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**Soil Security Concerns in the Era of Climate Change:** An Assessment of African Union's Legal Framework for Sustainable Soil Management and Implications for Combating Climate Change in Africa

by Author

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## **Soil Security Concerns in the Era of Climate Change: An Assessment of African Union's Legal Framework for Sustainable Soil Management and Implications for Combating Climate Change in Africa**

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### **ABSTRACT**

This paper makes a reflection on the nexus between soil and climate change, with a focus on how the latter has triggered a renewed concern about soil not only as a source of carbon emission, but more importantly, as a natural solution for combating climate change. The paper employs the content analysis and doctrinal methods to investigate the level of attention given to soil security and sustainable soil management (SSM) by relevant African Union (AU) legal instruments and the consequential climate change ramifications. The investigation and analysis reveal that the AU's legal landscape for SSM and soil security is inadequate and in consequence, limits Member countries from leveraging on soil as a natural and cost-effective solution to combat climate change. Based on the insufficiencies, the paper makes some recommendations, the key one being the need for the AU to give soil a special legal attention by way of a specific and comprehensive African soil charter that does not only promote SSM, but also underscores the centrality of soil as a natural and cost-effective climate change solution.

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## Introduction

Environmental problems notably, deforestation and forest degradation, pollution, biodiversity loss and climate change, have converged as planetary crises and constituting serious threats to the survival of the planet Earth and human beings. The United Nations Conference on the Human Environment held in Stockholm in 1972 (hereinafter the Stockholm Conference) that laid the foundation of modern International Environmental Law (IEL) had long predicted that the health of the planet is at the mercy of such converging crises provoked by human development. The Stockholm Declaration<sup>1</sup> that ensued from the Stockholm Conference vividly and succinctly captured the innumerable and unprecedented impacts of human evolution on the planet in paragraph 1. In effect, advancement in science and technology<sup>2</sup> has enabled the human race to considerably transform the natural environment thereby threatening our ecological capital notably, water, soil, air, the climate system, forests and their attendant biodiversity, which constitute the very foundation and life supporting wires of human survival.

Among the numerous environmental problems that have today converged as planetary crises, climate change has emerged as Africa's most critical with associated socio-economic and environmental impacts.<sup>3</sup> Many institutions<sup>4</sup> and scholars<sup>5</sup> have acknowledged that whilst the African continent at present contributes less than 4 percent of global greenhouse gas (GHG) emissions, its vulnerability makes it to bear the brunt of the impacts of climate change. In their Declaration on Climate Change and Development in Africa adopted in 2007, Member States of the Africa Union (AU) acknowledged Africa's vulnerability to climate change, expressing concerns about the danger that it presents for ecosystems, the wellbeing of the population and

the socio-economic progress of the continent. The Intergovernmental Panel on Climate Change (IPCC),<sup>6</sup> the AU in the African Union Climate Change and Resilient Development Strategy and Action Plan (2022-2032)<sup>7</sup> and some scholars<sup>8</sup> have expressed the same concerns about the danger of climate change in arid and semi-arid areas of sub-Saharan Africa, where the majority of the populations depend on rain-fed agriculture. The vulnerability of the African continent in the face of climate change is due to low adaptive capacity owing to lack of appropriate technology and finance; high levels of dependence on natural resources and climate sensitive activities such as agriculture; bad governance; etc.<sup>9</sup>

<sup>1</sup> Declaration of the United Nations Conference on the Human Environment, Stockholm, 16 June 1972, UN Doc. A/Conf.48/14/Rev.1.

<sup>2</sup> Bharat H Desai and others, "Sustainable Cities in India: A Governance Challenge" in Harald Ginzky and others (eds), *International Yearbook of Soil Law and Policy* 2018 (Springer 2019) 33.

<sup>3</sup> UNEP, "Bio-carbon Opportunities in Eastern & Southern Africa: Harnessing Carbon Finance to Promote Sustainable Forestry, Agro-Forestry and Bio-Energy" (UNEP 2009) 1.

<sup>4</sup> See Agenda 2063: The Africa We Want, adopted in September 2015 <<https://au.int/en/agenda2063/overview>>; Martin L Parry and others (eds), IPCC, 'Climate Change 2007: Impacts, Adaptation and Vulnerability' Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change' (Cambridge University Press 2007) 12, 13; UNFCCC Secretariat, *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries* (The Information Services of the UNFCCC secretariat 2007) 52; African Mayors Climate Change Declaration (Congress COCS2011 27 February - 3 March 2011, Cape Town); African Union Climate Change and Resilient Development Strategy and Action Plan (2022-2032), 3. <[https://au.int/sites/default/files/documents/42276-doc-CC\\_Strategy\\_and\\_Action\\_Plan\\_2022-2032\\_23\\_06\\_22\\_ENGLISH-compressed.pdf](https://au.int/sites/default/files/documents/42276-doc-CC_Strategy_and_Action_Plan_2022-2032_23_06_22_ENGLISH-compressed.pdf)>.

<sup>5</sup> See Rose Mwebaza, 'Climate Change and the International Human Rights Framework in Africa' in Rose Mwebaza and Louis J. Kotzé (eds), 'Environmental Governance and Climate Change in Africa: Legal Perspectives' (Institute for Security Studies 2009) 244; UNFCCC Secretariat (n ) 18; Jo-Ansie van Wyk, 'The African Union's Response to Climate Change and Climate Security' in Donald A Mwiturubani and Jo-Ansie van Wyk (eds), 'Climate Change and Natural Resources Conflicts in Africa' (Nairobi, Institute for Security Studies (ISS) 2010) 3, 6, 7; Gideon Fosoh Ngwome, 'The Contribution of Forest to Climate Change Mitigation under the REDD+ Initiative in Cameroon: The Search for an Appropriate Legal Framework' (Ph.D Thesis, University of Yaounde II 2018) 7, 8.

<sup>6</sup> Parry and others (n ) 12, 13.

<sup>7</sup> African Union Climate Change and Resilient Development Strategy and Action Plan (2022-2032) (n ) 10.

<sup>8</sup> See Donald A Mwiturubani, "Climate Change and Informal Institutions in the Lake Victoria Basin" in Rose Mwebaza and Louis J. Kotzé (eds), *Environmental Governance and Climate Change in Africa: Legal Perspectives* (Institute for Security Studies 2009) 49; Phillipa Niland and others, "Towards Sustainable Development: An African Perspective on Reforming the Clean Development Mechanism" in Rose Mwebaza and Louis J. Kotzé (eds), "Environmental Governance and Climate Change in Africa: Legal Perspectives" (Institute for Security Studies 2009) 145.

<sup>9</sup> *ibid.* See also African Union Climate Change and Resilient Development Strategy and Action Plan (2022-2032) (n ) 12 and 35.

Auspiciously, the natural resources with which the African continent is endowed present opportunities for addressing the climate crisis. As Rozanov<sup>10</sup> rightly pointed out, protecting, conserving and restoring nature and ecosystems acting as sinks and reservoirs of GHGs is crucial for achieving the Paris Agreement<sup>11</sup> goal of limiting the rise in global temperature to less than 2°C and to undertake further measures to contain the rise to less than 1.5°C.<sup>12</sup> Indeed, some natural resources notably: forests, soil, water bodies, etc., act as the ‘Trojan Horses’ of environmental problems such as climate change. In Greek mythology, the Trojan Horse was a hollow wooden statue of a horse in which the Greeks were said to have hidden themselves inside, entered Troy and defeated their enemy – the Trojans. Thus, just like the Trojan Horse used by the Greeks as a weapon to defeat their enemies, soil, when sustainably managed, is a crucial natural weapon for effectively combating climate change that has become the greatest enemy of mankind in the 21st century.

