conducted with five experts involved in NDC development to understand the potential constraints and opportunities to include SOC targets in NDCs. The NDCs were revised in 2022 and the next update is due by 2027. Respondents provided several reasons for the absence of SOC including:

1. Absence of soil experts in the NDC target setting team;
2. Lack of experts in the assessment of the SOC; and
3. Difficulty to accurately monitor SOC.

However, the absence of SOC in the Mali's NDCs (previous or revised) is not because of lack of interest by Mali's government.

There are multiple landscape restoration and on-farm agricultural interventions that can contribute to maintaining and/or improving soil health and SOC that have both adaptation and mitigation benefits. The experts commented that the SOC content is an important measure for soil health in agricultural soils. Currently, GHG emissions and carbon sequestration calculations only focus on forestry sector (aboveground biomass carbon) ignoring SOC and below ground biomass carbon, especially its potential in the agricultural sector. In fact, the NDC guidelines require the estimation of these carbon pools, based on IPCC, 2006 recommendations. However, soil health as well as SOC were not included in the NDC framework, i.e., it is not part of our GHG estimation criteria, however, there is a mention of the role of soil health for adaptation measures.

## Integration of climate, land, and biodiversity commitments

The challenges to integrating climate, land and biodiversity in the country commitments are numerous and are divided between technical challenges, financial challenges, and issues of expertise and skills on climate, land health and biodiversity like.

Since 2007, Mali has developed the National Adaptation Programme of Action, and in 2011, a National Climate Policy with a strategy for adapting to climate change which identified more than a hundred priority actions. These two policies

were developed to promote climate change adaptation and mitigation in Mali. In addition, the Ministry of Environment implemented projects costing more USD 100 million throughout the country, including projects financed by Mali Climate Fund. The government set up many consultation frameworks for integration of climate, land, and biodiversity commitments in development actions including

1. The national environment council,
2. The national climate change committee,
3. The CDN committee, and several sectoral platforms at the regional level with the Regional Committee for the Orientation, Coordination and Follow-up of Development Actions (CROCSAD), the Local Committee for the Orientation, Coordination and Monitoring of Development Actions (CLOCSAD) and Communal Committee of orientation, coordination and follow-up of development actions (CCOCSAD). The different committees mentioned above support the implementation of the NDC in AFAT sectors (agriculture, forestry, and land use).

## Monitoring NDCs progress

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The AEDD is the focal point of all government policies related to climate change including, NDCs, Green Fund, Adaptation Fund, Global Environment Facility. All the progress made in the NDCs are monitored through the Ministry of agriculture, the Ministry in charge of scientific research and of the Ministries of environment (Water and Forestry department). The results of these are validated through participatory consultations with the institutions in charge of Agriculture, Scientific research, and the Environment. The following priority needs in terms of physical and technical capacity for monitoring soil health and SOC have been identified by the key informants:

- Capacity building for the AEDD reporting team on SOC assessment and monitoring;
- Capacity building of the NDCs partners on SOC assessment and monitoring.
- More focus in upgrading laboratories for soil, water and plant analysis.
- May prove more efficient as there is a very high turnover of the staffs in the two above-mentioned national entities.

## Status of SOC in Mali and key evidence from monitoring

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There is a real need to fill research gaps around understanding the impact of land management on SOC. Respondents suggested the need for capacity building to assess SOC contributions to climate change mitigation and adaptation to fill these research gaps. They suggested building a research consortium, including developing a Memorandum of Understanding between AEDD and partners. There is also a need to enhance our understanding of the economic potential for different land use soils to offset or help reduce CO<sub>2</sub> emissions.

Advancements in soil health monitoring have improved the accuracy and accessibility of SOC maps. For example, the [Land Degradation Surveillance Framework \(LDSF\)](#)<sup>6</sup> was developed by World Agroforestry (ICRAF) in response to a need for systematic landscape-level assessment of soil and ecosystem health. The methodology is designed to provide a biophysical baseline at nested spatial scales across a landscape, covering a range of indicators, from soil properties, land degradation, biodiversity, land cover, and land use, including soil organic carbon. The LDSF method has been applied in over 43 countries, across a number of projects at multiple scales (from farm scale to national level), and the methodology has been widely published in peer-reviewed journals (Vågen and Winowiecki, 2013; Vågen et al., 2013; Winowiecki et al 2016; Vågen and Winowiecki, 2019) Including in Mali, with funding from various donors.

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6 [http://landscapeportal.org/uploaded/blogs/ldsf\\_files/LDSF\\_Flyer\\_Final\\_2020.pdf](http://landscapeportal.org/uploaded/blogs/ldsf_files/LDSF_Flyer_Final_2020.pdf)

Because the LDSF includes a robust analytical framework that builds on field data collection and uses machine learning algorithms and remote sensing satellite data to produce spatial assessments, the accuracy of these maps is above 80%. This allows for the monitoring of changes of these indicators, over time, which is needed when including such variables in NDCs and other policies. The below map is an example of the spatial variation of SOC across Mali, using the global LDSF dataset, at a resolution of 30m using Landsat 8.

**Figure 2:** Spatial variation of SOC across Mali produced using the global LDSF database at ICRAF.



## Future support needs

1. **Promote the soil, water and plant laboratory**, which plays a critical role both technically and as mitigation measure to the high turnover of the NDCs' successive teams,
2. **Increase collaboration between countries with experience managing SOC and countries needing support** to develop SOC related targets, policies, and measures,
3. **Development of collaborative project with research institution of expertise in soil health especially in AFAT sectors** (Agriculture, forestry, and land use), and with expertise in Land Degradation Surveillance for the whole country Maps establishment.

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## Acronyms

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<b>AEDD</b>	Agency for Environment and Sustainable Development	<b>CLOCSAD</b>	Local Committee for the Orientation, Coordination and Monitoring of Development Actions
<b>CCOCSAD</b>	Communal Committee of orientation, coordination and follow-up of development actions	<b>NDC</b>	National Determined Contribution
<b>GHG</b>	Greenhouse gas emissions	<b>SOC</b>	Soil Organic Carbon
<b>LDSF</b>	Land Degradation Surveillance Framework	<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
		<b>ICRAF</b>	World Agroforestry

## Acknowledgements

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This work was implemented as part of the Accelerating Impacts of CGIAR Climate Research in Africa (AICCRA) project in Mali funded by the International Development Association (IDA) of the World Bank, which is acknowledged. The authors thank Sabrina Chesterman from AICCRA for her support to the **policy roundtable** and production of the policy brief series.

The work has been supported by the Coalition of Action For Soil Health (CA4SH) which AICCRA is a consortium member of.



The main objective of CA4SH is to improve global soil health by addressing critical implementation, monitoring, policy, and public-private investment barriers that constrain farmers from adopting and scaling out healthy soil practices.

[www.coalitionforsoilhealth.org](http://www.coalitionforsoilhealth.org)

## Suggested Citation

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Kapoury S, Arinloye D, Aynekulu E, Vagen T-G and Winowiecki L. 2022. Integrating soil organic carbon (SOC) into the Nationally Determined Contribution (NDC) of Mali. AICCRA policy brief. Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA).

## About AICCRA

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Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) is a project that helps deliver a climate-smart African future driven by science and innovation in agriculture. It is led by the Alliance of Bioversity International and CIAT and supported by a grant from the International Development Association (IDA) of the World Bank.

Explore our work at [aiccra.cgiar.org](http://aiccra.cgiar.org).

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