

# UNFCCC CoP26: Key Outcomes for Soil Management



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**Abstract** Declining soil health does not often reach the frontpages of newspapers or dominate the news cycle. Yet the importance of soil health cannot be understated. The health of soil everywhere is threatened by climate change. Unsustainable soil policy and use can contribute to the advancing of climate change, whereas sustainable soil management can and should be part of the solution(s). Against this background, this brief paper aims to expand on the value of soil. After establishing this context for the purposes of the climate conversation, the paper expands on the international legal frameworks on soil and its place within the international climate change regime. From this, it discusses key advancements made at the UNFCCC CoP26 held in Glasgow, Scotland in 2021, with a particular focus on the Korovia Joint Work in Agriculture, the Global Methane Targets, and the Glasgow Declaration on Forests and land use. We conclude by looking forward to what might happen at the upcoming UNFCCC CoP27 in Sharm-el-Sheikh, Egypt in 2022.

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## 1 Introduction: The Value and Importance of Soil in the Climate Change Context

Land provides the basis for human livelihoods and well-being including food supply, freshwater and multiple other ecosystem services, as well as biodiversity. At the same time, human activity has already directly affected more than 70% of the global ice-free land surface. Further, land can be simultaneously a source and a sink of CO<sub>2</sub> due to both anthropogenic and natural drivers, making it difficult to separate anthropogenic from natural fluxes. Soils play an important part in this puzzle. The IPCC reports that activities related to ‘Agriculture, Forestry and Other Land Use (AFOLU)’ accounted for around 13% of CO<sub>2</sub>, 44% of methane (CH<sub>4</sub>), and 81% of nitrous oxide (N<sub>2</sub>O) emissions from human activities globally during 2007–2016, representing 23% of total net anthropogenic GHG emissions.<sup>1</sup> Agriculture is amongst the sectors already suffering from the heaviest negative impacts of climate change. Extreme weather events are having a profound effect on agricultural performance worldwide and will likely be both more frequent and more intense in the future. Not only does this influence levels of agricultural production, but it is also expected to alter the present conditions of agriculture in almost all countries worldwide, including risks for other important goals like food security.

At the same time, it is pointed out that the mitigation potential of agriculture is large, equivalent to around 6 billion tons of carbon dioxide per year. Around 90% of this potential lies in increasing carbon sinks, primarily through sequestering carbon in the soil, reducing emissions from inputs (e.g. fertilizers) and livestock management (e.g. manure management), etc. This can be promoted, among other means, through the implementation of practices such as agroforestry, improved grazing land management, crop rotations and fallows, residue management, reduced tillage and the restoration of degraded lands. In addition, considering that CDR technologies are still in their infancy, as mentioned above, so-called ‘nature-based solutions’ are gaining increasing recognition due to their huge potential and easier implementation.<sup>2</sup>

A growing number of States around the world are proposing policies that encourage the building of healthier agricultural soil. Although an expensive and costly investment, research indicates that this can benefit farmers and the environment. The improved health of soil will mean that it can retain water in a better manner.<sup>3</sup> Critically, healthy soil can also store more carbon; absorb water like a sponge before becoming saturated, making it more resilient in a dry year; and improve water quality by retaining more water, which reduces runoff from

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<sup>1</sup> IPCC (2019).

<sup>2</sup> de Andrade Correa and Voigt (2021).

<sup>3</sup> Friedrichsen et al. (2021), p. 3.

cropland.<sup>4</sup> Healthy soil goes further in meeting the needs of a growing population and food production.<sup>5</sup>

It is no wonder then that in recent years the attention of the global community has turned toward the question of sustainable soil management.

## ***1.1 The Importance of Soil as a Solution to Climate Change***

As already noted above, land and soil where managed and used unsustainably are key causes of climate change. However, as critical climate sinks, they can form a part of the solution to climate change.

