

*Mitigation for Net Zero?: Protecting Wetlands from Pollution and Degradation in Africa for Sustainability*

# **Mitigation for Net Zero?: Protecting Wetlands from Pollution and Degradation in Africa for Sustainability**

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**Kariuki Muigua**

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**Abstract**

*This paper critically discusses how wetlands in Africa can be protected from pollution and degradation among other human and environmental-induced threats. The paper notes that Africa is richly endowed with diverse wetlands including peatlands, mangroves, marshes, floodplains, rivers, lakes, and coral reefs. It argues that these wetlands play a key role in fostering Sustainable Development in Africa by providing vital ecosystems services including climate mitigation, food and water security, biodiversity conservation, coastal protection while also supporting the livelihoods of millions of people in the continent. Despite their key benefits for both humanity and nature, the paper argues that Africa's wetlands are facing mounting threats. It examines some of the major threats to Africa's wetlands. In light of these challenges, the paper suggests approaches towards protecting wetlands from pollution, degradation and other threats in Africa for sustainability.*

**1.0 Introduction**

According to the *Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)*<sup>1</sup>, wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which low tide does not exceed six metres. Further, a wetland has also been defined as a place in which the land is covered by water—salt, fresh, or somewhere in between—either seasonally or

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<sup>1</sup> Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), article 1 Available at

[https://www.ramsar.org/sites/default/files/documents/library/scan\\_certified\\_e.pdf](https://www.ramsar.org/sites/default/files/documents/library/scan_certified_e.pdf) (Accessed on 31/08/2025)

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permanently<sup>2</sup>. It has been argued that wetlands can be distinguished from other types of land or water bodies primarily by their vegetation which has adapted to wet soil<sup>3</sup>.

Wetlands occur where the water table is at or near the surface of the land, or where the land is covered by water<sup>4</sup>. Some of the most common types of wetlands include marine/coastal wetlands such as coastal lagoons, rocky shores, seagrass beds and coral reefs<sup>5</sup>; estuarine wetlands including deltas, tidal marshes and mudflats, and mangrove swamps<sup>6</sup>; lacustrine which are wetlands associated with lakes<sup>7</sup>; riverine which are wetlands found along rivers and streams<sup>8</sup>; and marshy wetlands such as swamps<sup>9</sup>. Further, fish ponds, rice paddies, depollution and stabilization ponds, and salt pans comprise some of the human-made/artificial wetlands<sup>10</sup>.

Wetlands are valuable ecosystems and provide crucial services for people and planet. According to the United Nations Environment Programme (UNEP), wetlands are the unsung heroes of the planet<sup>11</sup>. UNEP notes that healthy wetlands are critical for climate

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<sup>2</sup> What is a Wetland? And 8 other wetland facts., Available at <https://www.worldwildlife.org/stories/what-is-a-wetland-and-8-other-wetland-facts> (Accessed on 31/08/2025)

<sup>3</sup> Ibid

<sup>4</sup> Ramsar Information Paper No. 1., 'What are Wetlands' Available at <https://www.ramsar.org/sites/default/files/documents/library/info2007-01-e.pdf> (Accessed on 31/08/2025)

<sup>5</sup> Ramsar Convention Secretariat., 'An Introduction to the Ramsar Convention on Wetlands' Available at [https://www.ramsar.org/sites/default/files/documents/library/handbook1\\_5ed\\_introductiontoconvention\\_final\\_e.pdf](https://www.ramsar.org/sites/default/files/documents/library/handbook1_5ed_introductiontoconvention_final_e.pdf) (Accessed on 31/08/2025)

<sup>6</sup> Ibid

<sup>7</sup> Ibid

<sup>8</sup> Ibid

<sup>9</sup> Ibid

<sup>10</sup> United Nations Environment Programme., 'Wetlands and Biodiversity' is the theme for World Wetlands Day 2020' Available at <https://www.unep.org/news-and-stories/story/wetlands-and-biodiversity-theme-world-wetlands-day-2020#:~:text=According%20to%20The%20Ramsar%20Convention,metres.%E2%80%9D%20Fish%20ponds%2C%20rice> (Accessed on 31/08/2025)

<sup>11</sup> United Nations Environment Programme., 'Wetlands: the unsung heroes of the planet' Available at <https://www.unep.org/news-and-stories/story/wetlands-unsung-heroes-planet> (Accessed on 31/08/2025)