A question that begs for an answer at this juncture is: what is “soil” and what are its importance? Tamasang<sup>13</sup> posits that soil has many meanings but in its traditional meaning, soil is the natural medium for the growth of plants, habitat for animals and a base for human activities. According to FAO, soil in its traditional meaning is the natural medium for the growth of plants, a natural body consisting of layers (soil horizons) that are composed of weathered mineral materials, organic material, air and water, the end product of the combined influence of climate, topography, organisms (flora, fauna and human) on parent materials (original rocks and minerals) over time, an essential component of “Land” and “Eco-systems”.<sup>14</sup>

Regarding its importance, soil is a crucial versatile natural resource that delivers valuable services notably, the provision of food and ensuring food security, combating climate, safeguarding ecosystems and their attendant biodiversity, amongst others.<sup>15</sup> Soil is an essential basis for the development and survival of human beings and other terrestrial forms of life as it provides the ecological services on which they depend.<sup>16</sup> Indeed, soil is a natural resource that has critical roles in “supporting the life and survivability of our planet”, to borrow Fiantis and others’<sup>17</sup> words. Thus, as a versatile natural resource, soil provides crucial multiple ecological services such as nutrients for plant growth, animal habitation, agricultural production, biodiversity conservation, filters and cleans water and above all, is fundamental for regulating the climate system as one of the major carbon sinks and reservoirs.<sup>18</sup> In fact, the importance of soil has been articulated upon by some scholars notably, Wyatt, who describes it as “the living skin of the Earth” and a “foundation for all terrestrial life”.<sup>19</sup> In the same spirit, Tamasang qualifies soil as “the melting pot for all environmental resources”.<sup>20</sup> Tita underscores the importance of soil by noting that “human life depends on how seriously the soil is protected since it is the backbone of agriculture”.<sup>21</sup> The United Nations Convention to Combat Deserti-

<sup>10</sup> Liesl Wiese-Rozanov, “Soil Organic Carbon Commitments under Three Rio Conventions: Opportunities for Integration” (2022) 6 Soil Security 100052 1.

<sup>11</sup> Paris Agreement, Paris, 12 December 2015, in Report of the Conference of the Parties on its Twenty-First Session, UN Doc FCCC/CP/2015/10/Add.1.

<sup>12</sup> *ibid*, art 2.

<sup>13</sup> Christopher Funwie Tamasang, “The Protection of Soil under Cameroonian Law: The Place of Investors” in: Harald Ginzky and others, *International Yearbook of Soil Law and Policy* 2020/2021, vol. 2020 (Springer 2022) 146 <[https://doi.org/10.1007/978-3-030-96347-7\\_7](https://doi.org/10.1007/978-3-030-96347-7_7)>.

<sup>14</sup> FAO, “Key Definitions”, FAO Soils Portal <<https://www.fao.org/soils-portal/about/all-definitions/en/>>.

<sup>15</sup> Oliver C Ruppel, “Overview of International Soil Law” (2022) 6 Soil Security 100056 1. See also Harald Ginzky and Oliver C. Ruppel, “Soil Protection Law in Africa: Insights and Recommendations Based on Country Studies from Cameroon, Kenya and Zambia” (2022) 6 Soil Security 100032 1.

<sup>16</sup> Ian Hannam, “Soil Governance and Land Degradation Neutrality” (2022) 6 Soil Security 100030 1.

<sup>17</sup> Dian Fiantis and others, “The Increasing Role of Indonesian Women in Soil Science: Current & Future Challenges” (2022) 6 Soil Security 100050 1.

<sup>18</sup> Deyi Hou and others, “Sustainable Soil Use and Management: An Interdisciplinary and Systematic Approach” (2020) 729 *Science of the Total Environment* 1 <<https://doi.org/10.1016/j.scitotenv.2020.138961>>; Wartini Ng and others, “Mid-infrared Spectroscopy for Accurate Measurement of an Extensive Set of Soil Properties for Assessing Soil Functions” (2022) 6 Soil Security 100043 1.

<sup>19</sup> Alexandra M. Wyatt, “The Dirt on International Environmental Law Regarding Soils: Is the Existing Regime Adequate?” (2008) 19 *Duke Environmental Law & Policy Forum* 165.

<sup>20</sup> Christopher Funwie Tamasang, “Land Tenure Legislation and Soil Security Concerns in Cameroon” (2022) 6 Soil Security 100031 1 and 2 <<https://doi.org/10.1016/j.soisec.2021.100031>>.

fication (UNCCD), 1994<sup>22</sup> describes soil as the “foundation for all land-based natural and agricultural ecosystems, which provide a major part of the world’s food supply, natural resources and biodiversity”.<sup>23</sup> To crown it all, the 32nd President of the United States, Franklin Delano Roosevelt had once asserted that “the nation that destroys its soil destroys itself”.<sup>24</sup> These assertions all seek to underline and demonstrate the importance of soil for man and the environment. Indeed, soil is the melting pot not only for all forms of terrestrial life and natural resources,<sup>2025</sup> but also for human activities. Indeed, soil is a crucial life supporting natural resource, the bedrock on which essentially, all terrestrial life start and depend for food and nutrients, habitat and shelter and a stable climate system. As a resource that hosts other natural resources and as a natural asset for agricultural production, soil is the backbone of the economy of almost all African countries.

Meanwhile, soil security has come under the spotlight of international debates in recent times. Soil security refers to the maintenance and improvement of soil resources within the broader context of pursuing the sustainable development goals (SDGs).<sup>26</sup> The debates around soil security focus principally on: the threats posed to soil and its attendant biodiversity; the environmental and socio-economic impacts of soil degradation; the opportunities that sustainably managed and healthy soils present for general socio-economic and environmental good, and particularly for combating climate

change. In effect, soil security relates to soil quality, soil health and soil protection.<sup>27</sup>

The problem this paper sets out to address is that despite the multifunctional role of soil especially its climate change mitigation and adaptation functions, this important resource is yet to receive an adequate legal attention from the AU. The level of attention given to soil security in AU’s legal formulations is inadequate. Many reasons account for this state of affairs. The one is that there is no specific African soil charter that showcases soil as an important multifunctional resource that provides pressing socio-economic and environmental goods and services. The second reason is that even when existing environmental, natural resources and sustainable development policy instruments address the need to protect and sustainably manage soils, such instruments are of soft law character with no binding effects. A third reason is that the relevant hard law instruments that support sustainable soil management (SSM) are insufficient for want of enforcement mechanisms that can ensure compliance by AU Member States. A further reason is that there seems to be little or no quantitative and qualitative scientific data and information on soils in Africa especially on their multifunctional role and threats. Scientific data that speaks of the importance of soil and threats to soil is very critical in informing policy-making and constitutes the basis for SSM. Sadly, such scientific data is not only limited in Africa, but is not publicly available especially to those whose activities contribute to soil degradation. Although soil is the backbone of the economy of almost all African countries, Africa’s soils are being degraded due to increased pressure from unsustainable agricultural practices to meet the increasing demand for food, natural resources exploitation, industrial development, environmental problems such as climate change just to name a few. Despite these challenges, major AU policy and legal instruments that promote SSM are not only inadequate to effectively guarantee soil security, but have failed to capture the centrality of soil in combating climate change. Consequently, soil security and the climate change mitigation and adaptation potentials of soil are

<sup>21</sup> Joseph Atanga Tita, “Social and Environmental issues in Cameroonian Banana Production” (Master of Science Dissertation, Chalmers University of Technology 2006) 24.