Agriculture already suffers the heaviest negative impacts of climate change. Extreme weather events are having a profound effect on agricultural performance worldwide and will likely be both more frequent and more intense in the future. Not only does this influence levels of agricultural production, but it is also expected to alter the present conditions of agriculture in almost all countries worldwide, including risks for other important sustainable development goals including food security.<sup>6</sup>

At the same time, it is pointed out that the mitigation potential of agriculture is large, equivalent to around 6 billion tons of carbon dioxide per year.<sup>7</sup> With respect to the role of the land sector in reaching global net-zero CO<sub>2</sub> emissions, the IPCC notes that all modelled pathways that limit global warming to 1.5 °C or below 2 °C require land-based mitigation and land-use change, with most including different combinations of reforestation, afforestation, reduced deforestation, and bioenergy, but their scale depends on the pursued mitigation portfolio.<sup>8</sup> Pathways that limit global warming to 1.5 °C with project up to a 2.5 million km increase of non-pasture agricultural land for food and feed crops.<sup>9</sup>

In this context, it is useful to reflect on the fact that multiple technology solutions are still being researched. These include bioenergy, carbon capture and storage, and increased carbon sequestration in soils. While preliminary research reveals the enormous potential of these solutions, the market for these it yet to ripen. What may be useful in assessing market conditions and where to devote resources for the climate solution is that soils are the second largest carbon sinks in the world after the oceans.<sup>10</sup> It is no wonder then that international law and regulation has turned its attention to the sustainable use and management of soils, and soil conservation.<sup>11</sup>

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<sup>4</sup>*Id.*, 4.

<sup>5</sup>*Id.*, 6.

<sup>6</sup>FAO (2017a), p. 72.

<sup>7</sup>*Id.*, 78.

<sup>8</sup>IPCC (2019).

<sup>9</sup>FAO (2017b), p. 23.

<sup>10</sup>Geden and Schenuit (2020).

<sup>11</sup>Ruppel (2022).

## ***1.2 The International Law Association Guidelines on the Role of International Law in Natural Resources Management for Sustainable Development***

In Japan, the International Law Association adopted Guidelines on the Role of International Law in Natural Resources Management for Sustainable Development<sup>12</sup> and emphasized critically the importance of the sustainable management of soil. The accompanying report is especially important for the observations it makes about land use and soil.

In addition to the global relevance in relation to the sustainable management of the atmosphere and a stable climate system, and conservation of biodiversity, as well as any transboundary or regional relevance, land and soils within States still play a significant role in international environmental, societal, cultural and security concerns and are thus subject to international laws and policies as well as national laws and enforcement mechanisms.<sup>13</sup> Furthermore, the report notes that land and soil are increasingly viewed through an international human rights lens, which impacts on their sustainable management.<sup>14</sup>

The report also notes that nearly all States are required to create National Biodiversity Strategies and Action Plans (NBSAPs) for the sustainable use and conservation of biodiversity resources, which should include soil biodiversity. It prioritises that States should take action to restore, conserve and enhance terrestrial and coastal land and soils, including wetlands, peatlands and mangroves. These are especially important because these lands and soils function as greenhouse gas sinks and reservoirs.<sup>15</sup>

It further notes that States should additionally contribute to enhancing adaptive capacity, including in relation to agricultural lands and food security, and seek a high level of ambition in their NDCs under the Paris Agreement in order to minimize the risks and impact to land and soil resulting from the effects of climate change. States shall also combat desertification and mitigate the effects of drought in areas experiencing serious drought and/or desertification through effective National Action Plans as well as through international cooperation and partnerships, including long-term integrated strategies focusing on improved productivity of land, and the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions. States shall strive to achieve a land degradation neutral world through setting land degradation neutrality targets and collaboration. Further, States should designate wetlands of international

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<sup>12</sup> ILA (2020).