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mitigation and adaptation, biodiversity conservation, and human health and well-being<sup>12</sup>. It has been argued that wetlands are vital for humans, nature, ecosystems and for our climate, providing essential ecosystem services such as water regulation, flood control, water purification, climate mitigation and pollution control<sup>13</sup>. For example, a huge share of the world's biodiversity is found in wetlands – from inland lakes, swamps and river floodplains to coastal mangroves, coral reefs, tidal mudflats and salt marshes<sup>14</sup>. In addition, wetlands are also vital in supporting human health and well-being by reducing the impact of flooding and purifying polluted water<sup>15</sup>. Wetlands are also key in strengthening climate action. It has been argued that wetlands store more carbon than any other ecosystem, with peatlands alone storing twice as much carbon as all the world's forests<sup>16</sup>. Wetlands such as peatlands, mangrove forests, salt marshes and seagrass beds store nearly 20 per cent of the organic ecosystem carbon on the planet, even though they cover only 1 per cent of the Earth's surface making them an indispensable asset in the global fight against climate change<sup>17</sup>.

Wetlands therefore deliver multiple ecosystem services for both people and planet including carbon sequestration, biodiversity conservation, water purification, flood mitigation while also strengthening water and food security and climate

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<sup>12</sup> Ibid

<sup>13</sup> United Nations Environment Programme., 'Wetlands and Biodiversity' is the theme for World Wetlands Day 2020' Available at <https://www.unep.org/news-and-stories/story/wetlands-and-biodiversity-theme-world-wetlands-day-2020#:~:text=According%20to%20The%20Ramsar%20Convention,metres.%E2%80%9D%20Fish%20ponds%2C%20rice> (Accessed on 31/08/2025)

<sup>14</sup> Wetlands International., 'Biodiversity' Available at <https://www.wetlands.org/biodiversity/> (Accessed on 31/08/2025)

<sup>15</sup> United Nations Environment Programme., 'Drive to protect world's wetlands gains momentum' Available at <https://www.unep.org/news-and-stories/story/drive-protect-worlds-wetlands-gains-momentum#:~:text=Vegetated%20wetlands%2C%20such%20as%20swamps,insects%20to%20ducks%20to%20moose>. (Accessed on 31/08/2025)

<sup>16</sup> United Nations Environment Programme., 'Wetlands: the unsung heroes of the planet' Op Cit

<sup>17</sup> World Economic Forum., 'Wetlands, the forgotten carbon sink that can help mitigate impact of climate change' Available at <https://www.weforum.org/stories/2023/12/wetlands-carbon-sink-climate-change-mitigation/> (Accessed on 31/08/2025)

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resilience<sup>18</sup>. Despite their key benefits for people and planet, wetlands are some of the most endangered ecosystems globally. It has been observed that the world has lost most of its wetlands with many others being polluted or degraded as a result of climate change, pollution and unsustainable human development<sup>19</sup>. It is estimated that wetlands are disappearing three times faster than forests posing a threat to human beings and plant and animal species who rely on them for their survival<sup>20</sup>. Protecting the world's wetlands is therefore key in fostering sustainability.

This paper critically discusses how wetlands in Africa can be protected from pollution and degradation among other human and environmental-induced threats. The paper notes that Africa is richly endowed with diverse wetlands including peatlands, mangroves, marshes, floodplains, rivers, lakes, and coral reefs. It argues that these wetlands play a key role in fostering Sustainable Development in Africa by providing vital ecosystems services including climate mitigation, food and water security, biodiversity conservation, coastal protection while also supporting the livelihoods of millions of people in the continent. Despite their key benefits for both humanity and nature, the paper argues that Africa's wetlands are facing mounting threats. It examines some of the major threats to Africa's wetlands. In light of these challenges, the paper suggests approaches towards protecting wetlands from pollution, degradation and other threats in Africa for sustainability.

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<sup>18</sup> Global Wetland Watch: mapping and monitoring changes to wetland ecosystems., Available at <https://unepdhi.org/global-wetland-watch-mapping-and-monitoring-changes-to-wetland-ecosystems/#:~:text=to%20wetland%20ecosystems%20%2D-Global%20Wetland%20Watch:%20mapping%20and%20monitoring%20changes%20to%20wetland%20ecosystems,desired%20outcomes%20of%20the%20project> (Accessed on 31/08/2025)

<sup>19</sup> United Nations Environment Programme., 'Drive to protect world's wetlands gains momentum' Op Cit

<sup>20</sup> United Nations Environment Programme., 'Wetlands: the unsung heroes of the planet' Op Cit

