

# Info Note

## Assessment of agricultural policies to implement soil organic carbon (SOC) commitments in NDCs

*Examples from Brazil and Rwanda*

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### Key messages

- Countries with national agricultural policies providing quantified SOC-related mitigation actions and commitments can increase NDC transparency by referring to such policies and associated actions in their NDCs.
- Brazil's updated NDC set an absolute economy-wide mitigation target and for the 2020-2030 period, the ABC+ Plan sets out SOC-related mitigation actions and commitment targets to reduce agricultural GHG emissions for which an MRV mechanism is under development.
- In Rwanda, quantified SOC-related mitigation actions and an MRV Framework were developed as part of the NDC update process, however, this SOC-related information is not fully reflected in Rwanda's latest Strategic Plan for Agriculture Transformation, which was published two years prior to the updated NDC.
- NDC development can be a driver for national SOC-related projects, actions, commitments, mitigation potentials and MRV mechanisms. For developing countries, this process can be enhanced through support programs for NDC development.
- In countries where quantifying SOC-related agricultural actions is driven by NDC development, relevant agricultural policies need to be updated and aligned to support NDC implementation.

To evaluate domestic policies' contribution to the ambition of the [Nationally Determined Contributions](#) (NDCs) to the Paris Agreement and implementation of soil organic carbon (SOC) commitments for significant mitigation outcomes, we evaluated national agricultural policies referenced in the updated NDCs of two contrasting countries, Brazil and Rwanda. Identifying and enhancing

national policies and actions to achieve domestic commitments in NDCs is a key step in preparing for NDC implementation. In addition, information for clarity, transparency, and understanding (ICTU) of NDC commitments to SOC actions could be improved by including these policies' SOC-related outcomes.

Brazil and Rwanda were selected as two countries that referred to SOC for the first time in updated NDCs, yet with marked differences in the specificity of national mitigation targets and in the nature of their domestic policies. For each country, we compared the agricultural policies referenced in the NDC with the updated NDC for the specification and alignment of SOC-related agricultural mitigation action measures, associated commitments, GHG mitigation potentials, and provision for monitoring, reporting and verification (MRV) mechanisms to track implementation progress. We conclude with recommendations to enhance NDC and agricultural policy alignment for improved ICTU and implementation of SOC-related NDC commitments.

New and updated NDCs were assessed for agricultural sub-sector commitments of SOC and related measures (policies or actions) (Rose et al. 2021). As of 1 November 2021, 148 countries (including the 27 countries of the EU) have submitted new or updated NDCs. Of the new or updated NDCs, 35 (24% out of 148 countries) refer to SOC in agricultural land compared to 14 first-round NDCs (8% out of 184 countries). These SOC commitments were analyzed to understand progress and ambition since the previous NDCs, assess ambition among countries with the highest mitigation potential for SOC sequestration and protection, and summarize implementation support needs (Rose et al., 2021).

## Brazil

### Brazil's updated NDC mitigation targets & actions

[Brazil's updated NDC](#) was submitted on 9 December 2020, with subsequent updates communicated by Brazil as elaborated below.

The ***national mitigation target*** has evolved as follows:

- 9 December 2020 - In the updated NDC, Brazil maintained its economy-wide absolute mitigation target set in the first NDC to reduce GHG emissions in 2025 by 37% and in 2030 by 43% compared to 2005, stating a long-term objective to reach climate neutrality by 2060.
- 28 October 2021 - In an [updated NDC submission letter](#) submitted to the UNFCCC, Brazil advanced its climate neutrality objective by a decade to 2050.
- 1 November 2021 – At the 26<sup>th</sup> UNFCCC Conference of the Parties (COP26), the Brazil announced that it will increase the GHG emission reduction target for 2030 from 43% to 50% compared to 2005.<sup>1</sup>

***Sectoral targets and measures:*** No sectoral targets or measures to be implemented were provided in the updated NDC.

***MRV mechanism:*** No information on a national system to track implementation was provided in the updated NDC.

### Agriculture policy in the updated NDC

The updated NDC contained limited reference to national policies that would support NDC implementation. The NDC stated that the economy-wide absolute targets will be translated into policies and measures to be detailed and implemented by the Brazilian Federal Government. Reference to the National Policy on Climate Change (PNMC) (2009) was limited to the context of domestic institutional arrangements undertaken to prepare the NDC.