<sup>13</sup> *Id.*, 13.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

significance within their territories, adopting an ecosystem approach, and identify areas of relevance under the World Heritage Convention.<sup>16</sup>

The ILA Guidelines also recognise that States have a duty to prevent pollution of land and soils, including by chemical and other types of pollutants such as pesticides and fertilizers, or resulting from mining, and take appropriate measures to avoid the risks presented by such products or activities to human health and the environment, including through adequate legal and institutional measures at national level. It calls on them to implement regional conventions with provisions directed towards the sustainable management of soils, as well as sectorial treaties, dealing for example with water, air, protected areas and species, hazardous substances, pollution and waste, which implicitly have the objective of protecting land and soil.<sup>17</sup> This inclusion is important because it recognises implicitly the soil as part of what is regulated by States' obligations within international environmental law.<sup>18</sup>

The ILA further emphasises the importance of commitments that States have made already. It indicates that States should cooperate to implement the Revised World Soil Charter, as further elaborated in the Voluntary Guidelines for Sustainable Soil Management (VGSSM).<sup>19</sup> In particular, States should pursue the overarching goal to ensure that soils are managed sustainably and that degraded soils are rehabilitated or restored, and that actions at all levels are informed by the principles of sustainable land and soil management and contribute to the achievement of a land-degradation neutral world in the context of sustainable development. States should promote sustainable soil management and strive to create socio-economic and institutional conditions favourable to sustainable soil management by removal of obstacles, in particular those associated with land tenure, the rights of users, access to financial services and educational programmes, taking into account the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT).

The ILA calls on States to participate in the development of multi-level, interdisciplinary educational and capacity-building initiatives that promote the adoption of sustainable soil management by land users; support research programs that will provide sound scientific backing for development and implementation of sustainable soil management relevant to end-users; and incorporate the principles and practices of sustainable soil management into policy guidance and legislation at all levels of government.<sup>20</sup>

It further says that States should incorporate sustainable use and management of land and soil to promote food security and human nutrition as part of their agricultural, planning, and land management laws, policies and practices. States and non-state actors should promote responsible investments in land, agriculture and

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<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*

<sup>19</sup> *Id.*; also see, Blanco and Razzaque (2011), p. 72.

<sup>20</sup> ILA (2020), p. 15.

food systems, including through promoting the conservation and sustainable management of land and natural resources.<sup>21</sup>

## 2 Soils and the International Climate Change Regime

The purpose of this section is not to provide a holistic overview of international law related to soil management and protection. This includes regimes on many policy areas, such as the United Nations Convention to Combat Desertification (UNCCD), the Convention on Biological Diversity (CBD) as well as the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, which will be particularly relevant due to the emphasis on the climate aspects of soil management.

### 2.1 *The United Nations Framework Convention on Climate Change*

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) was adopted to regulate greenhouse gas concentration in the atmosphere, so as to, *inter alia*, avoid the occurrence of climate change on a level that would compromise initiatives in food production. Article 2 of the UNFCCC defines the object of the Parties as the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.<sup>22</sup> Agriculture, forestry and land use (AFOLU) have been key targeted areas of the climate change regime from the onset. Further, over time increasing attention has also been placed on regulation that aims to preserve and enhance emission sinks to remove carbon dioxide from the atmosphere.<sup>23</sup>

#### 2.1.1 The Kyoto Protocol

The Kyoto Protocol was adopted on 11 December 1997 and came into force on 16 February 2005. In short, the Kyoto Protocol operationalizes the UNFCCC by committing industrialized countries and economies in transition to limit and reduce greenhouse gases emissions in accordance with agreed individual targets. The Convention itself only asks those countries to adopt policies and measures on

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<sup>21</sup> *Id.*

<sup>22</sup> Article 2, United Nations Framework Convention on Climate Change.

<sup>23</sup> Feaver and Durrant (2008).

mitigation and to report periodically. The Kyoto Protocol is based on the principles and provisions of the Convention and follows its annex-based structure. It only binds developed countries and places a heavier burden on them under the principle of “common but differentiated responsibility and respective capabilities”, because it recognizes that they are largely responsible for the current high levels of GHG emissions in the atmosphere.