## 2.0 Examining the Status of Wetlands in Africa

Africa has many important wetlands, ranging from major river estuaries and deltas along its coasts, and extensive freshwater wetlands in areas of impeded drainage inland<sup>21</sup>. Africa's rich and diverse wetlands include peatlands, mangroves, marshes, floodplains, rivers, lakes, and coral reefs<sup>22</sup>. It is estimated that wetland ecosystems in Africa cover over 131 million hectares<sup>23</sup>. Wetlands are distributed all over Africa. They include wetlands of the four major riverine systems in Africa (Nile, Zambezi, Niger, and Congo)<sup>24</sup>; wetlands of the Rift valley lakes (including Victoria, Tanganyika, Nyasa/Malawi, Turkana and Albert)<sup>25</sup>; the Sudd in southern Sudan and Ethiopia<sup>26</sup>; and the Okavango Delta in Botswana<sup>27</sup>. In addition, Africa also boasts of rich marine/coastal wetlands including salt marshes, seagrass beds, and mangrove forests along the Indian Ocean and Atlantic Ocean<sup>28</sup>.

Africa's rich and diverse wetlands provide numerous benefits for both people and planet. It has been argued that Africa's inland and coastal wetlands support a great diversity of plants and animals, and their health and productivity is essential to the survival of a significant part of the continent's rural population<sup>29</sup>. Africa's wetlands provide numerous ecosystem services that contribute to human well-being including food security, water

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<sup>21</sup> Africa World Heritage Sites., 'Wetlands' Available at <https://www.africanworldheritagesites.org/natural-places/wetlands.html> (Accessed on 01/09/2025)

<sup>22</sup> Wetlands International., 'What are Wetlands' Available at <https://africa.wetlands.org/en/wetlands/what-are-wetlands/> (Accessed on 01/09/2025)

<sup>23</sup> Ibid

<sup>24</sup> Kabii. T., 'An Overview of African Wetlands' Available at [https://eastafricaschoolserver.org/content/\\_public/Environment/Natural%20Habitat/African%20Wetlands.pdf](https://eastafricaschoolserver.org/content/_public/Environment/Natural%20Habitat/African%20Wetlands.pdf) (Accessed on 01/09/2025)

<sup>25</sup> Ibid

<sup>26</sup> Ibid

<sup>27</sup> Ibid

<sup>28</sup> United Nations Environment Programme., 'Reviving wetlands in the Western Indian Ocean: Efforts and Progress' Available at <https://www.unep.org/gef/news-and-stories/blogpost/reviving-wetlands-western-indian-ocean-efforts-and-progress#:~:text=From%20Chake%20Chake%2C%20Pemba%2C%20where,through%20constructed%20wetland%20technology%2C%20UNEP> (Accessed on 01/09/2025)

<sup>29</sup> Kabii. T., 'An Overview of African Wetlands' Op Cit

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supply and purification, climate mitigation, flood regulation, coastal protection, feeding and nesting sites, recreational opportunities and tourism<sup>30</sup>. It has been argued that healthy wetlands in Africa are central to solving the interconnected climate, biodiversity, and water crises<sup>31</sup>.

Wetlands in Africa are therefore key ecosystems which provide numerous benefits in the quest towards Sustainable Development. They serve as biodiversity hotspots, act as water sources and purifiers, serve as natural carbon reservoirs and contribute to shoreline protection while also supporting livelihoods in key sectors such as agriculture and fisheries<sup>32</sup>. For example, the peat swamp forest of the Congo Basin stores around 29 billion tons of carbon which is approximately equivalent to three years' worth of global greenhouse gas emissions, while the Congo Basin as a whole absorbs nearly 1.5 billion tons of carbon dioxide a year making it one of the most important carbon sinks globally<sup>33</sup>. In addition, Africa's coastal/marine wetlands including salt marshes, seagrass beds, and mangrove forests are unique habitats and serve as breeding and feeding grounds for numerous species including fish, turtles, sea cucumbers and corals<sup>34</sup>. Coastal wetlands also provide significant economic and cultural value and support key sectors including fishing and tourism while also offering coastal protection against sea-level rise, flooding and storm surges<sup>35</sup>. Africa's freshwater lakes, rivers and deltas are an important source

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<sup>30</sup> Wetlands International., 'What are Wetlands' Op Cit

<sup>31</sup> Wetlands International., 'What are Wetlands?' Available at <https://eastafrika.wetlands.org/> (Accessed on 01/09/2025)

<sup>32</sup> The Best African Wetlands, Lakes & Estuaries to Visit., Available at <https://www.africanbudgetsafaris.com/blog/the-best-african-wetlands-lakes-estuaries/> (Accessed on 01/09/2025)

<sup>33</sup> United Nations Environment Programme., 'Critical ecosystems: Congo Basin peatlands' Available at <https://www.unep.org/news-and-stories/story/critical-ecosystems-congo-basin-peatlands> (Accessed 01/09/2025)

<sup>34</sup> United Nations Environment Programme., 'Reviving wetlands in the Western Indian Ocean: Efforts and Progress' Op Cit

<sup>35</sup> Ibid

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of food and drinking water, support biodiversity, while also playing an essential role in key economic sectors including agriculture, fisheries, transport and energy<sup>36</sup>.