<sup>22</sup> UN Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, Paris, 14 October 1994, 1954 UNTS 3 [hereafter Desertification Convention].

<sup>23</sup> UNCCD, “Pivotal Soil Carbon” (2015) Science-Policy Brief 01, 1 <[https://www.unccd.int/sites/default/files/documents/2015\\_PolicyBrief\\_SPI\\_ENG\\_0.pdf](https://www.unccd.int/sites/default/files/documents/2015_PolicyBrief_SPI_ENG_0.pdf)>.

<sup>24</sup> Jeremy Stroud and Michael DeSa, “Soil Erosion and Degradation: Opportunity Amidst the Loss” (Bonniefield 23 April 2019) <<https://bonniefield.com/2019/04/23/soil-erosion-and-degradation-opportunity-amidst-the-loss/>>.

<sup>25</sup> Tamasang (n) 2.

<sup>26</sup> Kurniatun Hairiah, “Hundred Fifty Years of Soil Security Research in Indonesia: Shifting Topics, Modes of Research and Gender Balance” (2022) 6 Soil Security 100049 1.

<sup>27</sup> *ibid.*



yet to be fully identified statistically, valorised, harnessed and tapped in Africa.

This paper therefore aims to examine the potentials that soils and their sustainable management have for combating climate change; the climate change implications of unsustainable soil management; the impacts of climate change on soils; the reasons that account for the insufficient or inadequate AU's legal framework for soil security; and the consequence of the AU's inadequate legal framework for soil security for combat climate change in Africa. The paper makes use of the content analysis and doctrinal methods. Thus, a content analysis of primary sources notably, relevant AU's legal and policy instruments, is made in order to demonstrate the level of attention given to the issue of soil security and SSM and their climate change ramifications. A doctrinal review of secondary sources is also carried out in order to showcase the nexus between soil and climate change and what soil security implies for the fight against climate change in Africa.

## The Nexus Between Soil and Climate Change

Soil and climate change are intrinsically linked.<sup>28</sup> The symbiosis or nexus between soil and climate change has instigated much scholarly debates aimed at demonstrating the interplay between them and the contours of their interconnectedness are increasingly becoming clearer. The nexus between soil and climate change can be understood from three dimensions viz: the role soil plays in combating climate change; the contribution of soil to the emission of carbon dioxide, one of the GHGs that cause climate change; and the impacts of climate change on soil.

<sup>28</sup> Ralph Bodle and others on behalf of the German Environment Agency, "Improving International Soil Governance – Analysis and Recommendations" Environmental Research of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Final Report, 75 (Umweltbundesamt 2020) <[https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/texte\\_75-2020\\_3716\\_71\\_2100\\_uba\\_endbericht\\_internationaler\\_bodenschutz.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/texte_75-2020_3716_71_2100_uba_endbericht_internationaler_bodenschutz.pdf)>.

## The Role of Soil in Combating Climate Change

Soil contributes to the fight against climate change both in terms of mitigation and adaptation. In terms of mitigation, soil is one of the largest global carbon sink and reservoir<sup>29</sup> and its sustainable management is crucial for mitigating climate change through its carbon capture and storage functions. As a natural carbon sink and reservoir, soil is capable of reducing the concentration of CO<sub>2</sub> in the atmosphere.<sup>30</sup> It has been argued that soil is the largest terrestrial carbon reservoir.<sup>31</sup> Zomer and others estimated that the global soil carbon pool of one-meter depth is estimated at 2500 Petagrams of carbon (PgC), of which about 1500 PgC is soil organic carbon, about 3.2 times the size of the atmospheric pool and 4 times that of the biotic pool.<sup>32</sup> According to a policy brief of the UNCCD,<sup>33</sup> the organic carbon content of the first metre of the top soil layer is more than double the amount in the atmosphere, and about three times the amount that is stored in the world's vegetation. It is therefore possible to reduce atmospheric levels of carbon through SSM.<sup>34</sup> SSM practices such as zero tillage, mulching, water harvesting, green manuring, etc., enhance soil organic carbon content.<sup>35</sup> Thus, enhancing the carbon storage function of soil through SSM practices is crucial for mitigating climate change.<sup>36</sup> Given that Africa has one of largest land surface, its soil provides an opportunity on

<sup>29</sup> Jannis Heil and others, "Evaluation of Using Digital Photography as a Cost-Effective Tool for the Rapid Assessment of Soil Organic Carbon at a Regional Scale" (2022) 6 Soil Security 100023 1.

<sup>30</sup> Robert J Zomer and others, "Global Sequestration Potential of Increased Organic Carbon in Cropland Soils" (2017), Scientific Report 1 <<https://www.nature.com/articles/s41598-017-15794-8.pdf>>.

<sup>31</sup> Yungun Zheng and others, "Carbon Availability Mediates the Effect of Nitrogen on CO<sub>2</sub> Release from Soils" (2022) 6 Soil Security 100041 1.

<sup>32</sup> Zomer and others (n ) 1.

<sup>33</sup> UNCCD (n ) 1.

<sup>34</sup> Eric C Brevik, "Soils and Climate Change: Gas Fluxes and Soil Processes" (2012) Soil Horizons, Soil Science Society of America 2 <<https://acsess.onlinelibrary.wiley.com/doi/pdfdirect/10.2136/sh12-04-0012?download=true>>.

<sup>35</sup> UNCCD (n ) 1.

<sup>36</sup> Heil (n ) 1.

which the continent can leverage to mitigate climate change.

In terms of adaptation, soil plays a crucial role in contributing to ecological and communities' resilience to the impacts of climate change. Given that Africa is the most vulnerable continent to the impacts of climate, SSM in Africa will enhance the resilience of ecosystems and communities to climate change in regions where climatic conditions such as rising temperatures are harsh. High soil carbon content that is built over time from organic matter increases the water holding capacity of soil which increases resilience to climate change.<sup>37</sup> Healthy soils can therefore bring about climate benefits apart from other socio-economic and environmental benefits.

## The Contribution of Soil to Climate Change

Although soil helps to fight against climate change when sustainably managed, it is also a potentially significant source of carbon emissions when unsustainably managed. Burning and ploughing or tilling the soil for agricultural production and burning for grazing are examples of unsustainable soil management practices that increase soil-based carbon emissions.<sup>38</sup> Zomer and others have highlighted the danger of intensively cultivated areas in Africa with respect to its associated carbon emissions.<sup>39</sup> Thus, while soil has the ability to sequester and store carbon and enhance resilience to climate change, unsustainable soil management practices can also contribute to the release of carbon from soil, making it a net source of carbon.