The Kyoto Protocol set quantitative targets for countries to reduce their emissions of greenhouse gases to the atmosphere, but it recognized that the same goal can be achieved by removing greenhouse gases from the atmosphere. There were opportunities to reduce the rate of build-up of atmospheric carbon dioxide (CO<sub>2</sub>) through land management activities, referred to as Land Use, Land-Use Change, and Forestry (LULUCF) activities. These opportunities include slowing the loss of carbon from plants and soils—e.g., through reduced rates of deforestation—and encouraging the return of carbon from the atmosphere to plants and soils—e.g., by planting trees (afforestation and reforestation) or improving management of forests or agricultural soils.<sup>24</sup>

The Kyoto Protocol provided opportunities for enhanced soil conservation activities. These opportunities would have realised the benefits of both carbon sequestration and soil conservation. Although in the past this would have implied simply mobilizing technologies for soil conservation, probably supported by public financing, the Kyoto Protocol identified carbon as a commodity that can be traded on the international market, and identified that sequestering carbon in the soil constitutes a global environmental benefit suitable for payment. This was a major shift in the focus of how soil could be conserved and managed in the fight against climate change and presented a new opportunity for promotion of soil conservation.

The list below is a summary of the most important articles within the Kyoto Protocol that related to soil conservation:

*Article 3.1: Emission Reduction:* Annex 1 (developed) countries agreed to reduce their overall emissions (assigned amounts) by at least 5% during the first commitment period, 2008–2012. This required monitoring and assessment of soil carbon (Article 5) and reporting (Article 3.7).

*Article 3.3: Forestry Sinks:* The net changes (difference between emissions at source and sequestration in sinks) in GHGs resulting from direct human induced land use change and forestry are limited to afforestation, reforestation, and deforestation since 1990, measured as changes in carbon stocks. Forestry accounting is on a ‘gross-net accounting’ basis, i.e., the net change in carbon stocks over the commitment period for activities begun after 1990.

*Article 3.4: Agriculture and Forestry Sinks:* The net changes (difference between emissions at source and sequestration in sinks) in GHGs resulting from direct human induced land use change and forestry, including cropland management,

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<sup>24</sup> Schlamadinger and Marland (2000).

grazing land management, re-vegetation, and forest management. Reporting on agricultural activities is based on ‘net-net accounting’, i.e., additions from sources and removals by sinks from all management practices on all areas registered for reporting. Most soil conservation activities would be reported under Articles 3.3 (forestry) and 3.4 (agriculture).

*Article 3.7: Reporting:* The countries shall report the change in carbon stocks (carbon dioxide equivalents) over the first reporting period (2008–2012) compared to the base year 1990. Based on these GHG inventories, it will be determined whether emissions have been reduced according to the amounts assigned to each country.

*Article 6: Joint Implementation (Carbon Trading):* Any Annex 1 party may acquire or transfer to another party ‘Emission Reduction Units (ERU)’ resulting from projects aimed at reducing anthropogenic emissions in any sector of the economy, providing that these are additional to any that would occur otherwise. This implies trading of carbon credits between and within developed countries.

*Article 12: Clean Development Mechanism:* A Clean Development Mechanism (CDM) shall be developed to assist Annex 1 countries to achieve compliance with their quantified reduction commitments, and to assist Annex 2 countries in contributing to the objectives of the Convention. This requires development of ‘Certified Emission Credits (CER)’, which are measurable and verified by an independent environmental audit team, and which are long term (relatively permanent) and additional to any that would have occurred in the absence of the certified project. Sinks in the CDM were initially limited to afforestation and reforestation projects for the first commitment period, but increased far more to include agricultural sinks.<sup>25</sup> This implies trading of carbon credits between developed and developing countries.

## 2.1.2 The Paris Agreement

The Paris Agreement is an international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century. The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.

In its Preamble, the Paris Agreement includes the explicit acknowledgement “that climate change is a common concern of humankind” and that “Parties should, when taking action to address climate change, respect, promote and consider their

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<sup>25</sup> Cabello (2011).

respective obligations on human rights”.<sup>26</sup> As such the agreement binds its parties regarding activities on their respective territories and under their control.