Under the section on fairness and ambition of Brazil's mitigation target, fairness considerations included mention of the Low Carbon Agriculture Plan (ABC Plan). According to the NDC, the ABC Plan has allocated over R\$ 17 billion (~USD 3 billion) to a wide range of mitigation measures in the agricultural and animal husbandry sector, "such as recovery of degraded pastures; biological nitrogen fixation; increased accumulation of organic

matter, and therefore carbon, in the soil; no-tillage system; crop-livestock-forestry integration and agroforestry systems; and forest planting." This statement constituted the only reference to SOC and related measures.

### ABC Plan (2010-2020)

The [ABC Plan](#) (Plano Agricultura de Baixo Carbono in Portuguese) was launched in 2012 for the period 2010-2020, coordinated by the Ministry of Agriculture, Livestock and Food Supply (MAPA). The ABC Plan was the main strategy for sustainable agriculture development in Brazil, aiming to reduce agricultural GHG emissions in the range of 134 to 163 Mt CO<sub>2</sub>eq relative to projected future levels by 2020. The Plan further sought to stimulate the adoption of sustainable agricultural practices that reduce GHG emissions and increase carbon sequestration in soil and biomass by offering farmers, through its financial branch (ABC Program), favourable lines of credit (4.5 – 8.5% annual interest rates from 2010-2020 disbursements and 5-15 years repayment period) as incentives.

***SOC-related mitigation measures, commitments, and mitigation potentials:*** Six agricultural measures were included, three of which were expected to support SOC sequestration (no-till, rehabilitation of degraded pastures, integrated crop-livestock-forest).<sup>2</sup> For each measure, the ABC Plan stated implementation commitments and associated projections of CO<sub>2</sub>eq emission reduction potentials by 2020 (Table 1).

***MRV mechanism:*** The ABC Plan did not include any formal monitoring tools.

***Next step:*** The implementation period for the ABC Plan ended during the same year that the updated NDC was submitted (2020). We evaluated the subsequent ABC+ Plan (Plan for Adaptation and Low Carbon Emissions in Agriculture) for SOC-related mitigation measures, commitments, and mitigation potentials, as well as MRV mechanisms that could be implemented during the updated NDC implementation period.

<sup>1</sup> Communication in Portuguese by Brazil's Ministry of Agriculture, Livestock and Food Supply (1/11/2021) available at: <https://www.gov.br/agricultura/pt-br/assuntos/noticias/agropecuaria-e->

[parte-da-solucao-para-mudancas-climaticas-diz-tereza-cristina-na-abertura-da-cop26](#)

<sup>2</sup> The other three measures were planting of commercial forest, biological nitrogen fixation, and animal waste treatment.

**Table 1.** SOC-related mitigation measures, commitments and potential for mitigation as specified in Brazil's ABC Plan and ABC+ Plan. Sources: (MAPA, 2021, 2012).

Mitigation measure	Commitment (increase in area)		Mitigation potential (Mt CO <sub>2</sub> eq)		MRV mechanism	
	ABC Plan	ABC+ Plan	ABC Plan	ABC+ Plan	ABC Plan	ABC+ Plan
No-till system	8 million ha	12.5 million ha	16-20 <sup>b</sup>	25-31.25	Not provided	Under development
Rehabilitating degraded pastures	15 million ha	30 million ha	83-104 <sup>c</sup>	166-208		
Integrated crop-livestock-forest (including agroforestry)	4 million ha	10 million ha <sup>a</sup>	18-22 <sup>d</sup>	45-55		

<sup>a</sup> Calculation base was 1.83 Mg of CO<sub>2</sub>eq ha<sup>-1</sup> year<sup>-1</sup>

<sup>b</sup> Through proper management and fertilization. Calculation basis was 3.79 Mg of CO<sub>2</sub>eq ha<sup>-1</sup> year<sup>-1</sup>

<sup>c</sup> Including agroforestry systems - calculation base was 3.79 Mg of CO<sub>2</sub>eq ha<sup>-1</sup> year<sup>-1</sup>

## ABC+ Plan (2020-2030)

The [ABC+ Plan](#) was announced on 20 April 2021 (4 months after submission of Brazil's updated NDC), providing the strategic vision for the 2020-2030 cycle (MAPA, 2021). According to the ABC+ Plan, an Action ABC+ Plan is yet to be launched to provide additional information on the necessary actions and measurable goals to be implemented. Communication from MAPA on 18 October 2021<sup>3</sup> indicated that the overall goal of the Plan is to reduce agricultural GHG emissions by 1.1 billion tons CO<sub>2</sub>eq. Since the Plan jointly promotes actions towards adaptation and mitigation of climate change in the rural sector, the ABC+ Plan will remain one of the most important national public policies in the fight against climate change.