<sup>37</sup> UNCCD (n) 4.

<sup>38</sup> Brevik (n) 2.

<sup>39</sup> Zomer and others (n) 1.

## The Impacts of Climate Change on Soil

Although soil helps to combat climate change, soil functions are being substantially affected by climate change. Global climate change is projected to have different effects on soil processes and properties.<sup>40</sup> Varying climatic conditions influence soil health in varying ways. For instance, increased frequencies of high intensity of rainfall especially in the equatorial zone of the southern part of Africa where rainfall is high throughout the year alter soil moisture or increase soil erosion rates, increasing soil leaching.<sup>41</sup> This increases the acidic contents of soil and reduces its productive value. Also, the high intensity of rainfall on exposed soil loosens the soil particles, giving rise to erosion as huge quantities of top soil are washed away every year.<sup>42</sup> In the Sahelian zone or semi-arid region of North Africa where temperatures are high with longer drier season, the frequent occurrence of droughts has caused soil moisture to reduce, affecting the soil quality of the zone.<sup>43</sup> The constant Harmattan winds in this zone equally contribute significantly to the rapid removal of the top soil. Since soil is intricately linked to the atmospheric climate system through the carbon, nitrogen, and hydrologic cycles, altered climate has effects on soil processes and properties.<sup>44</sup>

<sup>40</sup> Navneet Pareek, "Climate Change Impact on Soils: Adaptation and Mitigation" (2017) 2(3) *MOJ Ecology & Environmental Science* 136.

<sup>41</sup> Ahmad Hamidov and others, "Impact of Climate Change Adaptation Options on Soil Functions: A Review of European Case-Studies" (2018) 29 *Land Degradation Development* 2378, 2379.

<sup>42</sup> *ibid.*

<sup>43</sup> *ibid.*

<sup>44</sup> Brevik (n) 2.

## Key Concepts Underpinning Sustainable Soil Management and Soil Security and their Relevance in Combating Climate Change

One key concept that underpins SSM and soil security and therefore, augurs well for combating climate change is Improved and Sustainable Soil Management (ISSM). This concept is a clarion call on everyone to ensure that their activities do not cause harm to soil, but improve soil quality. The development and implementation of this concept in Africa will enhance soil quality and in consequence, will also enhance the role of the soil in fighting climate change. Another key concept that underlies SSM and soil security and promises good for combating climate change is the “Land Degradation Neutrality” (LDN)<sup>45</sup> concept that has as objective, to maintain and enhance the natural land and its associated ecosystem services. Actions to achieve the LDN include sustainable land management practices that mitigate soil degradation, and all efforts to reverse degradation through rehabilitation or restoration of degraded lands. In effect, land degradation also implies soil degradation in the sense of SDG 15.3 as intelligently noted by Bodle<sup>46</sup> in an attempt to demonstrate the relevance of the LDN target of the SDGs for the international protection of soil. The implementation of the LDN concept therefore requires efforts to avoid further net loss of land-based natural capitals<sup>47</sup>

<sup>45</sup> UN Convention to Combat Desertification Decision 3/COP.12, Integration of the Sustainable Development Goals and targets into the implementation of the United Nations Convention to Combat Desertification and the Intergovernmental Working Group report on land degradation neutrality, UN Doc ICCD/COP(12)/20/Add.1 (2015), para 2 defines Land Degradation Neutrality (LDN) as: “a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems”.

<sup>46</sup> Ralph Bodle, “International Soil Governance” (2022) 6 Soil Security 100037 2.

<sup>47</sup> Barron J Orr and others, “Scientific Conceptual Framework for Land Degradation Neutrality” (2017) A Report of the Science-Policy Interface, UNCCD, Bonn 3.

such as soil. According to Cowie and others,<sup>48</sup> the LDN initiative largely seeks to protect soil as the principal component of land. When soil is protected and sustainably managed, it lends support to the fight against climate change through its mitigation function as a carbon sink and reservoir and through its adaptation function by enhancing resilience to climate change. The effective implementation of these concepts within the context of SSM will enhance the achievement of soil security in Africa and in consequence, lends greater support to the fight against climate change in the continent.

## Some Global Political, Policy and Legal Developments on Soil Security

Since the 1972 Stockholm Conference, modern IEL has grown exponentially to address the ever increasing environmental issues and African countries have participated in the making of such modern IEL through the negotiation, adoption and ratification of both “hard law” and “soft law” instruments covering a wide range of environmental issues such as soil security. Although the Stockholm Declaration laid the foundation for the subsequent development of IEL on some of the environmental problems that have today converged as planetary crises, it did not formally pay specific attention to soil security and climate change. A possible explanation is that soil security and climate change were not major concerns at the time as they are now. After Stockholm, the importance of soil has made it to attract some political, policy and legal attentions at various global levels.

Politically, the importance of soil security has been recognised during the celebration of World Soil Days. For instance, the importance of soil security was reflected by the theme of the 2015 World Soil Day which read: “Soils a Solid Ground for Life”.<sup>49</sup> In the same spirit, the 2019 World

<sup>48</sup> Annette L. Cowie and others, “Land in Balance: The Scientific Conceptual Framework for Land Degradation Neutrality” (2017) 79 Environmental Science & Policy 25.



Soil Day was commemorated under the theme: "Stop Soil Erosion, Save our Future"<sup>50</sup>, that of 2020 was celebrated under the theme: "Keep soil alive, protect soil biodiversity"<sup>51</sup> and that of 2021 was celebrated under the theme: "Halt soil salinization, enhance soil production".<sup>52</sup> Finally, the theme of the 2022 World Soil Day was: "Soils: where food begins".<sup>53</sup> These carefully chosen themes mirror the centrality of healthy soil for ecosystems, biodiversity conservation, food security, human well-being, and to raise awareness concerning the importance of maintaining healthy soils and addressing the growing challenge of soil degradation.

From the policy angle, soil was given some level of attention in the Rio +20 Declaration, the "Future We Want - Outcome document".<sup>54</sup> Paragraph 205 underscores the socio-economic and environmental significance of soil in the context of good land management, particularly its contribution to agricultural productivity and food security, biodiversity and addressing climate change. The UN General Assembly further noted the importance of improving soil quality among other things in paragraph 207. Paragraphs 208, 209, 213-223, 224 and 228 are also relevant to SSM and soil security.

International policy development on soil received further impetus with the adoption in 1981 of the World Soil Charter and the World Soils Policy by the United Nations Environment Programme in coordination with FAO. Both instruments contain non-binding guidelines and principles relating to soil conservation that were intended to assist states in formulating do-

mestic soil policies.<sup>55</sup> The World Soil Charter was revised and unanimously endorsed in 2015 by the member states of the FAO. The revised guidelines seek to ensure that "soils are managed sustainably and that degraded soils are rehabilitated or restored"<sup>56</sup>

The LDN initiative whose objective is to maintain and enhance natural lands and their associated ecosystem services is another international instrument that supports soil security from the policy and political angle. The UNCCD provides the international policy and political framework for planning and implementing the LDN initiative that mostly seeks to protect land-based resources such as soil.<sup>57</sup> The implementation of the LDN requires efforts to avoid further net loss of land-based natural resources<sup>58</sup> such as soil. Sustainable land management practices that prevent or mitigate degradation and all efforts to reverse degradation through restoration or rehabilitation of degraded lands are actions to achieve LDN and consequently, soil security on the ground.