Africa's wetlands are thus crucial ecosystems which support biodiversity, climate action, human health and livelihoods. However, it has been observed that African wetlands are fragile ecosystems under serious threat and there are many pressures impacting their health and long-term survival<sup>37</sup>. For instance, growing human population, agricultural expansion, economic activities including the construction of hydroelectric dams along rivers and deltas, and deforestation are among the major threats to wetlands in Africa<sup>38</sup>. Further, it has been observed that peatlands in Africa are at risk of collapse due to climate change, nature and biodiversity loss, and pollution and waste while also being drained to support agriculture<sup>39</sup>. It has been argued that when disturbed or drained, peatlands can become significant sources of greenhouse gas emissions therefore worsening the climate crisis<sup>40</sup>. Coastal/marine wetlands in Africa including mangrove forests, salt marshes and seagrass beds are also being degraded due to human activities including pollution, agricultural expansion and deforestation of mangrove<sup>41</sup>s. Adverse climatic and weather events such as sea-level rise and cyclones are also a major threat to these vital wetlands<sup>42</sup>. It has been argued that human activities are causing damage and degradation of Africa's wetlands leading to water scarcity, biodiversity loss, disruption of wildlife breeding grounds, and loss of critical ecosystem services including food, water, and climate mitigation benefits<sup>43</sup>.

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<sup>36</sup> Wetlands International., 'What are Wetlands?' Op Cit

<sup>37</sup> Denny. P., 'Wetland of Africa: An Introduction' Available at [https://link.springer.com/chapter/10.1007/978-94-015-8212-4\\_1](https://link.springer.com/chapter/10.1007/978-94-015-8212-4_1) (Accessed on 01/09/2025)

<sup>38</sup> Wetlands International., 'What are Wetlands?' Op Cit

<sup>39</sup> United Nations Environment Programme., 'Critical ecosystems: Congo Basin peatlands' Op Cit

<sup>40</sup> Wetlands International., 'What are Wetlands?' Op Cit

<sup>41</sup> United Nations Environment Programme., 'Reviving wetlands in the Western Indian Ocean: Efforts and Progress' Op Cit

<sup>42</sup> Ibid

<sup>43</sup> Mureithi. S., 'Wetlands in Africa' Available at <https://storymaps.arcgis.com/stories/179b28e40d1d461c8d7d26981e9e9640> (Accessed on 01/09/2025)

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In light of the foregoing challenges, it is important to protect wetlands in Africa from pollution, degradation and other threats for sustainability.

### **3.0 Protecting Wetlands in Africa for Sustainability**

It is imperative to protect wetlands in Africa. These vital ecosystems provide habitats for biodiversity including endangered species, strengthen climate action by acting as carbon sinks, sustain livelihoods through agriculture and fisheries, while also protecting human and ecosystem health<sup>44</sup>. However, Africa's wetlands are facing mounting challenges including pollution, degradation, agricultural expansion, deforestation and adverse climatic events<sup>45</sup>. Consequently, protecting wetlands in Africa is key in ensuring that they continue to provide vital ecosystem services including food security, water supply and purification, climate mitigation, flood regulation, coastal protection, biodiversity conservation, recreational opportunities and tourism<sup>46</sup>.

Several strategies can be adopted towards effectively protecting wetlands in Africa. For instance, it has been argued that there is need to limit human encroachment into wetlands in order to allow natural processes to take place without interruption<sup>47</sup>. Human activities including water and nutrient pollution, drainage of wetlands, unsustainable development activities, over-grazing, mining, deforestation, and agricultural expansion into wetlands are threatening the health and vitality of wetlands in Africa and all over the world<sup>48</sup>. Curbing these activities and limiting human encroachment into wetlands is therefore towards sustainability. States have been urged to enact, implement and enforce laws and policies towards tackling human impacts on wetlands including pollution, drainage for agricultural activities and resource extraction<sup>49</sup>. In addition, it has been

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<sup>44</sup> Wetlands International., 'What are Wetlands?' Op Cit

<sup>45</sup> Ibid

<sup>46</sup> Ibid

<sup>47</sup> Mureithi. S., 'Wetlands in Africa' Op Cit

<sup>48</sup> Ibid

<sup>49</sup> United Nations Environment Programme., 'Critical ecosystems: Congo Basin peatlands' Op Cit

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suggested that establishing more wetland protected areas can enhance the conservation and protection of wetlands in Africa for sustainability<sup>50</sup>.