The Paris Agreement supplements the UNFCCC and the Kyoto Protocol by incorporating existing elements of this regime. Both the UNFCCC and Kyoto Protocol adopted rules on reporting and accounting for emissions from land use, land use change and forestry (LULUCF). These rules determine how parties have to report LULUCF in their regular emission inventories, which under the Kyoto Protocol is also relevant for accounting whether parties meet their emission reduction targets.<sup>27</sup>

Through the sustainable development mechanism in Article 6, the Paris Agreement allows the space to harness the lowest cost mitigation options worldwide. This may incentivise policymakers to enhance mitigation ambition by speeding up climate action. This implies that global climate policy development and the future of the carbon market also relate to mechanisms which support and encourage sustainable climate policies in host countries as production-based accounting does not necessarily reflect a country’s contribution to global emissions because globalisation and consumption can prompt emissions beyond borders.<sup>28</sup>

In addition, the parties to the Paris Agreement explicitly recognise—

[...] the fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impacts of climate change;

while Article 2(1)(b) of the Paris Agreement provides for—

[i]ncreasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production [...].

The Paris Agreement further requires parties to engage in adaptation planning and implementation that takes into account “vulnerable people, places and ecosystems”<sup>29</sup> and builds “the resilience of socio-economic and ecological systems, including through economic diversification and sustainable management of natural resources”.<sup>30</sup>

Soil as well as land use and sustainable land management are closely linked to climate change in terms of carbon capture and storage and the emissions from deforestation and agriculture. This is underlined by Article 4 of the Paris Agreement, which explicitly includes the target “to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century”. Although the Paris Agreement fails to explicitly mention ‘soil’, ‘land’ or ‘agriculture’, it does so indirectly. Article 5(1) of the Paris Agreement

<sup>26</sup>Preamble, Paris Agreement (2016).

<sup>27</sup>Bodle et al. (2016).

<sup>28</sup>Tanzler et al. (2011).

<sup>29</sup>Paris Agreement, Article 9(c).

<sup>30</sup>Paris Agreement, Article 9(e).

obliges parties to take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4(1)(d) of the Convention.

In 2018, the Paris Agreement adopted a transparency framework which, inter alia, included rules for reporting on and accounting for land use and land-use change, which is expected to eventually replace the existing UNFCCC framework. This may open opportunities also to shape new rules complementing the UNFCCC's Koronivia joint work on agriculture (KJWA).

## ***2.2 The Koronivia Joint Work on Agriculture***

Agriculture first appeared in the ongoing climate negotiations under the Koronivia Joint Work on Agriculture (KJWA) at CoP23 in 2017:<sup>31</sup>

The decision officially acknowledges the significance of the agriculture sectors in adapting to and mitigating climate change. Countries agreed to work together to make sure that agricultural development ensures both increased food security in the face of climate change and a reduction in emissions. The joint work is expected to address six topics related to soils, nutrient use, water, livestock, methods for assessing adaptation, and the socio-economic and food security dimensions of climate change across the agricultural sectors.

To achieve the aforementioned, countries should take all appropriate measures according to their capabilities to progressively achieve the protection of the interests of all concerned. And when speaking of 'all concerned' in the context of global food security, this phrase is by no means an exaggeration. Much of the work to translate the Paris Agreement and the NDCs into concrete climate interventions in agriculture is in progress.

Food systems are responsible for 21–37% of global greenhouse gas emissions and a major driver of deforestation and land degradation, yet there is still widespread food insecurity and malnutrition. Managing the land sector (agriculture, forestry, wetlands bioenergy) sustainably and holistically could contribute up to 30% of the global climate mitigation effort.

As can be seen, the KJWA is a landmark Decision recognizing the unique potential of agriculture in tackling climate change. The KJWA was established at the 23rd COP in Fiji in 2017 as a new process to advance discussions on agriculture in the United Nations Framework Convention on Climate Change (UNFCCC).