The 2015 Global 2030 Agenda for Sustainable Development also provides policy guidelines for soil security. Goal 15 which sets out to protect, restore and promote sustainable use of terrestrial ecosystems, combat desertification, and halt and reverse land degradation and biodiversity loss, supports soil security. Target 15.3 which urges States to strive to achieve a land degradation neutral world by 2030 constitutes the most significant target for soil security. In effect, in demonstrating the relevance of the LDN target of the SDGs for the international protection of soil, Bodle<sup>59</sup> noted that land degradation is always also soil degradation in the sense of SDG 15.3. Other SDGs also support soil security. Goal 12 which sets out to ensure sustainable production and consumption patterns especially as such production relates to land, supports soil security as soil is the physical component of land on which such productive activities take place. In line with Goal 13 which

<sup>49</sup> FAO "Global Soil Partnership" (5 December 2015) <<https://www.fao.org/global-soil-partnership/resources/events/detail/en/c/345502/>>.

<sup>50</sup> IISD, "World Soil Day 2019" <<https://sdg.iisd.org/events/world-soil-day-2019/>>.

<sup>51</sup> Hindustan Times, "World Soil Day 2020: Theme, significance and history" <<https://www.hindustantimes.com/india-news/world-soil-day-2020-theme-significance-and-history/story-Jny184ZBa1mCvdFwfimOWO.html>>.

<sup>52</sup> NDTV, "World Soil Day 2021: Know The Date, Significance And History" <<https://www.ndtv.com/india-news/world-soil-day-2021-date-significance-and-history-2637780>>.

<sup>53</sup> FAO, "World Soil Day, 5 December 2022" <<https://www.fao.org/world-soil-day/en/>>.

<sup>54</sup> UN General Assembly Resolution 66/288, The Future we Want, UN Doc A/RES/66/288 (2012).

<sup>55</sup> Ruppel (n) 1.

<sup>56</sup> See Section 3 of the Revised World Soil Charter.

<sup>57</sup> Cowie and others (n) 25.

<sup>58</sup> Orr and others (n) 3.

<sup>59</sup> Bodle (n) 2.

entreats everyone to take urgent action to combat climate change and its impacts, soil is one of the important natural solutions for combating climate change both in terms of mitigation and adaptation. The nexus between the SDGs and soil security has been demonstrated by Helming and others<sup>60</sup> who argue that soil is fundamental for achieving at least four of the SDGs notably: SDG2, SDG7, SDG13 and SDG15. Some of the SDGs therefore provide a global political framework and policy guidance for achieving soil security which is crucial for combating climate change. The 2015 Global 2030 Agenda for Sustainable Development has therefore placed a mammoth responsibility on soil to provide food, protect the environment especially in term of biodiversity conservation and combating climate change.

Other global policy instruments relevant to SSM and soil security include, but not limited to the Rio Declaration on Environment and Development, 1992;<sup>61</sup> Agenda 21, 1992;<sup>62</sup> and the Johannesburg Declaration on Sustainable Development, 2002.<sup>63</sup>

The UNCCD is one of the global instruments of hard law character that supports soil security albeit indirectly. Although the text of the Convention does not make any direct reference to soil, land degradation as used in the Convention<sup>64</sup> may be interpreted to include soil degradation which by the way constitutes the physical component of land. The Convention limits its scope of application to addressing land degradation and by implication, soil degradation in arid, semi-arid and dry sub-humid areas particularly in Africa.<sup>65</sup> This underscores the specificity of

Africa in the global policy efforts to protect land and achieve soil security.

Other global instruments of hard character relevant to SSM and soil security include, but not limited to the Convention on Biodiversity Diversity, 1992;<sup>66</sup> UN Framework Convention on Climate Change, 1992;<sup>67</sup> Paris Agreement, 2015;<sup>68</sup> Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals & Pesticides in international Trade, 1998 amended in 2004, 2008, 2011, 2013 and 2015;<sup>69</sup> Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal, 1989;<sup>70</sup> Stockholm Convention on Persistent Organic Pollutants, 2001;<sup>71</sup> Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, 1972;<sup>72</sup> Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, Geneva, 1992; Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, New York, 1976;<sup>73</sup> Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971;<sup>74</sup> Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979;<sup>75</sup> Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal, 2000;<sup>76</sup> Protocol concerning Co-operation in Combating Pollution in Cases of Emergency, 1981;<sup>77</sup> and International Plant Protection Convention, Rome, 1951.<sup>78</sup> The issue of

<sup>60</sup> Katharina Helming and others, "Assessment and Governance of Sustainable Soil Management" (2018) 10 Sustainability 1. See also Spyros Schismenos and others, 'Soil Governance in Greece: A Snapshot' (2022) 6 Soil Security 100035 4.

<sup>61</sup> Rio Declaration on Environment and Development, 14 June 1992, UN Doc A/CONF.151/26/Rev. 1 (Vol. I), Annex II (1992), principles 3, 4, 10, 14, 15, 17, 20, 22 and 23.

<sup>62</sup> Agenda 21, Report of the UN Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, UN Doc A/CONF.151/26, Chapter 10; Chapter 18 paragraph 65; paragraph 76(b)(ii), (d)(iv), (e)(i)(v); paragraph 85(a).

<sup>63</sup> Johannesburg Declaration on Sustainable Development, 4 September 2002, UN Doc A/CONF.199/20, paras 3 and 41.

<sup>64</sup> See Article 1 and 2 in this respect.

<sup>65</sup> Article 1 of the Desertification Convention (n).

<sup>66</sup> *ibid*, generally Articles 1-18, but more importantly, Articles 1 and 8(a), (b), (d), (f), (e).

<sup>67</sup> *ibid*, Articles 3(3), 4(1)(d), 4(2)(a).

<sup>68</sup> *ibid*, Article 5(1).

<sup>69</sup> *ibid*, Articles 1, 2, 5, and 6.

<sup>70</sup> *ibid*, Articles 1 to 10.

<sup>71</sup> *ibid*, Articles 1, 3, 5, 6, 7, 9, 10, 11, 15 and 16.

<sup>72</sup> *ibid*, Articles I - V.

<sup>73</sup> *ibid*, Articles I, II and IV.

<sup>74</sup> *ibid*, Article 2.

<sup>75</sup> *ibid*, Articles III(4)(a) & (c) and V(5) e, f, & g.

<sup>76</sup> *ibid*, Articles 1, 2(2) & (4), 4, 15, 16, 17, 18, 20, 22 and 23.

<sup>77</sup> *ibid*, Articles 9 and 10.

<sup>78</sup> *ibid*, Articles I(1), IV, V, VI(I), VII and VIII.

soil security and the importance of this life supporting resource have indeed received enormous global political, policy and legal attention.

## **African Union's Legal Framework for SSM and Soil Security and Implications for Combating Climate Change**

The analysis under this head seeks to determine whether the AU has in place a legal framework that supports SSM and soil security and therefore, aids in the fight against climate change in Africa. The AU's legal landscape for SSM and soil security can conveniently be catalogued into instruments of "soft law" (non-binding) and "hard law" (binding) character.