### What we know so far:

**SOC-related mitigation measures, commitments, and mitigation potentials:** The ABC+ Plan will continue to promote the adoption of no-tillage, restoration of degraded pastures, and integrated systems (ICLF<sup>4</sup>, ICL, ILF and other agroforestry systems) (Table 1). On 1 November 2021 during COP26, Brazil announced its updated implementation targets per measure (Table 1). The GHG mitigation potentials per measure are yet to be communicated. In Table 1, we calculated the proportional mitigation potentials based on the estimates from the ABC Plan. Other science-based sustainable production systems proven to be effective in tackling climate change are being developed, considering specificities of soil, climate, water, and Brazilian ecosystems. It is not yet known whether these systems would support SOC sequestration.

**MRV Mechanism:** Monitoring and evaluation will be a priority. MRV mechanisms, aligned to internationally approved scientific criteria, will serve to establish economic incentives to reward sustainable production systems. An integrated data management system (ABC Plan Information System – SINABC) will systematize and consolidate actions and results throughout the Plan's

implementation. The SINABC will (amongst other functions) incorporate data from the multi-institutional platform for monitoring GHG reductions from agriculture (ABC Platform). In turn, information in the SINABC will be monitored and validated by the Technical Committee for Monitoring the ABC Plan (CTABC). The CTABC will define guidelines for monitoring results from the ABC+ implementation. It is envisaged that this new governance structure will enable proper evaluation of effectiveness and efficiency under Brazilian agriculture to cope with climate change with transparency, supported by a solid mechanism for evaluation, monitoring and reporting.

## Rwanda

### Rwanda's updated NDC mitigation targets & actions

[Rwanda's updated NDC](#) was submitted on 20 May 2020. The NDC update process was supported by the NDC Partnership and seven other development partners.

**National mitigation targets:** using 2015 as baseline were set as follows:

- Unconditional contribution: Reduce GHG emissions by 16% (~1.9 MtCO<sub>2</sub>eq) relative to business as usual (BAU) in 2030.
- Conditional contribution: Additional reduction of 22% (~2.7 MtCO<sub>2</sub>eq) relative to BAU in 2030 based on international support and funding.

**Sectoral targets and measures:** The NDC outlined sector-specific implementation plans for mitigation and adaptation measures, including for agriculture. The mitigation contribution from agriculture was estimated at a reduction of 2.24 MtCO<sub>2</sub>eq in 2030 based on nine unconditional action measures. Mitigation measures within the agriculture sector account for about 49% of the total NDC mitigation target. The NDC reinforces that the mitigation measures are in accordance with the SDGs and will bring direct adaptation benefits.

<sup>3</sup> Communication in Portuguese by Brazil's Ministry of Agriculture, Livestock and Food Supply (18/10/2021) available at: <https://www.gov.br/agricultura/pt-br/assuntos/noticias/com-tecnologias->

[de-producao-sustentavel-plano-abc-pretende-reduzir-emissao-de-carbono-em-mais-de-1-bilhao-de-toneladas](#)

<sup>4</sup> ICLF = integrated crop-livestock-forest; ICL = integrated crop-livestock; ILF = integrated crop-forest

### SOC-related mitigation measures, commitments, and mitigation potentials:

Four of the nine agricultural measures (crop rotation, terracing, multicropping, conservation tillage) were specified in the NDC to contribute to carbon sequestration in soils. A non-GHG outcome target, indicator, and associated mitigation potential was provided for each measure (see Table 2). These four measures account for about half of the agricultural sector's mitigation potential.

**MRV mechanism:** Rwanda's updated NDC put high emphasis on the importance of MRV to track NDC implementation of mitigation and adaptation actions. It emphasized the need for a domestic MRV system that can quantify GHG emissions and removals annually. The NDC further highlighted the new Paris Agreement requirement of an Enhanced Transparency Framework (ETF) to transparently report progress made towards Rwanda's NDC targets. Primary data to track NDC implementation is generally collected at the local (District) level.

Specific MRV system requirements envisaged to track NDC implementation of mitigation actions in Rwanda are:

- Monitoring the implementation of mitigation measures.
- Assessing whether the mitigation measures delivered the targeted impact on GHG emissions.
- Assessing whether the mitigation measures deliver the expected low emission development impact.

An MRV Framework with a series of MRV tables was provided as an NDC annex. These MRV tables will enable monitoring of GHG emissions and the effectiveness of mitigation measures within each sector. Monitoring of agricultural measures related to SOC will be tracked based on the indicators per measure indicated in Table 2. Information is being developed on baselines for NDC indicators to enhance MRV of mitigation and adaptation actions.