It is also vital to restore damaged and degraded wetlands in Africa. The world has lost most of its wetlands with the remaining continuing to be threatened by human activities<sup>51</sup>. Restoring lost and degraded wetlands therefore presents a valuable and cost-effective opportunity for society to recover and enhance the benefits of wetlands for ecosystem and human health and well-being<sup>52</sup>. It has been argued that restoration and revegetation of wetlands is vital for creating resilient ecosystems better able to respond to a changing climate without dramatic loss of biodiversity or ecosystem function<sup>53</sup>. Restoring wetlands is a key global agenda envisioned under both the *Ramsar Convention*<sup>54</sup> and the *United Nations Decade on Ecosystem Restoration*<sup>55</sup>. It is therefore imperative to restore wetlands including through removing disturbances, planting native species, re-establishing the tidal flow of water-degraded sites, reforestation of mangroves and putting in place effective monitoring systems to measure the progress of restoration efforts<sup>56</sup>.

Further, there is need to embrace and utilise indigenous knowledge towards protecting wetlands in Africa for sustainability<sup>57</sup>. It has been argued that traditional knowledge

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<sup>50</sup> Ibid

<sup>51</sup> Ramsar Convention Secretariat., 'Wetlands restoration: unlocking the untapped potential of the Earth's most valuable ecosystem' Available at [https://www.ramsar.org/sites/default/files/documents/library/factsheet\\_wetland\\_restoration\\_general\\_e\\_0.pdf](https://www.ramsar.org/sites/default/files/documents/library/factsheet_wetland_restoration_general_e_0.pdf) (Accessed on 01/09/2025)

<sup>52</sup> Ibid

<sup>53</sup> Zivec. P., Sheldon. F., & Capon. S., 'Natural Regeneration of Wetlands under Climate Change.' *Frontiers in Environmental Science.*, Volume 11 (2023)

<sup>54</sup> Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)

<sup>55</sup> United Nations Decade on Ecosystem Restoration., Available at <https://www.decadeonrestoration.org/> (Accessed on 01/09/2025)

<sup>56</sup> Ramsar Convention Secretariat., 'Wetlands restoration: unlocking the untapped potential of the Earth's most valuable ecosystem' Op Cit

<sup>57</sup> Ibid

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particularly that of indigenous peoples and communities, plays a fundamental role in wetland conservation efforts globally<sup>58</sup>. This knowledge serves as a crucial foundation for natural resource management, reflecting centuries of custodial responsibility of land and natural resources including wetlands<sup>59</sup>. It has been argued that in Africa, indigenous knowledge has played a key role in protecting wetlands through practices such as agro-pastoralism, traditional hunting and fishing techniques, and sustainable use and conservation of biodiversity in wetlands<sup>60</sup>. It is therefore necessary to utilise indigenous knowledge and embrace the participation of indigenous peoples and local communities towards effectively protecting wetlands in Africa.

### **4.0 Conclusion**

Africa's wetlands are invaluable ecosystems which provide numerous benefits for people and planet. However, wetlands in Africa are facing mounting threats due to pollution and degradation among other human and environmental impacts. It is therefore imperative to protect wetlands in Africa by limiting human encroachment, restoring damaged and degraded wetlands, and utilising indigenous knowledge for sound conservation of wetlands<sup>61</sup>. Protecting wetlands from pollution and degradation in Africa is therefore possible towards sustainability.

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<sup>58</sup> Barman. A., Rajak. F., & Jha. R., 'Integrating Traditional Knowledge Systems for Wetland Conservation and Management: A Critical Analysis' Available at [https://neptjournal.com/upload-images/\(17\)B-4212.pdf](https://neptjournal.com/upload-images/(17)B-4212.pdf) (Accessed on 01/09/2025)

<sup>59</sup> Ibid

<sup>60</sup> The Largest wetlands in Africa, Sudd., Available at <https://schoolfor.africa/environment/the-largest-wetlands-in-africa-sudd/> (Accessed on 01/09/2025)

<sup>61</sup> Mureithi. S., 'Wetlands in Africa' Op Cit



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