A major AU instrument that supports SSM and soil security is the Regional Implementation Plan for the African Soil Partnership (AfSP) that was adopted in 2016. This Plan is grounded on the concept of ISSM and makes a clarion call on everyone to ensure that their activities do not cause harm to soil, but improve soil quality. The plan recognises the importance of soil as the main resource base for many people in Sub-Saharan Africa (SSA) and calls for the strong support of national governments as well as national and regional entities involved in natural resource management to contribute to achieving the common goal of ISSM. The importance of SSM and soil security is therefore underscored by this Plan. The implementation of the Plan in SSA is structured on five main pillars which all support SSM and promote soil security and therefore, augur well for combating climate change. Pillar 1 for instance, focuses on the promotion of sustainable management of soil resources for soil protection which is crucial for soil security. No less can be said of Pillar 2 that encourages technical cooperation, policy development, education, and awareness programmes on soil; Pillar 3 that promotes soil

related research; Pillar 4 that encourages the enhancement of quantitative and qualitative soil data and information through data collection, analysis, validation, reporting, monitoring and integration with other disciplines; and Pillar 5 that supports the achievement of soil security by promoting the harmonisation of methods, measurements and indicators for the sustainable management and protection of soil resources.

The Plan also recognises six priority areas of action in SSA which also support SSM and soil security and in consequence, usher well for the fight against climate change. The first focuses on addressing soil degradation. The second focuses on the implementation of sound and SSM practices and the restoration of soil health.<sup>79</sup> The third focuses on developing, updating and disseminating updated and harmonised national and regional soil information addressing all user needs including soil fertility information and making the best use of science available to increase soil productivity. The fourth focuses on addressing climate change and developing resilience towards climate change adaptation. This priority area of action is the most relevant in the context of this discussion as it expressly identifies the role that sustainably managed soil can play in combating climate change especially in terms of adaptation. The fifth focuses on developing and implementing training and capacity building programmes for existing and new generations of experts in soil science and land management. The sixth focuses on establishing linkages and networks with other national, regional and global initiatives that impact soil health.

The above five pillars of the Regional Implementation Plan for the AfSP and its six priority areas of action all support SSM and soil security and therefore work favourably for the fight against climate change both in terms of mitigation and adaptation. Despite the strength of this Plan in promoting SSM and soil security in Africa, its effectiveness in doing so depends on an effective compliance and enforcement mech-

<sup>79</sup> Soil health refers to "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans." See Patricia L Farnese, "Soil Governance in a Pandemic" (2022) 6 Soil Security 100033 1; Coyne MS and others, "Soil Health - It's Not All Biology" (2022) 6 Soil Security 100051.

anism which unfortunately, is absent. Furthermore, although the Plan largely supports SSM and soil security, another regret is that it is only a soft law instrument having no legal binding effect that can coerce effective compliance. Consequently, it may not adequately enhance SSM actions and soil security. This does not promise well for the fight against climate change. However, the Plan, like other soft law instruments can have a persuasive effect and inspires the enactment of hard law instruments on SSM and soil security in Africa.

The African Union Vision 2063<sup>80</sup> also known as Agenda 2063: the “Africa We Want” adopted in 2015, is another policy instrument that supports SSM and soil security and therefore, augurs well for the fight against climate change. The Agenda is Africa’s master plan for transforming the continent into a global powerhouse of the future, within a 50 years period, from 2013 to 2063.<sup>81</sup> Although none of the seven Aspirations of the Agenda specifically addresses the need to sustainably manage soil as the major natural asset in Africa, soil security concerns can be inferred from Aspiration 1, Paragraph 10 which seeks to valorise and protect Africa’s natural endowments, its environment and ecosystems, including its wild lands and make them climate resilient. Soil is one of Africa’s natural endowments and the continent’s ecosystems and wild lands all embody soil in which case valorising and protecting them usher well for soil security. Again, soil security concerns can be inferred from Aspiration 7, Paragraph 72 (b) which calls for the need to fast-track effective territorial planning and land use and management systems actions. These can be achieved through SSM which augurs well for climate change mitigation and adaptation. Agenda 2063 therefore provides an indirect policy framework for promoting SSM and soil security that works favourably for climate change mitigation and adaptation in Africa.

Notwithstanding the inference of SSM and soil security concerns from some of the Aspirations of Agenda 2063, its failure to specifically mention soil and the need to sustainably manage

and protect same is surprising. This is so especially considering that soil is Africa’s most important natural endowment and capital that will help drive the transformation of the continent into the desired global powerhouse of the future. As the major natural asset in Africa, soil is the springboard for the majority of investments that will spur growth and transform Africa into such a global powerhouse. The failure of the Vision to specifically mention soil and the need to sustainably manage and protect it does not speak well for soil security and certainly does not usher well for combating climate change in Africa. Moreover, the Vision is a soft law instrument with no binding force that can coerce compliance. There is also no enforcement mechanism that can strengthen compliance. Consequently, it may not effectively promote soil security in Africa. This does not work favourably for the fight against climate change. However, the Vision, like other soft law instruments can have a persuasive effect and can inspire the enactment of hard law instruments on SSM and soil security in Africa.

The Great Green Wall for the Sahara and the Sahel Initiative (GGWSSI), 2007<sup>82</sup> is another AU’s policy instrument that underpins SSM and soil security and lends support to the fight against climate change in Africa. The GGWSSI is a programme that seeks to restore Africa’s degraded landscapes and transform millions of lives in the Sahel region.<sup>83</sup> Among the targets of the GGWSSI, those that support SSM and soil security and lend help to the fight against climate change are:<sup>84</sup> the rehabilitation or restoration of 100 million hectares of degraded land by 2030, the sequestration of 250 million tons of carbon in the soil, and the enhancement of climate resilience in Africa especially in regions where temperatures are fast rising. This important initiative therefore aims to tackle persisting land degradation (soil inclusive) in arid countries that are facing water and food insecurity owing to limited productive soil which is being exacerbated by converging planetary crises

<sup>80</sup> AU, “Agenda 2063: The Africa We Want”, adopted in September 2015 <<https://au.int/en/agenda2063/overview>>.

<sup>81</sup> *ibid.*

<sup>82</sup> See “Commission of the African Union, The Green Wall for the Sahara Initiative” <<https://www.fao.org/3/be992e/be992e.pdf>>.

<sup>83</sup> UNCCD, “Great Green Wall Initiative” <<https://www.unccd.int/actions/great-green-wall-initiative>>.

<sup>84</sup> *ibid.*

such as climate change, drought and desertification.

The African Union Green Recovery Action Plan 2021-2027<sup>85</sup> that aims to guide the continent's sustainable recovery from Covid-19 within a five-year period also fails to specifically mention soil and the need to sustainably manage same. Such a failure is also surprising if one considers that resilient agriculture is one of the five priority areas and soil being the foundation of such resilient agriculture, ought to be given some special consideration. The absence of any reference to soil does not speak well for soil security and consequently, does not augur well for fighting climate change in Africa.