Under the leadership of the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA) and Subsidiary Body for Implementation (SBI), and in conjunction with ten Constituted Bodies of the Convention, countries agreed to work together to make sure that agricultural development ensures both increased food security in the face of climate change and a reduction in emissions. The joint work is addressing six topics related to soils, nutrient use, water, livestock, methods for assessing adaptation, and the socio-economic and food security dimensions of climate change across the agricultural sectors.

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<sup>31</sup> FAO (2021).

The implementation and success of the KJWA depends on combined efforts from Subsidiary Bodies, Constituted Bodies as well as operating entities of the Financial Mechanism under the UNFCCC, Parties and observers, and other relevant stakeholders. Such a setup brings with it many opportunities, as it strengthens science-policy-practice linkages, with the potential to catalyze concrete action when it comes to addressing approaches to food security, the vulnerability of agriculture to climate change, and how to mitigate agriculture's contribution to climate change.

As the Decision<sup>32</sup> elaborates, States were especially invited to consider and share their views on:

- a) Modalities for implementation of the outcomes of the five in-session workshops on issues related to agriculture and other future topics that may arise from this work;
- b) Methods and approaches for assessing adaptation, adaptation co-benefits and resilience;
- c) Improved soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management;
- d) Improved nutrient use and manure management towards sustainable and resilient agricultural systems;
- e) Improved livestock management systems;
- f) Socioeconomic and food security dimensions of climate change in the agricultural sector.

The above focus indicates the KJWA's prominence in providing a platform for discussions on soil use and management. The SBSTA and the SBI initiated their joint consideration of the KJWA at their 48th sessions in Bonn, Germany. Based on Parties' and observers' views, a roadmap to guide the KJWA was adopted, with the KJWA due to report back to the plenary at CoP26.

### **3 UNFCCC CoP26: Specific Results for Soils**

#### ***3.1 Developments Under the Koronivia Joint Work on Agriculture***

At CoP26 in 2021, Governments recognized that soil and nutrient management practices and the optimal use of nutrients lie at the core of climate-resilient, sustainable food production systems and can contribute to global food security. It was also recognized that while livestock management systems are vulnerable to climate change, improving sustainable production and animal health can contribute to reducing greenhouse gas emissions while enhancing sinks on pasture and grazing lands.<sup>33</sup>

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<sup>32</sup>Koronivia Joint Work on Agriculture, Decision 4/CP.23, Report of the UNFCCC Conference of the Parties on its twenty-third session, held in Bonn from 6 to 18 November 2017, FCCC/CP/2017/11/Add.1, 8 February.

<sup>33</sup>Loeb (2021).

Governments agreed on the need to continue working on Agriculture under the UNFCCC process with a view to adopting a decision at CoP27 in 2022. They recognized that the KJWA has an impact on financing entities and can help to better align international organizations and processes in their work on agriculture and climate change. Furthermore, there was acknowledgement of how the working mode of the KJWA promotes inclusivity through knowledge sharing between decisions makers, farmers, indigenous peoples, women and youth.<sup>34</sup>

At CoP26, Governments found significant agreement on the last three topics of the initial KJWA roadmap, which complement the conclusions already adopted on the previous three CoP Conferences. The conclusions relative to each of the topics are the result of a process combining views from Parties and observers submitted to the UNFCCC, KJWA workshops, and the corresponding UNFCCC Secretariat workshop reports. Key conclusions include:<sup>35</sup>

***TOPIC 2(a) Modalities for implementation of the outcomes of the five in-session workshops on issues related to agriculture and other future topics that may arise from this work***<sup>36</sup>

The SBI and the SBSTA welcomed the report on the first Koronivia road map in-session workshop, on topic 2(a) (modalities for implementation of the outcomes of the five in-session workshops on issues related to agriculture and other future topics that may arise from this work), which was held in conjunction with SB 49. The SBSTA and the SBI considered the workshop report and agreed to:

- a) Recognize that information provided during the workshop and in the workshop report and other information provide a mapping of activities and mandates of constituted bodies;
- b) Encourage the continued involvement of constituted bodies and financing entities in the KJWA, highlighting the potential of creating interlinkages that lead to enhanced action and improvements in implementation;
- c) Recognize that some modalities for implementation already exist and invite Parties to scale up implementation;
- d) Recognize the importance of the continued involvement of scientific and technical knowledge in transforming the agriculture sector, enabling conditions, the crucial role of farmers, youth, local communities and Indigenous Peoples, including gender considerations, and of meeting the needs of farmers and the food systems;
- e) Welcome the presentation made by the Green Climate Fund (GCF) on its work on issues relating to agriculture, and welcome the subsequent clarification from the secretariat on the process for Parties to submit their views to the Standing Committee on Finance, in line with existing procedures, on elements to be taken into account in developing guidance to the operating entities of the Financial Mechanism.

***TOPIC 2(b) Methods and approaches for assessing adaptation, adaptation co-benefits and resilience***<sup>37</sup>

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<sup>34</sup> UNFCCC (2021).

<sup>35</sup> *Id.*

<sup>36</sup> FCCC/SB/2019/L.2.

<sup>37</sup> FCCC/SB/2019/L.5.

Having considered the workshop report on topic 2(b), the SBSTA and the SBI recognized that various tools are available for assessing and monitoring adaptation and its co-benefits, but existing tools could benefit from further adjustment and new tools could be developed for country-specific circumstances, while taking into consideration the importance of sharing best practices among countries and other stakeholders and the important role of science, technology and capacity-building in facilitating data collection and adaptation assessment.

***TOPIC 2(c) Improved soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management*<sup>38</sup>**

Having considered the workshop report on topic 2(c), the SBSTA and the SBI also recognized that issues relating to soil carbon, soil health and soil fertility as well as sustainable soil and integrated water management are context-specific and, taking into account countries' circumstances, should be dealt with in a holistic and inclusive manner to realize the full potential of increased productivity in contributing to food security, adaptation and adaptation co-benefits as well as enhancing carbon sinks.

***TOPIC 2(d) Improved nutrient use and manure management towards sustainable and resilient agricultural Systems*<sup>39</sup>**

Having considered the report on the workshop on topic 2(d), the SBSTA and the SBI recognized that soil and nutrient management practices and the optimal use of nutrients, including organic fertilizer and enhanced manure management, lie at the core of climate-resilient, sustainable food production systems and can contribute to global food security.

***TOPIC 2(e) Improved livestock management systems, including agropastoral production systems and other systems*<sup>40</sup>**

Having considered the report on the workshop on topic 2(e) of the Koronivia road map, the SBSTA and the SBI also recognized that livestock management systems are very vulnerable to the impacts of climate change, and that sustainably managed livestock systems have high adaptive capacity and resilience to climate change while playing broad roles in safeguarding food and nutrition security, livelihoods, sustainability, nutrient cycling and carbon management. They noted that improving sustainable production and animal health, aiming to reduce greenhouse gas emissions in the livestock sector while enhancing sinks on pasture and grazing lands, can contribute to achieving long-term climate objectives, taking into account different systems and national circumstances.

***TOPIC 2(f) Socioeconomic and food security dimensions of climate change in the agricultural sector*<sup>41</sup>**

Having considered the report on the workshop on topic 2(f) of the Koronivia road map, the SBSTA and the SBI recognized that socioeconomic and food security dimensions are critical when dealing with climate change in agriculture and food systems. They also recognized the fundamental priority of safeguarding food security and ending hunger by designing sustainable and climate-resilient agricultural systems applying a systemic approach in line with the long-term global climate objectives, further recognizing the importance of long-term investments in agriculture focused on this objective.

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<sup>38</sup> FCCC/SB/2019/L.5.

<sup>39</sup> FCCC/SB/2021/L.1.