Rwanda's NDC presents detailed information on the institutional arrangements for tracking NDC implementation. The Ministry of Agriculture and Animal Resources (MINAGRI) is responsible for tracking and reporting agriculture related mitigation indicators. The primary lead agencies providing support are the Rwanda Agriculture Board (RAB) and National Agricultural Exports Board (NAEB).

**Table 2. Unconditional agricultural mitigation measures in Rwanda's updated NDC that contribute to carbon sequestration in soils. Compiled from [Rwanda's updated NDC](#).**

	Measure	Brief description	Indicator	Target (ha)	Mitigation effect	Mitigation potential in 2030	
						Calculated potential (Mt CO <sub>2</sub> eq) <sup>a</sup>	Contribution to agricultural mitigation
Soil and water conservation measures	Crop rotation	Continuous crop rotation	Crop rotation (ha)	600,000	Prevention of soil erosion, leading to reduced CH <sub>4</sub> and N <sub>2</sub> O emissions and <b>carbon sequestration in soils</b>	~0.55	24%
	Terracing	Land protection terracing structures in sloped arable areas	Terraced land (ha)	165,000		~0.45	20%
	Multicropping	Multicropping of coffee and bananas	Banana and coffee multi-crop production (ha)	40,000		~0.07	3%
Conservation tillage	Reduction in vertical movement of soil, leaving more crop residue on the soil surface, thereby reducing soil erosion	Conservation tillage (ha)	Not specified	~0.2		9%	

<sup>a</sup> These mitigation potential values were not provided in the NDC. The values were calculated based on the proportional contribution of each measure to the total agricultural mitigation target of 2.24 Mt CO<sub>2</sub>eq. The NDC did not provide information on the calculations used to determine the mitigation potentials per measure.

### NDC development support

Rwanda joined the NDC Partnership (NDC Partnership, 2021) in June 2018, which has enabled access to finance for readiness support to develop pipeline projects targeting public and private climate finance. Support packages under the partnership were designed as a "Deep Dive" and Climate Action Enhancement Package

(CAEP) which are currently implemented. These packages enabled the development of sectoral concept notes on mitigation and adaptation to develop national priority pipeline projects to accelerate Rwanda's climate action. Supported by the NDC Partnership and seven development partners, Rwanda's NDC implementation

efforts have emphasized the development of data needed to quantify and track emission reduction targets.

### Agriculture policy in the updated NDC

Rwanda's NDC states that it was based on and aligned with several existing national policies. The NDC was developed from the Green Growth and Climate Resilient Strategy (GGCRS) (2011), which has been integrated into District Development Plans, the National Strategy for Transformation (NST) (2018–2024) and associated sector strategic plans. The Sector Strategic Plans served as critical reference documents for sector consultations and included identifying and refining the analytical framework that captures climate adaptation and resilience.

Based on the NDC emphasis on Sector Strategic Plans, we selected the Strategic Plan for Agriculture Transformation (2018-2024) as relevant to the implementation of agricultural measures that support carbon sequestration in soils.

### Strategic Plan for Agriculture Transformation (2018-2024)

The [Strategic Plan for Agriculture Transformation](#) (MINAGRI, 2018) for the period 2018-2024 (PSTA4) is the agriculture plan under Rwanda's National Strategy for Transformation. The PSTA4 outlines priority investments in agriculture and estimated required resources for the agriculture sector. It is also the implementation plan for Rwanda's National Agricultural Policy.

The PSTA4 emphasized that Rwanda's main limiting production factor is land, with land degradation representing a major threat to agricultural production and performance. Challenges related to Rwanda's soils include nutrient losses through erosion, soil acidity, low organic matter, and emerging soil salinity problems in marshlands. The PSTA4 was reflected in Rwanda's Land Degradation Neutrality targets (set in 2018) which included maintaining and improving SOC at country level and increasing the area of land protected against soil erosion.

The PSTA4 was designed to achieve impacts in four strategic areas, of which the second impact area, Productivity and Resilience, is most relevant to SOC; impacts will be measured based on the indicator "Share of agriculture land under sustainable land management practices". The baseline value for this indicator was estimated at 56% in 2016/17, and the target for 2023/24 was set at 83%.

**SOC-related measures and commitments:** Of the four SOC-related mitigation measures included in the updated NDC (Table 2), only terracing is included in the PSTA4 with associated implementation commitments. Radical terracing is set to increase from 110,905 ha in 2017 to

142,500 ha in 2024, and progressive terraces from 923,604 ha to 1,007,624 ha for the same period.