The African Union Climate Change and Resilient Development Strategy and Action Plan (2022-2032)<sup>86</sup> contains anchor points for SSM and soil security. The document recognises land degradation as a major constraint to raising Africa's agricultural productivity, owing partly to poor soils.<sup>87</sup> The document recognises soil as one of the land-based atmospheric carbon removal, carbon sinks, increasing peoples' resilience to climate shocks and therefore needs protection and proper management not only for the purpose of combating climate change mitigation, but also for food security, protection of biodiversity and controlling soil erosion.<sup>88</sup> These policy guidelines are pointers to AU's intention to prioritise SSM and soil security for food security, biodiversity conservation and more importantly, for combating climate change.

Although the above AU policy documents support SSM and respond to soil security concerns, they are only instruments of soft law character, having no binding effects that can guarantee effective compliance. This lends little support to the fight against climate change. One can only hope that such non-legally binding policy docu-

ments would have persuasive authority or bring political pressure to bear on AU Member States to take appropriate domestic legal measures and implement plans and programmes to achieve their objectives especially as regard SSM. Moreover, how effective the implementation of the policy documents is, depends largely on the financial strength of each member country to support implementation action. In addition to the soft law instruments, some AU hard law instruments contain anchor points for SSM and soil security that promise good for combating climate change.

A major hard law instrument that contains anchor points for SSM and soil security in Africa is the African Convention on the Conservation of Nature and Natural Resources, 1968<sup>89</sup> and the subsequent instrument<sup>90</sup> revising same. They contain both direct and indirect anchor points for SSM and soil security which are relevant for combating climate change. Regarding the direct provisions, Article IV of the 1968 Convention entitled "soil" commits contracting States to take effective measures to conserve and improve soil and in particular, combat erosion and misuse of the soil when implementing agricultural practices and agrarian reforms. This article is clear evidence that the 1968 Convention has expressly taken on board the need to sustainably manage soil for which one has reason to commend the intentions of the legislative organ of the AU to promote the achievement of soil security.

The 2003 revision has retaken the above provision and, has even broadened the scope of soil protection in order to make SSM and soil security emphatic and to establish a better legal regime for SSM and soil security in Africa.<sup>91</sup> This is the purport of Article VI entitled "land and soil" which obliges Parties to implement effective measures to prevent the degradation of land, including soil. The Parties are required in particular, to adopt measures for the conservation and improvement of soil, combat its erosion and misuse as well as the deterioration of its phys-

<sup>85</sup> AU, "African Union Green Recovery Action Plan 2021-2027" <[https://au.int/sites/default/files/documents/40790-doc-AU\\_Green\\_Recovery\\_Action\\_Plan\\_ENGLISH1.pdf](https://au.int/sites/default/files/documents/40790-doc-AU_Green_Recovery_Action_Plan_ENGLISH1.pdf)>

<sup>86</sup> AU, "The African Union Climate Change and Resilient Development Strategy and Action Plan (2022-2032)" <[https://au.int/sites/default/files/documents/42276-doc-CC\\_Strategy\\_and\\_Action\\_Plan\\_2022-2032\\_23\\_06\\_22\\_ENGLISH-compressed.pdf](https://au.int/sites/default/files/documents/42276-doc-CC_Strategy_and_Action_Plan_2022-2032_23_06_22_ENGLISH-compressed.pdf)>.

<sup>87</sup> *ibid* 12.

<sup>88</sup> *ibid* 20, 41, 43, 50, 82, 84 and 87.

<sup>89</sup> African Convention on the Conservation of Nature and Natural Resource, Algiers, 15 September 1968.

<sup>90</sup> African Convention on the Conservation of Nature and Natural Resources, Maputo, 11 July 2003.

<sup>91</sup> *Ibid* art 6.



ical, chemical and biological or economic properties. They are also required to, when implementing agricultural practices and agrarian reforms, improve soil conservation and introduce sustainable farming and forestry practices, which ensure long-term productivity of the land, control erosion caused by land misuse and mismanagement which may lead to long-term loss of surface soils and vegetation cover, and to control pollution caused by agricultural activities. The Article further commits Parties to ensure that non-agricultural forms of land-use, including but not limited to public works, mining and the disposal of wastes, do not result in erosion, pollution, or any other form of land degradation. They are also required to plan and implement mitigation and rehabilitation measures in areas affected by land degradation. Above all, Parties are required to plan and implement land tenure policies that can facilitate the above mentioned measures.

From the above provisions, there is also good reason to commend the intentions of the legislative organ of the AU to sustainably manage soil for the reason that, as one of the natural assets of vital importance to biotic resources and people, soil is under increasing pressure to meet its multipurpose functions. Although commendable, these provisions are not exhaustive to guarantee SSM and soil security in Africa. Given the centrality of soil as the most vital and versatile resource on Earth and as the main capital in Africa, one would have thought that the AU and its Member States would give soil a special legal attention by way of a specific soil legal instrument that adequately and comprehensively address this important resource.

The Conventions also contain indirect provisions that support SSM and respond to soil security concerns which are relevant for combating climate change. In this respect, since the Convention and its subsequent revisions focus on the conservation of nature and natural resources, soil being the foundation and melting pot for all terrestrial natural resources, benefits indirectly from the protection offered by most of the provisions<sup>92</sup> of the Conventions. When soil is sustainably managed, it offers as-

sistance to combating climate change through its mitigation and adaptation functions.

Notwithstanding the strength of the Conventions as far as SSM and soil security are concerned, there is the absence of an enforcement mechanism to ensure effective compliance. In the absence of such a mechanism, the AU relies on the political will of Parties States to give effect to the Conventions. How to get Parties to give effect to the provisions and spirit of the Conventions especially as they relate to SSM and soil security is just another legal concern that may not be addressed in this short paper. In the absence of an enforcement mechanism for the Conventions, the relevant soil protection provisions become weak and insufficient. This as a matter of course does not enhance the role of soil in combating climate change.

The Bamako Convention, 1991<sup>93</sup> is another instrument of hard law character containing provisions that support SSM and soil security and in consequence, augur well for addressing climate change. Relevant provisions of the Convention for SSM and soil security are those relating to the ban and criminalisation of import of all hazardous wastes into Africa from non-Contracting State; and all measures that aimed at safeguarding human health and the environment when producing, transporting and disposing of hazardous wastes within the territories of Contracting States.<sup>94</sup> Other relevant provisions of the Bamako Convention that support SSM and soil security and in consequence, favours the fight against climate change include 5, 6, 9, 10 and 11 that all seek to prevent hazardous wastes from causing damage to the environment. Although the Bamako Convention does not specifically mention soil, all reference to the obligation to prevent and minimise the effects of hazardous wastes on human health and the environment implies the obligation to prevent and minimise harm to soil which happens to be the foundation for all terrestrial biotic resources. Thus, by seeking to prevent hazardous wastes from harming the environment, the relevant provisions of the Convention indirectly promote

<sup>92</sup> See in this respect Articles II, VI, X, XVI of the 1968 Convention.

<sup>93</sup> Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, 30 January 1991, 2101 UNTS 177.

<sup>94</sup> See generally, *ibid* Article 4.



soil security in Africa and in consequence, work favourable for combating climate change. In spite of the strength of the Bamako Convention regarding soil security concerns, it also suffers from the lack of an enforcement mechanism to ensure effective compliance. Hence, its insufficiency in promoting soil security in Africa does not augur well for combating climate change.