<sup>40</sup> FCCC/SB/2021/L.1.

<sup>41</sup> FCCC/SB/2021/L.1.

### 3.2 *Global Methane Pledge*

At CoP26, for the first time in history, the CoP decision included an invitation for Parties to “consider further actions to reduce by 2030” other greenhouse gases, including methane. Further, the EU and the US launched the Global Methane Pledge—a collective goal of reducing man-made methane emissions by at least 30% from 2020 levels by 2030.<sup>42</sup> Although the 30% target is insufficient to limit global warming to 1.5 °C, according to the IPCC a 40–45% by 2030 is required, increasing the chances of keeping the 1.5 °C target within reach. Countries joining GMP also commit to improving inventory methodologies to quantify methane emissions, particularly from high emission sources. It is a significant development given the uncertainty of current methane emissions estimates.<sup>43</sup>

This is of interest for soil management and use especially as recent studies have revealed that the amount of methane absorbed by soils has reduced by 77% over the past 30 years.<sup>44</sup> Given that soils also produce methane, the GMP provides an opportunity for greater partnerships and investment into soil research moving forward.

### 3.3 *Glasgow Leaders’ Declaration on Forests and Land Use*

Launched on 2 November, 134 countries covering 91% of the world’s forests (including Brazil, China, Russia and Indonesia) have now endorsed the Glasgow Leaders’ Declaration on Forests and Land Use, committing to halt and reverse forest loss and land degradation by 2030. The full package of commitments and action includes a range of fresh partnerships and new commitments.

The Policy Action Agenda for the Transition to Sustainable Agriculture sets out pathways and actions that countries can take to repurpose public policies and support to food and agriculture, to deliver these outcomes and enable a just rural transition.<sup>45</sup> It also sets out actions and opportunities for other stakeholders (international organisations, food producers, financial entities, researchers, civil society and others) to channel their expertise, knowledge and resources in support of this agenda. Leaders were also able to secure funding of £38.5m over 2 years to the CGIAR, the world’s leading agricultural science and innovation organisation, which will create and scale new crops and technologies yielding climate, nature, health, gender and economic impact. Funding will support the development and deployment of

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<sup>42</sup>Olczak and Pieblags (2021).

<sup>43</sup>Mountford et al. (2021).

<sup>44</sup>Ni and Groffman (2018).

<sup>45</sup>UNFCCC (2021).

- crop varieties that are climate-resilient (more resistant to heat, drought and flooding) and more nutritious (with elevated levels of essential micronutrients).
- agricultural practices that are more productive, sustainable and climate-resilient;
- new livestock varieties, diagnostics and management practices, which reduce the risks faced by pastoralists and livestock keepers.
- foresight and trade off tools for risk management of, and resilience to, major threats emerging from the food system, including anti-microbial resistance and emerging zoonotic diseases.
- evidence on better policies to help poor farmers use new technology to access markets, reduce risks and increase incomes.<sup>46</sup>

Finally, as a final component of the Glasgow Leaders Declaration, it also led to the launch of the Gilbert Initiative, which will coordinate investments in evidence generation, technology development and delivery to support a food system that by 2030 feeds 9 billion people with nutritious, safe foods; uses environmental resources sustainably; enhances resilience and adaptation to climate change; and generates inclusive growth and jobs.<sup>47</sup>

Taken together, this funding and these partnerships are especially critical for the way that research and policies for soil are mobilised moving forward.

## 4 Concluding Remarks

Given its relevance, soils could still receive further attention in the climate agenda and outcomes of international processes. At the same time, the efforts outlined above already provide a solid basis for soils to be better protected through the recognition of their role as carbon sinks, in addition to all the other environmental services they provide, through different mechanisms under the climate regime. There is enough reason to look with hope toward UNFCCC CoP27 in Sharm-el-Sheikh, especially with agreement still needed on three topics as part of the Koronivia Joint Work on Agriculture.

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<sup>46</sup> *Id.*

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