The PSTA4 emphasised the need for alternative land management to complement terracing with comprehensive climate smart soil and integrated watershed management. In this context, the importance of climate smart agriculture practices to increase productivity, build resilience to climate variability and reduce GHG emissions was highlighted. Examples of climate smart agriculture listed included crop rotation and conservation agriculture (particularly reduced or zero tillage, maintaining crop residues and crop rotation). Widespread training of farmers in climate smart agriculture practices was envisaged to improve adoption rates. The PSTA4 did not include any mention of multicropping.

**Mitigation potentials:** The PSTA4 did not include information on GHG mitigation potentials.

**MRV mechanism:** The PSTA4 included a monitoring and evaluation (M&E) plan to assess progress towards achieving the set targets. Many of the output indicators are tracked through MINAGRI'S Management Information System (MIS) which is the main instrument for data management on sector performance. At the operational level, M&E includes outputs and indicators with targets, related activities and costs which are reported biannually.

Progress in the construction of terraces is monitored by RAB. The area (ha) of new terraces constructed is used as an indicator. This area of new terraces is tracked through regular field visits by agronomists who take GIS points of the entire area covered or to be covered by terraces.

## Conclusions and recommendations

### Example from Brazil

The updated NDC for Brazil referred to SOC-related agricultural actions only in relation to previous investment to implement its ABC Plan. The NDC did not indicate whether these SOC-related actions would be implemented as part of Brazil's updated NDC mitigation efforts. The ABC Plan (2010-2020) provided SOC-related mitigation actions, commitment targets, and mitigation potentials, but no MRV mechanism to track implementation. The ABC+ Plan for the period 2020-2030 was released after the submission of the updated NDC, with quantified actions and commitments communicated during the UNFCCC COP26. GHG mitigation potentials and an MRV mechanism for the ABC+ Plan are yet to be communicated.

In 2025, Brazil will be requested to communicate its new NDC with a time frame up to 2035. In its new NDC, Brazil

can provide information for clarity, transparency and understanding of SOC-related agricultural actions by referring to the ABC+ Plan, its mitigation actions, and associated targets. To maintain flexibility for meeting the updated or new NDC commitments, reference to the ABC+ Plan could be provided as additional NDC information for clarification purposes only.

### Example from Rwanda

With support from the NDC Partnership and seven development partners, Rwanda's NDC updating process emphasized the development of data needed to quantify and track emission reduction targets at the sector level. The updated NDC provided good information for CTU of four SOC-related agricultural measures, associated commitment targets, measurement indicators and mitigation potentials, as well as an overall MRV Framework. The Strategic Plan for Agriculture Transformation (2018-2024) (PSTA4), published two years prior to the updated NDC, is not aligned with the updated NDC. The PSTA4 included information and targets for only one of the four SOC-related agricultural NDC mitigation measures.

In 2025, Rwanda will be requested to communicate its new NDC with a time frame up to 2035. Based on the timeline of the PSTA4 and previous versions, we assume that the next Strategic Plan for Agriculture Transformation (probably PSTA5) will also be published in 2025. As part of its updated NDC implementation process, Rwanda can integrate and align the SOC-related agricultural mitigation measures and targets in its Strategic Plan for Agriculture to enhance NDC implementation support and tracking.

### General conclusions

While this analysis has only examined the case of two countries, the alignment of domestic policy and NDC commitments is a broader issue that will require attention for implementation of climate pledges. Countries with national agricultural policies providing quantified SOC-related mitigation actions and commitments can increase NDC transparency by referring to such policies and associated actions.

To maintain flexibility for meeting NDC commitments while enhancing information, NDCs could at a minimum refer to domestic policies for implementation without necessarily committing to mitigation or adaptation outcomes.

In addition, NDC development can be a driver for the development of national SOC-related projects, actions, commitments, mitigation potentials and MRV mechanisms. For developing countries, this process can be enhanced through NDC development support programs. In countries where the development of quantified SOC-related agricultural actions is driven by

the NDC development process, relevant agricultural policies need to be updated and aligned to support NDC implementation.

### Further reading

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*This series of briefs summarizes findings on livestock of an analysis of the nationally determined contributions to the Paris Agreement submitted between 2020-2021. This brief is one of a series on this analysis. The other Info Notes focus on the NDC's inclusion of soil organic carbon and rice. This work was conducted as part of the CCAFS Low-Emissions Development Flagship.*

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