Another instrument of hard law character that contains relevant provisions that support SSM and soil security and thus, lends help to the fight against climate change is the Phyto-Sanitary Convention for Africa, 1967.<sup>95</sup> Articles II, III and IV encourage each Member State to take protection measures against all organisms, plants, seeds, soil, and other material the importation of which is considered by the AU to constitute a threat to agriculture in any part of Africa. Since soil is the backbone of agriculture, any of the above sources of threat to agriculture implies a corresponding threat to soil health. Thus, from the preventive perspective, all relevant protection measures of the Convention indirectly support soil security in Africa and therefore, usher well for the fight against climate change. Although the Convention records some strength regarding soil security, it regrettably, suffers the same fate as the other Conventions for want of an enforcement mechanism to ensure effective compliance and is therefore inadequate in promoting soil security in Africa. Such inadequacy does not enhance soil's role in contributing to the fight against climate change in Africa.

The above analysis reveals that some of the AU's legal instruments directly address soil security concerns and the need to sustainably manage soil for which one has reason to commend the intentions of the AU policy and legislative organs in promoting the achievement of soil security. Furthermore, although some of the relevant instruments do not specifically mention soil, this multipurpose resource constitutes the most important component of the terrestrial environment and reference to the protection of the environment and its appurtenant resources in such instruments can be interpreted to in-

clude the protection of soil. One may therefore remark that although soil security has received a certain level of policy and legal attention, such a level of attention is inadequate to effectively guarantee soil security with the effect that the potential that soil holds for combating climate change cannot be fully harnessed.

The attention given to soil security is inadequate for at least four reasons. The one is that some of the relevant instruments are of soft law character with the effect that they cannot coerce compliance and implementation at national levels. The second reason is that the instruments of hard law character lack enforcement mechanisms that can enhance their compliance. In effect, "good substantive soil governance provisions will keep being only ink on paper" if effective compliance and enforcement mechanisms are not properly established and effectively enforced, to use Ginzky's phrase.<sup>96</sup> The third reason is that some of the legal instruments do not make any reference to soil and for those instruments that make references to soil and the need for their sustainable management, such references are not comprehensive enough to guarantee soil security. In the absence of a comprehensive soil legal framework,<sup>97</sup> soil security is under looked in the continent. The fourth reason is that being an important versatile resource and one of humanity's most precious natural assets especially in Africa, soil security is addressed in a rather general and sketchy manner in a few soft law and hard law instruments that are not specifically designed to protect soil. Thus, despite all the policy and legal efforts by the AU to protect soil and promote its sustainable management, the policy and legal efforts are inadequate especially considering that there is no specific soil treaty in Africa. On this note, it may be safe to conclude that because the AU legal landscape underpinning soil security is inadequate, a weak legal support exists for leveraging on soil to combat climate change in Africa. This implies that the climate change mitigation and adapta-

<sup>95</sup> Phyto-Sanitary Convention for Africa, Kinshasa, 13 September 1967.

<sup>96</sup> Harald Ginzky, "Soil Governance: The Case of Implementation and Enforcement" (2022) 6 Soil Security 100040 4.

<sup>97</sup> A comprehensive soil legal framework here refers to one that clearly envisages all potential threats to soil health and clearly establishes and apportions visible responsibility for soil protection for all those whose activities have impacts on soil health.

tion potentials of soil are not valorised and harnessed and therefore remain largely untapped in the continent. This limits the continent's effort in tackling climate change and its impacts by leveraging on soil as an important natural climate change solution.

It may therefore be apt to opine that giving the versatility and sanctity of soil, the protection of such an important and multipurpose natural resource should not be merely inferred from the dotted and disjointed provisions of soft law and hard instruments addressing general environmental and natural resources or threats to the environment, but should be given special legal attention. Special legal attention here means that soil should be addressed in a specific African soil charter. The importance of a specific and comprehensive African soil charter is crucial for many reasons: it will lay down binding soil protection standards and establish a springboard for SSM and soil security. Such a lofty soil charter will also establish a monitoring, enforcement and follow up mechanism to ensure that the vision of the charter is achieved. A specific and comprehensive African soil charter will among other things, establish the centrality of soil and its sustainable management in combating climate change and its impacts through its mitigation and adaptation functions.

Furthermore, the AU does not seem to have an African soil data and information system that speaks of soil health, the socio-economic and environmental functions of soil and soil actual or potential degradation threats that can inform decision and policy making. Thus, in order to establish an African soil charter that adequately captures the versatility of soil especially regarding its climate change functions, there is need for quantified and qualitative scientific data and information that speak of soil health, soil functions and soil actual or potential degradation threats in Africa. Within the science-policy interface, a quantified and qualitative soil data and information is one that is scientifically verifiable, requiring data collection, analysis and validation, monitoring and reporting. Such a quantified and qualitative soil data is crucial for informing decision and policy making especially as it relates to environmental challenges such as climate change.

## Conclusion and Recommendations

A number of conclusions are drawn from the above analyses: Firstly, it is undisputedly clear that soil and climate change are closely linked. Soil is one of the natural carbon sinks and reservoirs the sustainable management of which is crucial for climate change mitigation. In terms of adaptation, soil when sustainably managed, contributes to enhancing the resilience of ecosystems, communities and people in the face of adverse climatic conditions. Despite the climate change mitigation and adaptation roles of soil, it is also a significant source of carbon emissions when unsustainably managed. Moreover, the multiple soil functions are being adversely and substantially affected by climate change. Secondly, some key concepts underpin SSM and soil security and works favourably for combating climate change. Thirdly, although the AU has in place a legal framework for soil governance, such a legal framework is inadequate to support SSM and guarantee soil security and therefore, cannot enhance the role of soil in combating climate change. Such inadequacy stems from a number of reasons that are well elucidated above. In consequence of the AU's inadequate legal framework for SSM and soil security, a weak legal support exists for leveraging on soil to combat climate change in Africa despite the huge climate change mitigation and adaptation potentials that soil has in the continent. This limits Africa's efforts in tackling climate change and its impacts using soil as an important natural solution. Thus, the potentials and centrality of soil in contributing to the fight against climate change is yet to be valorised, harnessed and tapped in Africa.

From the above conclusions establishing the inadequacy of the AU's legal framework for SSM and soil security and the consequential weak legal support for leveraging on soil to combat climate change in Africa, some recommendations are proffered. A key recommendation is that given the huge natural potentials that soil has for combating climate change, SSM is crucial and for this to take root in Africa, the AU must give soil a special legal attention by way of a specific and comprehensive African soil charter. Such a soil charter should not only en-

courage SSM, but must underscore the centrality of soil as a natural and cost-effective climate change solution by providing for important benchmarks in this respect. The proposed soil charter must include the following important considerations:

- The environmental opportunities especially the climate case for investing on SSM.
- The centrality of soil as a cost-effective nature-based climate change mitigation and adaptation solution.
- Promotion of education and awareness programmes on the soil and climate change nexus.
- Promotion of synergy between SSM practices and climate change mitigation and adaptation actions with very clear and precise objectives or targets by way of an annex.
- Establishment of African soil data and information system that speaks of soil types and health, actual and potential threats to soil and the socio-economic and environmental functions of soil especially its climate change functions, to be periodically updated. Such soil data and information must be one that is scientifically verifiable, requiring data collection, analysis, validation, reporting and monitoring in order to inform decision and policy making.

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